Infraestructura tecnològica

de veu, dades i seguretat

Hospital BCN-UOC

Índex

1. Descripció i objectiu del projecte.

El projecte tracta de dotar a l'Hospital fictici BCN-UOC d'una infraestructura informàtica que permeti compartir les dades dels pacients, ja siguin les emmagatzemades com la història clínica, dades personals, proves realitzades, etc..., com les que es poden consultar a temps real, com les constants vitals del pacient, medicació actual i restant, etc...
Per una banda s'estructurarà una doble xarxa IP standard cablejada, una per donar cabuda a les connexions dels ordinadors i dels sensors que mesuraran l'estat de cada pacient. Formarà part d'aquesta xarxa la connexió inalàmbrica que estarà disponible a tot el centre. L'altra xarxa es dedicarà a la vídeo vigilància IP, degut a l'alta demanda d'ample de banda d'aquest servei.

Ens basarem en un hospital petit, de 4 plantes, amb 20 habitacions per planta i dos llits per habitació. La planta baixa és més gran que la resta i està compartida per les habitacions i el departament d'administració.
Comptem amb 4 ambulàncies, les quals han d'estar connectades amb la intranet de l'hospital fins i tot quan estiguin fent un servei, els que es farà mitjançant connexions 3G i dispositius mòbils (tablets).
Els professionals podran consultar tota la informació des de fora de l'hospital, només amb una connexió a internet disponible, així com passar consulta amb dispositius mòbils. També disposaran d'un lloc de treball fix al seu despatx per comoditat.
A totes les habitacions, hi haurà aparells de control mèdic (pressió arterial, cardíac, etc...) connectats a la xarxa cablejada de l'hospital. També hi haurà disponible pels pacients que ho necessitin les versions inalàmbriques d'aquests sensors, que es connectaran mitjançant la xarxa wifi del centre.
Evidentment, el centre tindrà una connexió redundant a Internet, per poder gestionar i actualitzar tota la informació. S'instal·larà un firewall amb gestió de continguts i control d'ample de banda i Quality of Service. Així com els switch de cada planta hauran de ser inteligents i gestionats.

La xarxa de video-vigilància IP estarà separada de la xarxa abans descrita, ja que es pretén fer una gravació constant, disparada per moviment, de totes les càmeres disponibles, les quals estaran situades als accessos al centre i en algun punt sensible addicional. Per dur a terme aquesta gravació es compta amb un dispositiu d'emmagatzemament massiu al centre. Això no impedeix que es puguin consultar les gravacions des de fora del centre, mitjançant internet. Les gravacions es guardaran un màxim d'un mes, i després s'esborraran.

<u>Objectius del projecte</u>

L'objectiu del projecte és dotar al centre mèdic d'immediatesa en la consulta d'informació, així com de facilitat d'accés a la mateixa sense renunciar a la seguretat.
La informació ha d'estar disponible en tot moment i els professionals han de poder accedir-hi independentment d'on es trobin, tant la informació emmagatzemada com la generada en temps real.

2. Infraestructura.

2.1 Comuna.

2.1.1 Armari rack.

Per tal de centralitzar tota l'electrònica de xarxa, els servidors i l'emmagatzemament, a fi de mantenir tots aquests elements en un espai controlat físicament, amb un entorn tancat amb clau o altres mesures de seguretat i controlat també en l'aspecte ambiental, amb refrigeració activa i alarmes de fum i humitat.

Aquest armari rack ens proporciona suficient lloc per encabir tots els aparells que proposem i poder afegir més en un futur, ja que és de 42U (per exemple, els commutadors ocupen 1U).

HP Rack 10842 G2 AF041A

http://h18004.www1.hp.com/products/servers/proliantstorage/racks/10000series-g2/index.html

Seguretat física

Un tema important del lloc triat per instal·lar l'armari rack, és que ha d'estar protegit de possibles intrusions de gent aliena a la gestió de la infraestructura. Una primera aproximació seria un tancament amb clau, però això no comporta un nivell de seguretat acceptable, ni registre de possibles intents d'entrada. Es recomana un dispositiu d'empremta dactilar que permet mantenir un registre de les persones que hi accedeixen, juntament amb una video-vigilància que s'activés quan la porta s'obrís. Si això no és possible, es pot instal·lar un pany amb obertura per codi.

http://www.kimaldi.com/productos/sistemas_biometricos/control_de_accesos_biometrico/terminal_biometrico_de_huella_dactilar_suprema_bioentry_plus

Seguretat ambiental

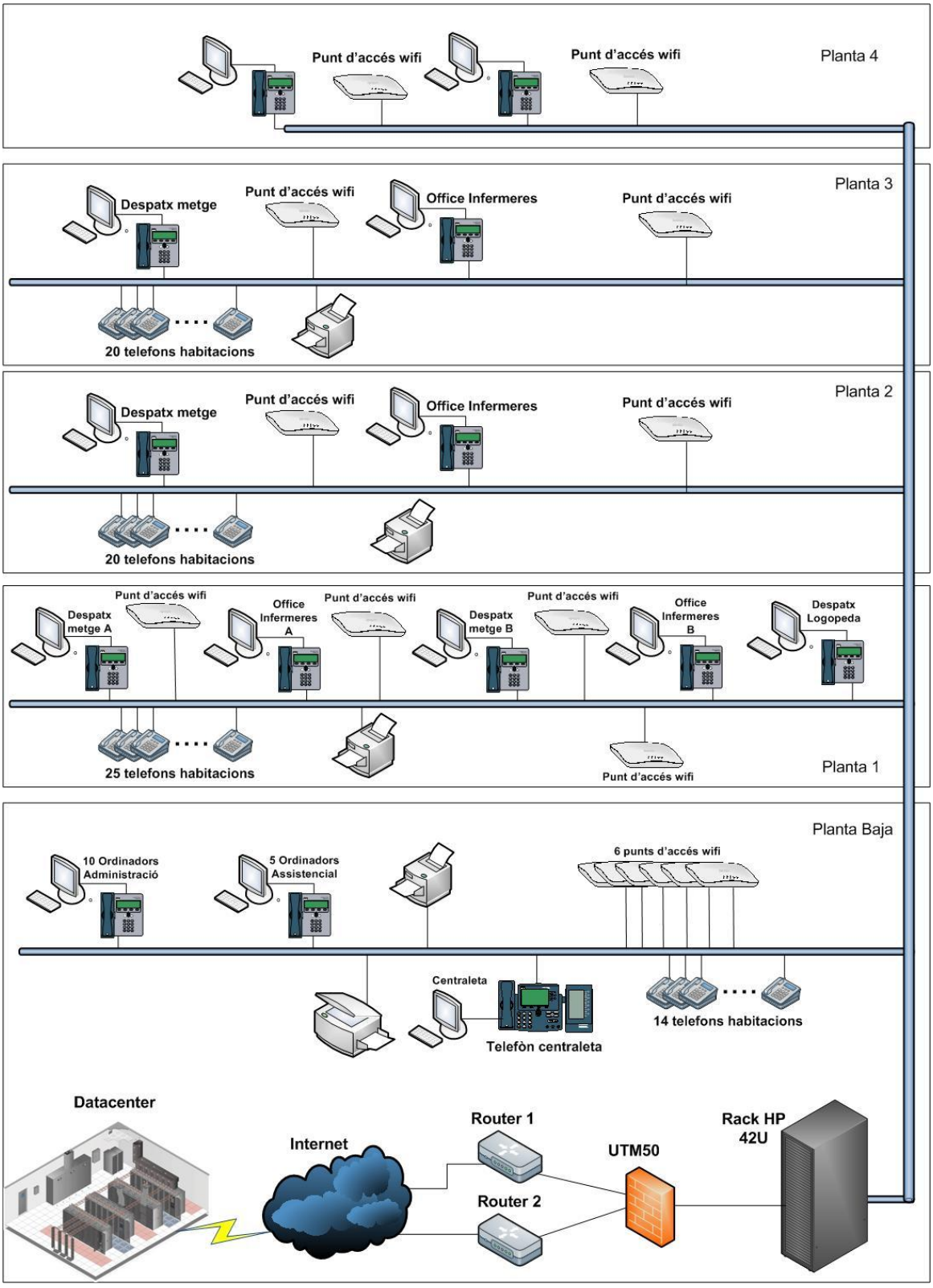
L'entorn del rack ha d'estar constantment controlat per prevenir possibles desastres. A banda d'estar refrigerat activament, és a dir, no seria vàlid un extractor d'aire, s'ha d'instal·lar un aire condicionat dedicat exclusivament a aquest entorn. També hi ha d'haver sensors de fum, temperatura i humitat. Aquests hauran d'estar connectats i enviar alarmes al responsable de la instal·lació.

http://www.apc.com/products/family/index.cfm?id=400

2.1.2 Estructura de xarxa. Topologia.

La xarxa del centre s'estructurarà en tres blocs: xarxa de dades i veu, xarxa de video-vigilància i xarxa inalàmbrica.

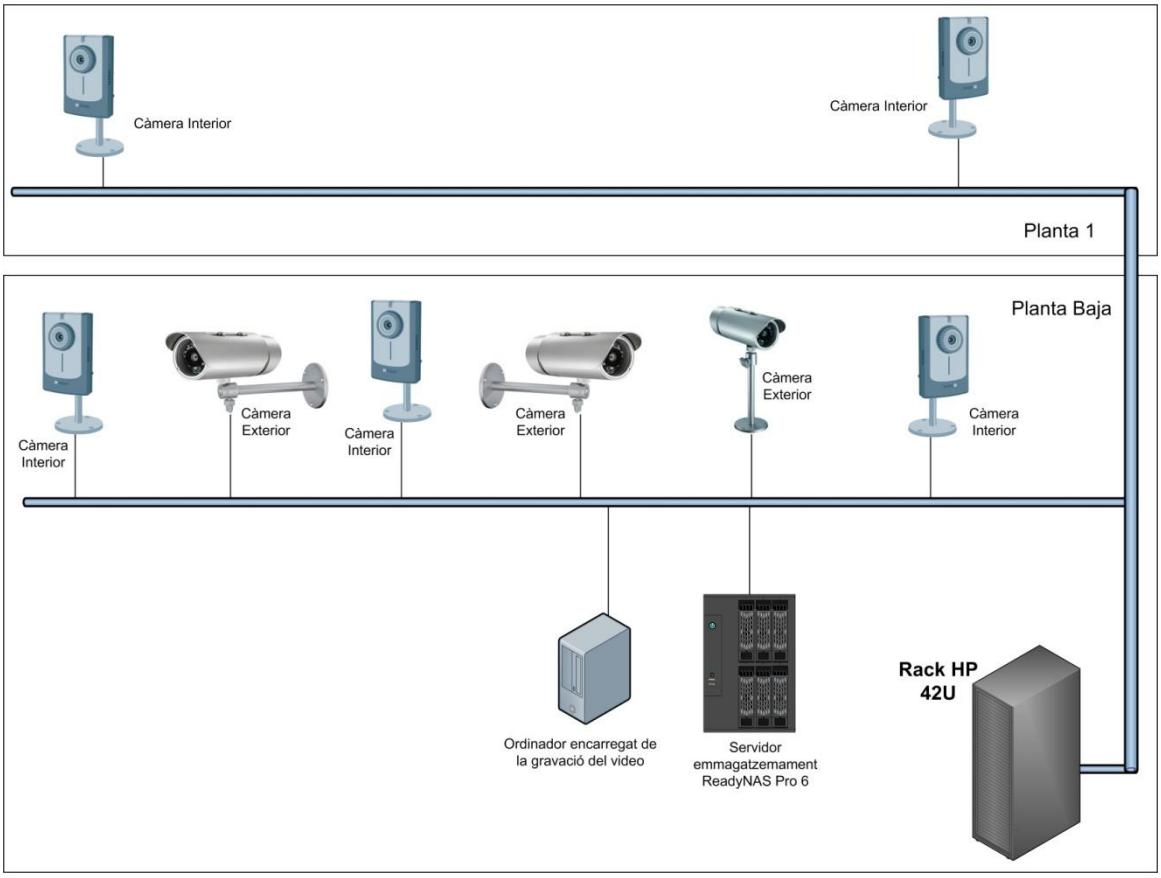
Topologia de la xarxa de veu i dades.



La xarxa de dades i veu tindrà una estructura en estrella, centralitzada físicament i lògica a l'armari rack disponible, mitjançant els commutadors que comentarem. Aquesta és la xarxa principal.

La xarxa inalàmbrica, que lògicament formarà part de la xarxa de dades i de veu, físicament es tractarà d'una sèrie de punts d'accés que donaran servei i cobertura a gran part del centre, ja que s'ha decidit no donar cobertura al cent per cent del centre per un tema de costos. Aquests punts d'accés si que estaran connectats per cable al concentrador instal·lat al rack. La gestió d'aquests punts d'accés es durà a terme de manera centralitzada amb un controlador inalàmbric.

Topologia de la xarxa de vídeo vigilància.



La xarxa de video-vigilància serà una xarxa físicament separada de la de dades i veu, degut a la gran demanda d'ample de banda d'aquest tipus de dispositius, però també estarà centralitzada a l'armari rack.

2.1.3 Electrònica de xarxa.

Commutadors

La quantitat de punts fixes cablejats puja entre 31 llocs, a això li hem de sumar els punts per connectar els punts d'accés inalàmbric que són 16 més. Amb aquesta ocupació de 47 ports, amb un commutador de 48 ports estem al límit i no podríem ampliar en un futur, per tant ens decantem per instal·lar un commutador de 48 ports i un de 24 ports.

Els dos commutadors que hem escollit, són apilables (stacking), el que ens permet connectar-los entre si sense perdre ports útils, i gestionar tots dos com si fossin un sol commutador de 72 ports. Aquests commutadors tenen ports addicionals amb més velocitat per poder-hi connectar dispositius que necessiten un ample de banda més gran com podria ser un servidor o un dispositiu d'emmagatzematge, al qual poden accedir diferents usuaris, podent-se agregar l'ample de banda de cada usuari en el seu accés simultani, pel que aquests ports ens permeten absorbir aquesta demanda puntual sense col·lapsar-se.

La velocitat dels punts serà de 1Gbps, compartit en alguns casos amb el telèfon IP, la necessitat d'ample de banda del qual no és gaire alta. Els càlculs estan explicitats en l'annex 1.

S'instal·laran commutadors que disposaran de la tecnologia Power over Ethernet (PoE) que ens permeten alimentar tant els punts d'accés inalàmbrics com els telèfons IP que compartiran port amb el punt de dades.

Aquesta compartició de port dels ordinadors amb els telèfons ens permetrà efectuar un gran estalvi en el cablejat, ja que en aquest cas el nombre de cables es redueix a la meitat, reduint per tant també els costos a la meitat.

http://www.netgear.com/service-provider/products/switches/fully-managed-switches/GSM7252PS.aspx#two

http://www.netgear.com/service-provider/products/switches/fully-managed-switches/GSM7228PS.aspx#one

Pel que fa a la telefonia IP de les habitacions, instal·larem 1 telèfon per habitació, el que fa un total de 79 punts telefònics bàsics. Aquests punts no generen tant de trànsit, i per tant podem optar per commutadors més senzills, en aquest cas dos commutadors de 100 Mbps de 48 ports, evidentment també amb la tecnologia PoE per poder alimentar els telèfons i estalviar-nos cables elèctrics.
Per tant, disposarem de 96 ports, el que ens dóna un marge de seguretat per si hem d'instal·lar algun telèfon més.

http://www.netgear.com/business/products/switches/smart-switches/smart-switches/fs752tp.aspx

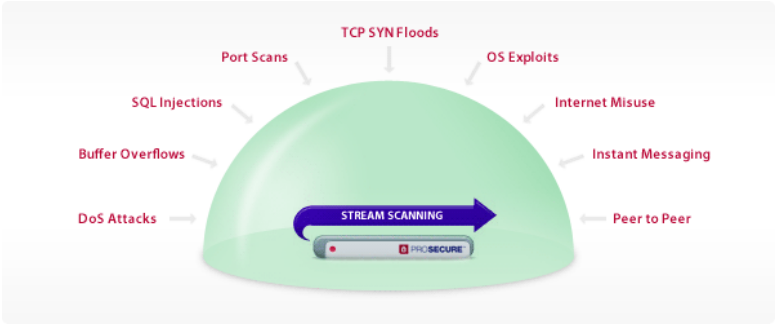
2.1.4 Firewall i balancejador de càrrega.

En el tema de seguretat en la xarxa s'ha optat per un dispositiu UTM, concretament el UTM50 de la marca Netgear.

Aquest dispositiu ens ofereix en el mateix espai de 1U, un firewall amb gestió de continguts i anàlisi antivirus del tràfic, tant de navegació com de correu, un balancejador de càrrega per poder tenir una connexió a internet d'emergència, i accés remot d'usuaris, podent establir xarxes privades virtuals (VPN) des de fora del centre, mitjançant SSL, només requerint un navegador estàndard.

http://www.prosecure.netgear.com/products/prosecure-utm-series/models.php

Firewall
Ens permet securitzar la xarxa interna, evitant intrusions i atacs externs a la xarxa del centre.
També ens facilita desplegar unes polítiques de seguretat definint que poden fer i on poden accedir els usuaris interns de la xarxa.



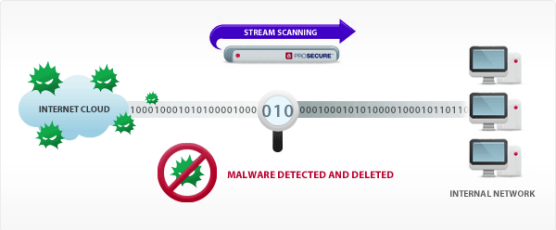
http://www.prosecure.netgear.com/technology/network-security.php

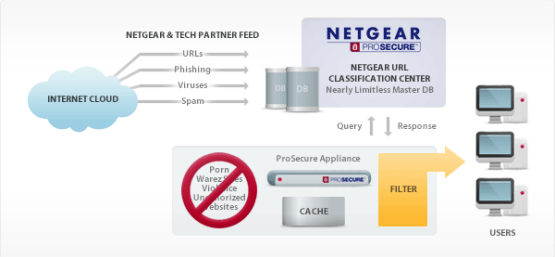
Seguretat web i correu

El gestor de continguts permet denegar l'accés a les pàgines web que nosaltres decidim i addicionalment, decidir si les webs que no tenim controlades són segures d'accedir mitjançant un sistema de reputació al núvol.

El sistema també escaneja el correu que passa a través, identificant el correu brossa (spam) i aturant-lo.

http://www.prosecure.netgear.com/technology/web-security.php
http://www.prosecure.netgear.com/technology/email-security.php





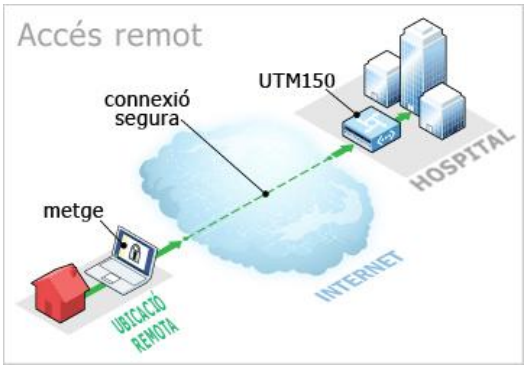
Balancejador de càrrega

L'aparell ens proporciona dos ports per connectar a internet, pel que podem disposar d'una connexió redundant i utilitzar-la de dues maneres, o fem que una sigui inactiva per defecte i només entri en funcionament quan la principal falla (failover), o fem que les dues estiguin actives a l'hora i repartim la càrrega entre les dues connexions (load balancing).

Es pot canviar de l'una a l'altra sense problema, pel que ja es decidirà quina de les dues implementem.

Accés remot

En el cas que algun usuari necessités accedir a la xarxa interna del centre, el sistema ofereix un portal per on es pot fer login des de qualsevol navegador modern i tenir accés segur a la xarxa interna, podent treballar com si fos al centre.



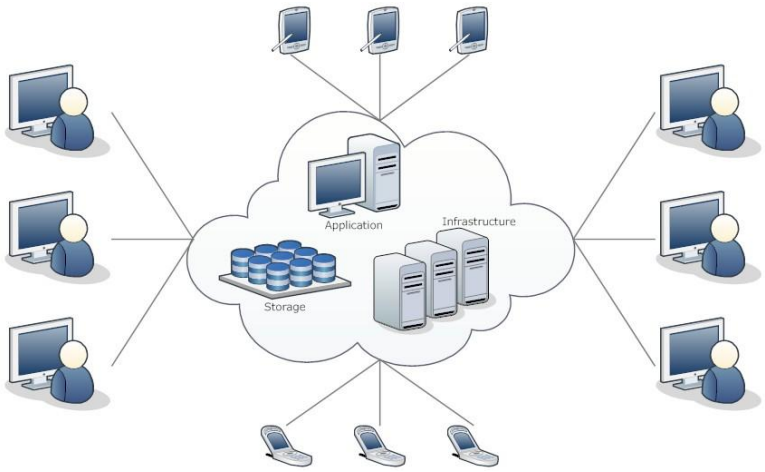
2.1.5 Centraleta IP.

Les comunicacions del centre es contractaran amb un proveïdor de telefonia IP, que permetrà un estalvi de costos important. La centraleta serà gestionada per una empresa externa ja que tenim uns requeriments elevats.
Aquesta centraleta té totes les funcionalitats clàssiques i també correu vocal.

http://www.cisco.com/web/ES/solutions/smb/products/voice_conferencing/uc_manager_business_edition_3000/index.html

2.1.6 Datacenter.

L'elecció del datacenter és crucial, ja que suportarà la majoria de la infraestructura software del centre. Ens ha de proporcionar una continuïtat de servei el més alta possible i un accés a recursos addicionals si són necessaris puntualment.



http://www.arsys.es/cloud-hosting/cloudbuilder-resumen.html

Hem contactat amb ARSYS i el seu producte Cloudbuilder contempla tots els nostres requeriments tant en temes de rendiment com de seguretat i privacitat. Apart en qualsevol moment es poden ampliar els serveis automàticament si el sistema detecta que es queda sense recursos, el que ens garanteix un uptime o temps sense caigudes del servidor molt alt.
El fet d'estar al núvol ens permet que els nostre recursos estiguin disponibles des de qualsevol lloc només amb una connexió a Internet, mitjançant les degudes credencials de seguretat.

2.2 Connectivitat.

2.2.1 Cablejat dades i VoIP.

Com que el centre no és gaire gran, podem fer tirades de cable de com a màxim 90 metres entre el patch panel del rack i la connexió de paret del dispositiu, això ens deixa 10 metres de marge entre el dispositiu i la roseta de paret i també pel cablejat del rack.
Per tant podem centralitzar tot el cablejat al rack previst.
S'utilitzarà cable UTP categoria 6a, si pel cost no fos possible, es pot utilitzar categoria 6.

Cost cablejat 6a: 1,3 €/m
Cost cablejat 6: 0,6 €/m

2.2.2 Cablejat video-vigilància.

Per la mateixa raó, podem centralitzar aquesta xarxa paral·lela al rack i per opcions de futur com hem comentat abans, es recomana instal·lar cablejat categoria 6a.

2.2.3 Xarxa Inalàmbrica.

El desplegament de la xarxa wifi s'ha proposat després de fer un estudi amb el software Aerohive HiveManager Online Planner. El resultat s'inclou com a annex 2.

Partint d'aquesta base, es necessiten 16 punts d'accés, cablejats amb cable cat 6a fins al rack, d'on s'alimentaran via PoE des del commutador citat anteriorment.

El punt d'accés escollit és el Netgear WNDAP660 amb ràdio de banda dual (2,4 GHz i 5 GHz) i 3x3 canals d'emissió/recepció amb un rendiment màxim teòric de 450 Mbps. En principi s'utilitzarà només la banda de 2,4 GHz ja que és la més establerta aquí, deixant la banda de 5 GHz que té pitjor cobertura, per possibles ampliacions o per solucionar algun problema puntual.

Es muntaran al sostre on quedaran dissimulats, bastant important en aquest tipus d'entorns.
Aquest dispositiu permet la connexió d'antenes exteriors suplementàries si fos necessari per tal de millorar la cobertura o el rendiment.

http://www.netgear.com/business/products/access-points-wireless-controllers/access-points/WNDAP660.aspx#two

Al rack es muntarà un controlador inalàmbric Netgear WC7520 que permet fer canvis de configuracions en massa a tots els punts d'accés connectats, així com actualitzacions de firmware dels punts d'accés.
Aquest controlador ens permet a més a més, fer la gestió de detecció de rogue AP o sigui, punts d'accés externs a la xarxa que es poden usar per atacar al sistema, així com l'assignació

automàtica i gestió del nivell de transmissió dels canals de tots els punt d'accés per millorar el rendiment i aprofitar l'espectre disponible. També permet la monitorització dels punts d'accés.

Una característica molt convenient d'aquest aparell és que ens permet crear xarxes per convidats, és a dir, xarxes separades lògicament, que no poden accedir a la xarxa interna del centre, però si poden accedir a internet.

http://www.netgear.es/productos/profesional/punto-accesso-controllers-inalambrica/wireless-management/WC7520.aspx

2.2.4 Connexió a Internet.

Es contractaran dues línies de dos proveïdors diferents. En el nostre cas s'optaria per una connexió de fibra òptica de 100 Mb de movistar com a principal i una connexió de 50 Mb de Ono com a secundària o backup.
Això ens permetrà assegurar un downtime o temps de pèrdua de connexió molt petit ja que haurien de fallar les dues companyies per que el centre es quedés sense connexió a Internet, i donat que les aplicacions residiran fora del centre, és força important que això no passi o que tinguem un pla de contingència si arriba a passar.
En un cas extrem, podríem inclús proposar un segon backup amb una connexió 3G, però això seria el darrer recurs, ja que la capacitat d'aquest tipus de connexió no és gaire elevada.

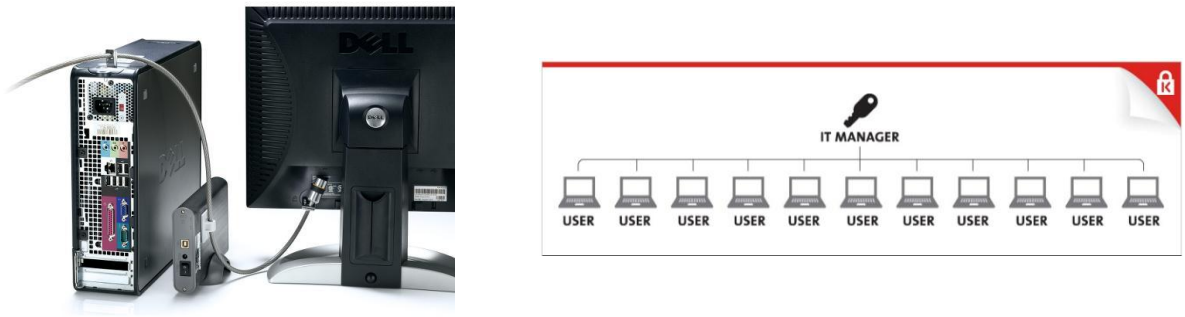
2.3 Dispositius.

2.3.1 Llocs de treballs fixes.

Pels llocs de treball fixes s'ha escollit el model HP Compaq Elite 8300 Ultrafí, i la pantalla HP Compaq LE2002x, que possibilita muntar el PC darrera el monitor amb un muntatge VESA, estalviant espai a la taula de l'usuari. Aquests són ordinadors pensats per negocis, amb una alta fiabilitat i remotament gestionables.

http://h20386.www2.hp.com/SpainStore/Merch/Product.aspx?id=B0F44ET&opt=ABE&sel=PBDT

Això ens permet tenir un pc amb unes característiques adequades que ocupa molt poc, ja que l'espai del que disposem no sempre és massa generós.
És important fer notar que tots els pc's es securitzaran amb solucions tipus kensington lock, ja que no podem assegurar que els pc's estiguin vigilats en tot moment i estem en un entorn que hi ha gent voltant lliurement gairebé les 24 hores del dia.
S'ha escollit una solució Kensington amb clau mestra, per tal que el servei de manteniment informàtic sempre tingui accés als dispositius.



http://www.kensington.com/kensington/es/es/p/1695/K64617M/kit-para-pc-de-sobremesa-y-perifericos-llave-maestra.aspx

2.3.2 Llocs de treballs mòbils al centre.

S'ha optat per la tablet Samsung Galaxy Tab 2 10.1, per la bona relació qualitat preu i el seu sistema operatiu obert que ens permetrà adeqüarla a les necessitats del centre si fos necessari.

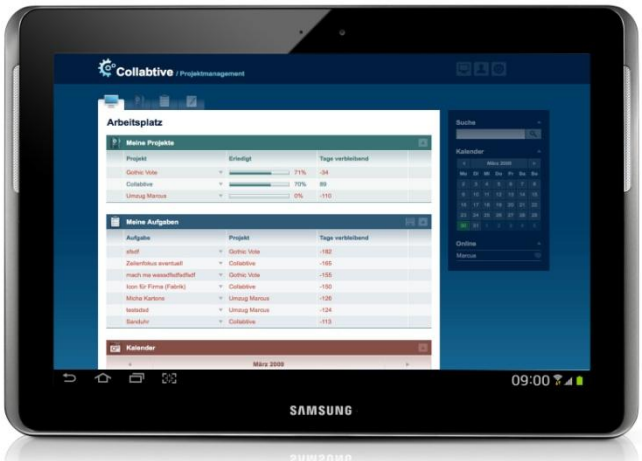
Els llocs de treball mòbil es poden separar en dos grups, assistencial i manteniment.

Assistencial

Per fer possible que els metges accedeixin a la història del pacient o qualsevol altra dada, quan han d'anar per les habitacions dels pacients fent les rondes, se'ls proporcionarà una tablet que es podrà connectar inalàmbricament a la xarxa del centre, tenint així accés a les aplicacions web on resideix la informació.

Manteniment

Les tasques del personal de manteniment són variades, però imprescindibles per un bon funcionament del centre. Per tal que estiguin informats en qualsevol moment dels problemes que es puguin presentar, se'ls proporcionarà tablets precarregades amb una aplicació que permetrà que els treballadors del centre els comuniquin via web qualsevol possible incidència, o que la persona encarregada de supervisar el manteniment, els pugui assignar tasques a fer, ja sigui amb data límit o no.



http://www.samsung.com/es/consumer/mobile-phone/tablets/tablets/GT-P5110TSEPHE

2.3.3 Llocs de treball mòbils. Ambulàncies.

El personal d'ambulància, té necessitats diferents al que està sempre al centre, ja que han de mantenir la connectivitat fora del centre, quan surten a atendre una emergència. Per tant, les tablets que se'ls proporcionaran hauran de tenir connectivitat 3G, amb la qual es connectaran a les aplicacions del centre que estan al núvol.

Aquestes aplicacions permetran saber al personal del centre com està el pacient abans que entri per la porta d'urgències, ja que la monitorització s'enviarà a l'aplicació que resideix al núvol i aquesta pot ser consultada pels treballadors del centre.

http://www.samsung.com/es/consumer/mobile-phone/tablets/tablets/GT-N8000EAAPHE

2.3.4 Telèfons IP

La centraleta que hem escollit, ha de portar els següents telèfons IP propietaris.
El model Cisco 3905 és el model bàsic que destinarem a totes les habitacions.

http://www.cisco.com/en/US/products/ps11542/index.html
http://www.cisco.com/en/US/prod/collateral/voicesw/ps6788/phones/ps7193/ps11542/data_sheet_c78-651588.html

El model Cisco 6945 és el model avançat que farem servir en tots els punts on veu i dades comparteixin cablejat ja que té connectivitat Gigabit. S'instal·larà a tots els despatxos assistencials i al departament d'administració.

http://www.cisco.com/en/US/products/ps11368/index.html
http://www.cisco.com/en/US/prod/collateral/voicesw/ps6788/phones/ps10326/data_sheet_c78-637812.html

Pel que fa a la centraleta, instal·larem el model Cisco 7965G i afegirem dos mòduls d'expansió 7916 per facilitar la feina de la operadora.

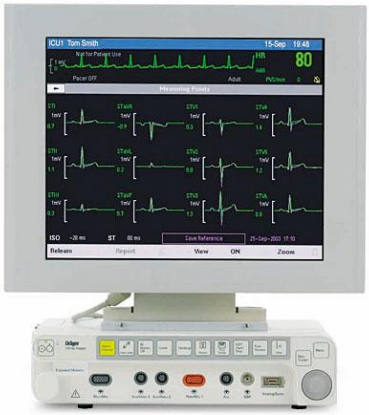
http://www.cisco.com/en/US/products/ps8537/index.html
http://www.cisco.com/en/US/prod/collateral/voicesw/ps6788/phones/ps379/ps8537/product_data_sheet0900aecd8069bd58.html
http://www.cisco.com/en/US/prod/collateral/voicesw/ps6788/phones/ps379/data_sheet_c78-468673.html

2.4 Sensors mèdics.

Després de valorar vàries opcions de diversos fabricants, hem optat per implementar un sistema homogeni i complert del fabricant Dräger, ja que trobem en el seu portfoli de productes tots els nostres requeriments, proporcionant un entorn amb un sol fabricant, eliminant problemes de compatibilitat i retards en la instal·lació.

2.4.1 Sensors fixes cablejats.

Pel que fa a la capçalera del llit del pacient, s'ha escollit el model Infinity Kappa. Aquest model és adequat per pacients que no s'han de moure del llit i que no han de ser traslladats. Es connecta a la xarxa de manera cablejada o inalàmbrica, i s'integra al sistema general de monitorització remota.



http://www.draeger.com/ES/es/products/medical_monitoring/infinity_bedside_solutions/mon_infinity_kappa.jsp

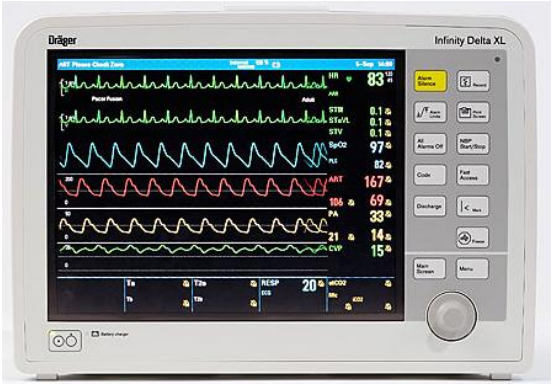
2.4.2 Sensors inalàmbrics.

El model Infinity M300 és totalment portàtil i es connecta a la xarxa del centre via wifi amb el mode d'accés WPA2 incorporat, per tal de disposar d'una seguretat adequada ja que al centre no estará disponible el mode WEP degut a la seva baixa seguretat.
També haurem de comprar el carregador del dispositiu. N'hi ha de dos tipus, el de capçalera, que permet carregar mentre continua monitoritzant, adequat per carregar un dispositiu al llit del pacient i el central, que permet carregar 10 dispositius a la vegada, però sense monitoritzar.

http://www.draeger.com/ES/es/products/medical_monitoring/patient_worn_monitoring/mon_infinity_m300.jsp

2.4.3 Sensors mixtes fixes-portàtils.

Una solució molt pràctica si no sabem si el pacient voldrà llevar-se del llit i voltar pel centre, és el model Infinity Delta XL, ja que mitjançant una docking station, es comporta com un monitor de capçalera de llit, però podem separar-lo i portar-lo amb el pacient allà on vagi sense interrupcions en la monitorització gràcies al seu canvi automàtic i ininterromput entre les xarxes cablejada i inalàmbrica.



http://www.draeger.com/ES/es/products/medical_monitoring/infinity_bedside_solutions/mon_infinity_delta_xl.jsp

3. Software.

3.1 Aplicacions web.

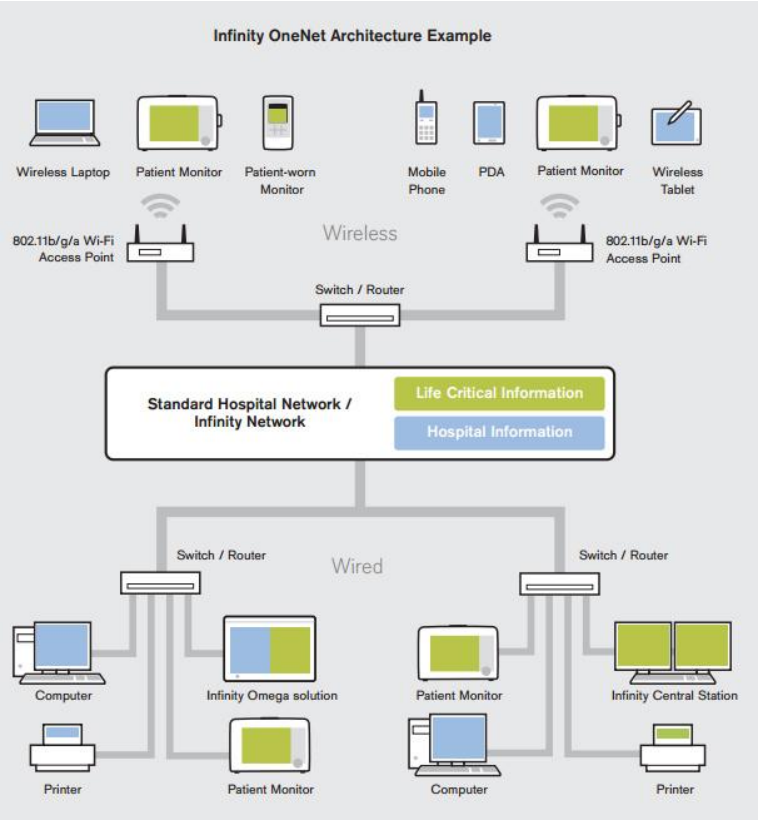
L'hospital utilitzarà aplicacions seguint el model SaaS (Software as a Service), és a dir, no comprarem les aplicacions sinó que les llogarem com un servei més pel qual pagarem una mensualitat. Això ens assegura tenir sempre la darrera versió de les aplicacions i despreocupar-nos del manteniment d'aquestes, no havent de fer un gran despesa en la compra del software al principi, sinó que el cost es repartirà durant la vida del software. Pagarem per la utilització real que fem de les llicències que es poden anar actualitzant en cas que necessitem més o haguem de reduir-les. El preu mensual sortirà de multiplicar el preu de la llicència per les que utilitzem.

3.2 Monitorització sensors mèdics.

L'integració dels sensors mèdics a la xarxa de l'hospital, que de moment només era física, amb el software de Draeger també serà lògica, ja que ens proporciona una consola central per poder visionar l'estat de tots el sensors dels quals disposa el centre. Cada metge o infermera pot en tot moment consultar l'estat de qualsevol pacient que estigui monitoritzat per algun sensor.

Aquesta consola també ens pot emetre alertes per si algun sensor es surt dels paràmetres normals que li hem programat.

Aquest és un programa que si hem de comprar ja que resideix a la nostra xarxa interna, no pot estar fora de l'Hospital, encara que si es pot consultar des de fora, per les persones autoritzades.



http://www.draeger.com/ES/es/products/medical_monitoring/infinity_network/mon_OneNet.jsp

3.3 Aspectes legals.

En entorns assistencials la legislació és molt estricta en el que es refereix a dades personals dels pacients, que han de complir la LOPD i encara més estricta si aquestes dades són mèdiques, ja que s'han de guardar registres durant molts més anys que si fossin dades identificatives de la persona.

Qualsevol software que creï un fitxer amb dades mèdiques haurà de tenir un responsable i haurà d'estar inscrit a l'Agència de Protecció de Dades, convenientment protegit i amb els mitjans adients per salvaguardar la seva integritat.

4. Vídeo vigilància.

A cada sortida i entrada del centre es proposa instal·lar una càmera de vigilància, així com a les zones sensibles, per exemple a les zones on hi ha màquines de vending, on s'han produït robatoris i vandalisme. A la zona del pàrking també s'instal·larà una càmera d'exterior per vigilar l'entrada no autoritzada de vehicles.

Les càmeres seran d'última generació, proporcionant una qualitat d'imatge elevada, Full HD quan sigui possible.

4.1 Dispositius.

Càmeres d'exterior

Per la vigilància del perímetre exterior s'ha escollit la càmera Dlink DCS-7110. Està totalment aïllada amb certificació IP-66, és d'alta resolució i suporta alimentació per PoE, evitant cable elèctrics addicionals. És una càmera de dia i nit, és a dir que mitjançant infraroig també pot gravar en condicions de poca llum. Addicionalment també té unes sortides i entrades digitals on hi podem connectar alarmes o dispositius per obrir la porta del pàrking per exemple.

http://www.dlink.es/cs/Satellite?c=Product_C&childpagename=DLinkEurope-ES%2FDLProductCarouselMultiple&cid=1197388928961&p=1197357768092&packedargs=ParentPageID%3D1197337625381%26TopLevelPageProduct%3DBusiness%26locale%3D1195806681347%26packedargs%3DProductParentID%253D1197318673211&pagename=DLinkEurope-ES%2FDLWrapper

Càmeres d'exterior

Per la vigilància interior hem escollit la càmera Dlink DCS-2210. Té una resolució Full HD a 30 imatges per segon o HD a 30 imatges per segon. És una càmera molt petita i molt poc pesant, pel que es pot instal·lar gairebé a qualsevol lloc. També suporta gravació nocturna, pel que encara que les llums estiguin apagades, la càmera pot seguir gravant. Addicionalment també té micròfon, pel que si ens interessés podríem sentir el que estigui passant a prop de la càmera.

http://www.dlink.es/cs/Satellite?c=Product_C&childpagename=DLinkEurope-ES%2FDLProductCarouselMultiple&cid=1197391518359&p=1197357768092&packedargs=ParentPageID%3D1197337625381%26TopLevelPageProduct%3DBusiness%26locale%3D1195806681347%26packedargs%3DProductParentID%253D1197318673211&pagename=DLinkEurope-ES%2FDLWrapper

4.2 Enregistrament

Totes aquestes càmeres registraran el vídeo a un aparell d'emmagatzematge que definirem seguidament. Aquest suport haurà de ser prou gran per encabir almenys 30 dies de gravació 24 hores al dia. Per optimitzar l'espai, s'ha definit que la gravació serà activada per moviment, que vol dir que si la imatge és estàtica, no es gravarà res, i quan hagi moviment llavors es gravarà, ja que les imatges estàtiques no ens servirien de res.
La gravació estarà centralitzada en un PC que s'encarregarà de gestionar totes les càmeres amb el software del fabricant que és qui realitzarà les gravacions.

4.2.1 Hardware.

La unitat d'emmagatzematge escollida és la Netgear ReadyNAS Pro6 que té capacitat per 6 discos, doble connexió a xarxa que podem usar en Failover (un connexió està en espera per si l'altra falla) o Bonding (les dues connexions estan actives, sumant-se l'ample de banda).
És una unitat molt fiable, amb un molt bon rendiment i un preu assequible.
Permet configuracions RAID, que asseguren que si un disc falla, la gravació no s'interromp i ens avisa per que canviem el disc defectuós sense haver de parar la màquina.
Els càlculs per al necessitat d'espai i d'ample de banda s'han realitzat a l'annex 1.

http://www.netgear.es/productos/profesional/almacenamiento/readyNAS-profam/RNDP6000.aspx

Discos Seagate Constellation 3 Tb
Hem escollit discos de Seagate ja que és un fabricant amb un llarg recorregut, i dintre del seu portfolio, agafem els discos Constellation, que són els recomanats per temes de vigilància.
De moment instal·larem discos de 3 Tb ja que són els que estan disponibles. Si en un futur estiguessin disponibles discos amb més capacitat, es poden canviar sense perdre la informació.

4.3 Connectivitat.

Per la xarxa de video-vigilància s'ha optat per un commutador de 24 ports amb tecnologia PoE de 100 Mbps ja que les càmeres no arriben a aquestes tasses d'ocupació de l'ample de banda, i disposem de ports addicionals amb velocitat de 1 Gbps que connectarem a la unitat d'emmagatzemament la qual si que ha de poder rebre l'ample de banda agregat de totes les càmeres.
Els càlculs per al necessitat d'ample de banda s'han realitzat a l'annex 1.

http://www.netgear.es/productos/profesional/switches/smart-switches/FS728TP.aspx#two

4.4 Aspectes legals.

S'ha de preveure la col·lació de cartells d'advertència a cada entrada del centre, fent palès que el centre és vigilat mitjançant càmeres de vídeo que guarden gravacions durant un període de temps. Els usuaris que vulguin les seves aparicions en aquestes imatges siguin esborrades, s'han de dirigir al responsable del fitxer per poder exercir el seu dret.

5. Valoració econòmica.

5.1 Despeses úniques.

Descripció	Quantitat	Preu unitari	Preu total	Parcials
Xarxa				37.025,00 €
HP Rack 10842 G2	1	2.000,00 €	2.000,00 €	
Netgear FS752TP	2	780,00 €	1.560,00 €	
Netgear GSM7252PS	1	3.770,00 €	3.770,00 €	
Netgear GSM7228PS	1	2.040,00 €	2.040,00 €	
Netgear WNDAP660	16	550,00 €	8.800,00 €	
Netgear WC7520	1	4.745,00 €	4.745,00 €	
Netgear UTM50	1	1.610,00 €	1.610,00 €	
Cablejat dades cat6a	5.000	1,30 €	6.500,00 €	
Cablejat veu habitacions cat6	10.000	0,60 €	6.000,00 €	
Ordinadors i tabletes				34.998,00 €
HP Desktop 8300 + LCD LE2002x	30	999,00 €	29.970,00 €	
Samsung Galaxy Tab2 10.1	8	329,00 €	2.632,00 €	
Samsung Galaxy Note 10.1	4	599,00 €	2.396,00 €	
Seguretat física				2.071,00 €
Kimaldi Bioentry Plus	1	751,00 €	751,00 €	
Kensington Lock K64617S	30	44,00 €	1.320,00 €	
Telefonia				15.400,00 €
Cisco Business Edition 3000	1	1.450,00 €	1.450,00 €	
Cisco 7965G + 7915 Centraleta	1	620,00 €	620,00 €	
Cisco 6945 Telefons avançat	47	190,00 €	8.930,00 €	
Cisco 3905 Telèfon bàsic	80	55,00 €	4.400,00 €	
Monitorització assistencial				1.066.250,00 €
Draeger Infinity Kappa	15	23.000,00 €	345.000,00 €	
Draeger M300	25	450,00 €	11.250,00 €	
Draeger Infinity Delta XL	40	15.500,00 €	620.000,00 €	
Draeger Infinity Onenet software	1	90.000,00 €	90.000,00 €	
Video vigilància				7.149,00 €
D-Link DCS-7110 Càmera exterior	3	350,00 €	1.050,00 €	
D-Link DCS-2210 Càmera interior	5	200,00 €	1.000,00 €	
Netgear ReadyNAS Pro 6	1	1.370,00 €	1.370,00 €	
Disc Seagate 3 Tb	6	250,00 €	1.500,00 €	
Netgear FS728TP	1	429,00 €	429,00 €	
Cablejat videovigilancia cat6	3.000	0,60 €	1.800,00 €	
Total General			**1.162.893,00 €**	

5.2 Despeses recurrents.

Detallem aquí la despesa mensual que suposa el manteniment de la estructura que acabem de presentar.

Descripció	Quantitat	Preu unitari	Preu total
Lloguer servidors datacenter	1	400,00 €	400,00 €
Connexions banda ampla internet	2	60,00 €	120,00 €
Lloguer Software SaaS (aprox)	60	60,00 €	3.600,00 €
Total			4.120,00 €

5.3 Elecció del material.

Justificarem la elecció del material proposat en aquest estudi per marques.

Netgear
S'ha escollit aquesta marca per la seva elevada relació qualitat-preu, pel gran nombre de dispositius que comercialitza, que ens facilita poder escollir el que millor s'adapti a les nostres necessitats i per últim, perque és una marca que coneixem bé i donem fe que tant pel que fa a fiabilitat com a resposta del servei tècnic, ambdues són excel·lents.

HP
Hem escollit els ordinadors d'aquesta marca per la seva fiabilitat així com pel seu servei tècnic, encara que recomanem comprar garanties ampliades (Support pack) ja que HP només ofereix 1 any de garantia. El factor de forma reduït també ha estat important en la elecció.

Cisco
És un fabricant pioner i punter en solucions voIP, i els seus telèfons tenen connexió gigabit.

Samsung
Actualment és líder en tabletes Android, i té un portfolio prou gran per permetre'ns escollir l'adequada per la funció a desenvolupar.

5.4 Anàlisi de viabilitat econòmica.

Es proposa una amortització del material a 10 anys, el que suposaria una amortització anual d'aproximadament 120.000 €.
S'ha de tenir en compte que el material de sensors mèdics, té una vida útil molt llarga, més enllà dels 10 anys, el que no es pot dir per exemple dels ordinadors, però el material amb vida útil de menys de 5 anys representa una part petita del total de la despesa, podent-se actualitzar quan es consideri necessari sense alterar en excés l'amortització general.
Per tant veiem totalment viable econòmicament la proposta realitzada.

ANNEXOS

ANNEX 1. Estudi velocitats LAN.

Servei de dades mixtes (assistencial i administració)

Aquestes connexions compartiran el cablejat.

Velocitat de connexió: 1 Gbps
Backplane Switch GSM7352S: 192 Gbps

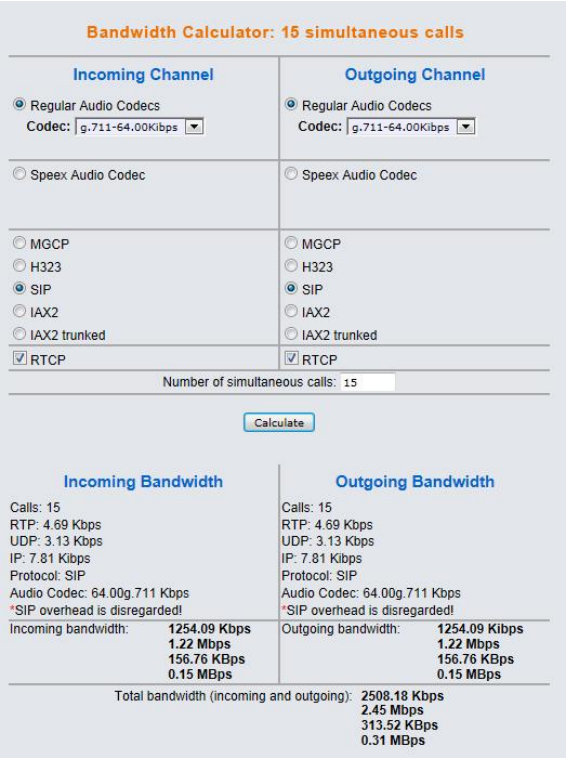
S'han fet mesures basades en el consum actual i el requeriment de velocitat típica mitja dels usuaris és de 3 Mbps, en pitjor dels casos. L'us majoritari és la navegació i les aplicacions de correu que actualment conten com a navegació.
Per tant tindríem una demanda per part dels usuaris de 141 Mbps

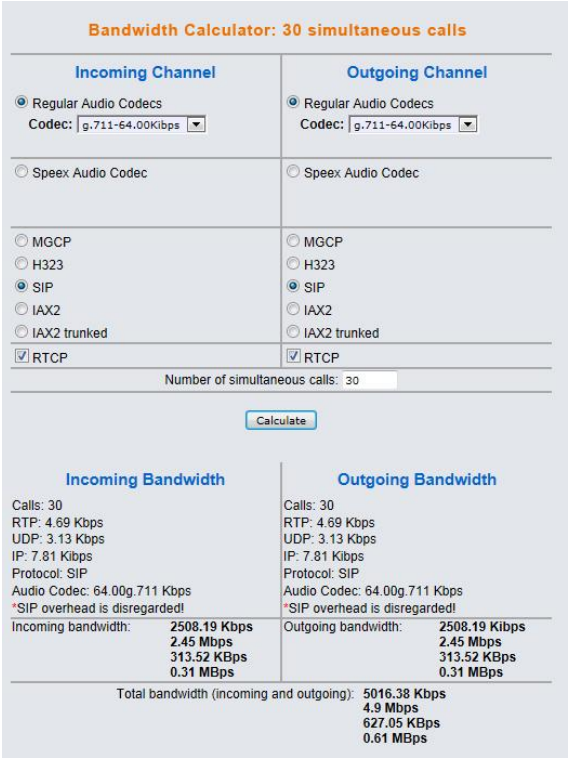
Velocitat típica veu realitzant trucada: 167,22 Kbps = 0,16 Mbps
La demanda si tots els usuaris fessin les trucades al mateix temps és de 7,52 Mbps

Combinat ens dona prop de 150 Mbps

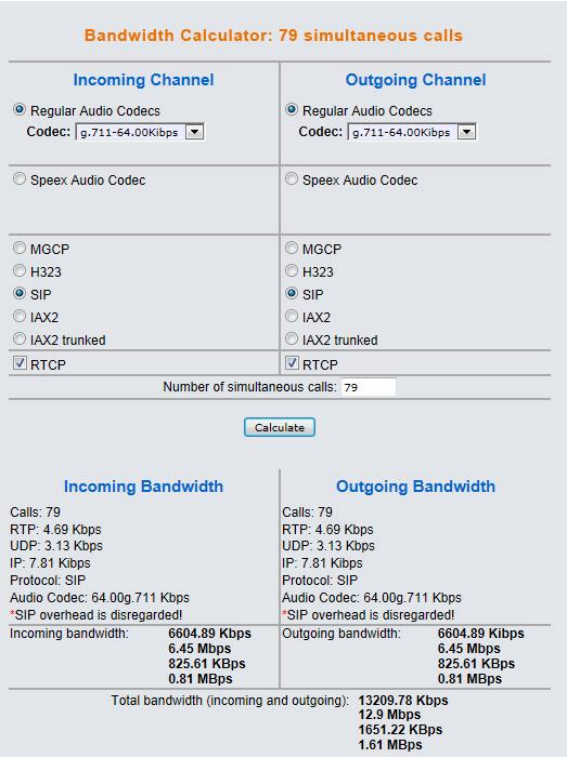
Servei de veu a les habitacions

Per comprovar la capacitat adient de la xarxa de veu de les habitacions, que permetrà cursar totes les trucades que es demanin,





Aquests dos càlculs són els més realistes, i són els que possiblement es donin en el dia a dia, entre 15 i 30 trucades simultànies, on se'ns demana, en el cas pitjor, 4,9 Mbps d'ample de banda.



Bandwidth Calculator: 79 simultaneous calls

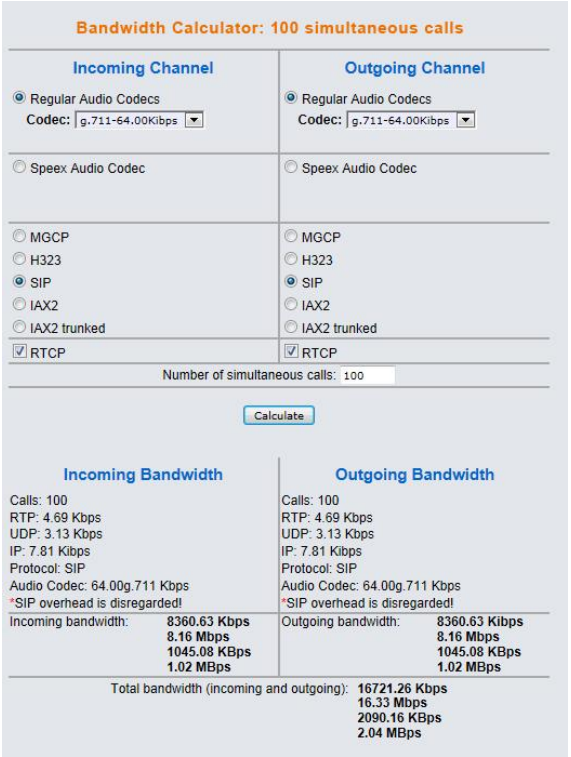
Incoming Channel	Outgoing Channel
Regular Audio Codecs Codec: g.711-64.00Kibps	Regular Audio Codecs Codec: g.711-64.00Kibps
Speex Audio Codec	Speex Audio Codec
MGCP H323 SIP IAX2 IAX2 trunked	MGCP H323 SIP IAX2 IAX2 trunked
RTCP	RTCP

Number of simultaneous calls: 79

Calculate

Incoming Bandwidth	Outgoing Bandwidth
Calls: 79 RTP: 4.69 Kbps UDP: 3.13 Kbps IP: 7.81 Kibps Protocol: SIP Audio Codec: 64.00g.711 Kbps *SIP overhead is disregarded!	Calls: 79 RTP: 4.69 Kbps UDP: 3.13 Kbps IP: 7.81 Kibps Protocol: SIP Audio Codec: 64.00g.711 Kbps *SIP overhead is disregarded!
Incoming bandwidth: 6604.89 Kbps 6.45 Mbps 825.61 KBps 0.81 MBps	Outgoing bandwidth: 6604.89 Kibps 6.45 Mbps 825.61 KBps 0.81 MBps

Total bandwidth (incoming and outgoing): 13209.78 Kbps
12.9 Mbps
1651.22 KBps
1.61 MBps



Bandwidth Calculator: 100 simultaneous calls

Incoming Channel	Outgoing Channel
Regular Audio Codecs Codec: g.711-64.00Kibps	Regular Audio Codecs Codec: g.711-64.00Kibps
Speex Audio Codec	Speex Audio Codec
MGCP H323 SIP IAX2 IAX2 trunked	MGCP H323 SIP IAX2 IAX2 trunked
RTCP	RTCP

Number of simultaneous calls: 100

Calculate

Incoming Bandwidth	Outgoing Bandwidth
Calls: 100 RTP: 4.69 Kbps UDP: 3.13 Kbps IP: 7.81 Kibps Protocol: SIP Audio Codec: 64.00g.711 Kbps *SIP overhead is disregarded!	Calls: 100 RTP: 4.69 Kbps UDP: 3.13 Kbps IP: 7.81 Kibps Protocol: SIP Audio Codec: 64.00g.711 Kbps *SIP overhead is disregarded!
Incoming bandwidth: 8360.63 Kbps 8.16 Mbps 1045.08 KBps 1.02 MBps	Outgoing bandwidth: 8360.63 Kibps 8.16 Mbps 1045.08 KBps 1.02 MBps

Total bandwidth (incoming and outgoing): 16721.26 Kbps
16.33 Mbps
2090.16 KBps
2.04 MBps

Si totes les habitacions fessin una trucada simultània, la capacitat necessària seria de 13.209,78 Kbps o 12,9 Mbps. La probabilitat que això passi és remota, però ens posem sempre en el pitjor cas possible.

La capacitat del switch FS752TP és de 17,6 Gbps, però com que n'hi haurà dos, la meitat de trucades es realitzarien per cadascun dels switch, per tant la demanda real a cada switch serà de 6,45 Mbps.

Inclús podríem ampliar a 100 trucades, fent el càlcul de la figura 4, on surt una demanda d'ample de banda de 8,165 Mbps per switch.

El coll d'ampolla real vindrà en la connexió a Internet i en l'ample de banda que tinguem contractat, però si són els que proposem, el problema vindria imposat per la velocitat de pujada, que pel cas de fibra òptica a 100 Mb és de 10 Mbps.

Els càlculs s'han dut a terme amb l'eina d'asterisk que es troba a:

http://www.asteriskguru.com/tools/bandwidth_calculator.php

Servei de dades (vídeo vigilància)

Necessitat d'ample de banda i d'emmagatzematge.

Recording Parameters

Type: IP | Add Camera

Type	Model	Channels	Resolution	FrameRate	Format	Quality	Scenario	Hours/day	Days	Bandwidth	Disk Space	Sample Video	Remove
IP		1	1.3M (1280x1024	30	H.264	High	Stairway	24	30	2.95 Mbps	957.0 GB		
IP		1	1.3M (1280x1024	30	H.264	High	Stairway	24	30	2.95 Mbps	957.0 GB		
IP		1	1.3M (1280x1024	30	H.264	High	Stairway	24	30	2.95 Mbps	957.0 GB		
IP		1	2M (1920x1080)	30	H.264	High	Stairway	24	30	4.57 Mbps	1480 GB		
IP		1	2M (1920x1080)	30	H.264	High	Stairway	24	30	4.57 Mbps	1480 GB		
IP		1	2M (1920x1080)	30	H.264	High	Stairway	24	30	4.57 Mbps	1480 GB		
IP		1	2M (1920x1080)	30	H.264	High	Stairway	24	30	4.57 Mbps	1480 GB		
IP		1	2M (1920x1080)	30	H.264	High	Stairway	24	30	4.57 Mbps	1480 GB		

Calculate

Bandwidth & Storage Recommendations

ReadyNAS Surveillance	
Minimum Bandwidth	31.70 Mbps
Minimum Disk Space	10.271 TB

http://www.readynas.com/download/surveillance/.calculator/index.html

Amb aquestes dades, amb el switch Netgear FS728TP, tenim que cap de les càmeres arribarà a ocupar el port on es connectarà, que són de 100 Mbps, i disposem de 4 ports de 1 Gigabit per poder satisfer la demanda agregada de 31,70 Mbps necessària, on connectarem l'ordinador que gestionarà les gravacions i el dispositiu d'emmagatzematge, ambdós connectant-se al switch a una velocitat de 1 Gbps.

El dispositiu d'emmagatzematge és un ReadyNAS Pro 6 que pot portar fins a 6 discos. Fent els càlculs amb 6 discos de 3 Tb, obtenim 18 Tb bruts d'espai, com que s'implementa una protecció d'errada de disc X-RAID, l'espai net que ens queda és una mica menys de 15 Tb utilitzables, suficient pels requeriments que tenim.

La tecnologia RAID ens permet que si un disc falla, primer la màquina no deixa de funcionar, simplement ens envia una alerta i podem reemplaçar-lo sense haver de parar la màquina, que refarà automàticament la informació a partir dels altres discos.

Informe de Planificació

Predicció Ràdio Freqüencia (RF)

Una predicció RF és una estimació del rendiment i de la cobertura de la xarxa inalambrica. Utilitza algoritmes inteligents per examinar el comportament dels punts d'accés (AP) basat en un plànol importat amb característiques de construcció assignades. La precisió de la predicció RF depèn del nivell de confiança amb que les característiques RF de construcció són assignades, i la precissió del posicionament dels AP. És ideal prer entorns típics d'oficina amb tipus de paret uniformes. A més a més, la RF en si mateixa pot ser impredictible, degut a la dificultat per caracteritzar el comportament de la RF quan interactua amb diversos materials.

Els entorns complexos han de ser verificats amb un estudi in situ per verificar les estimacions utilitzades en la predicció RF

Suposicions

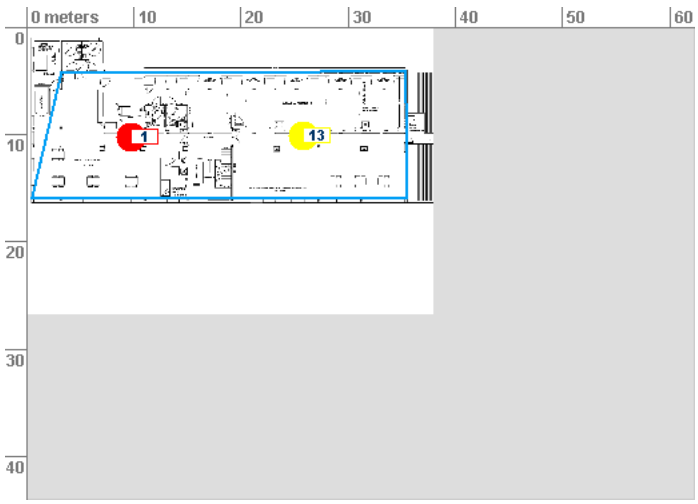
Les directrius en aquest document estan basades en les següents condicions i suposicions:

- Potència de Transmissió (Tx) del Terminal de Dades del Client: >=15 dBm.
- Guany de l'Antena del Terminal de Dades del Client: >=0 dBi.
- El tipus d'entorn del mapa (p.e. Magatzem, Oficina) es refereix a una densitat mitja que es quantifica com un valor de l'exponent de pèrdues de camí. Estima com de ràpid una senyal RF s'atenua amb la distància.
- El valor de pèrdua per travessa de paret indicat (p.e. 12dB per paret de formigó) és l'atenuació d'una senyal RF mentre viatja a través de la paret incidint en angle recte. Per qualsevol altre angle, la pèrdua seria major.
- El EIRP (Effective Isotropic Radiated Power)(Potència Isotròpica Efectiva Radiada) de la radio d'un AP's està determinat per la potència de Tx, el guany de l'antena i le pèrdues del cables. El guany de l'antena és una mitja del guany obtingut mitjançant mesures efectuades per diferents tipus d'AP.
- Les velocitats de dades estan basades en la sensitibilitat de recepciót i s'han obtingut mitjançant mesures efectuades per diferent tipus d'AP, i un marge d'esvaiment que és configurable per l'usuari.
- Les velocitats de dades pels AP de tipus n assumeixen una amplada de canal de 20 MHz (velocitats HT20).

Nota: Aquestes suposicions són típiques pels Terminals de Dades de Client 802.11 disponibles i entorn d'oficina.

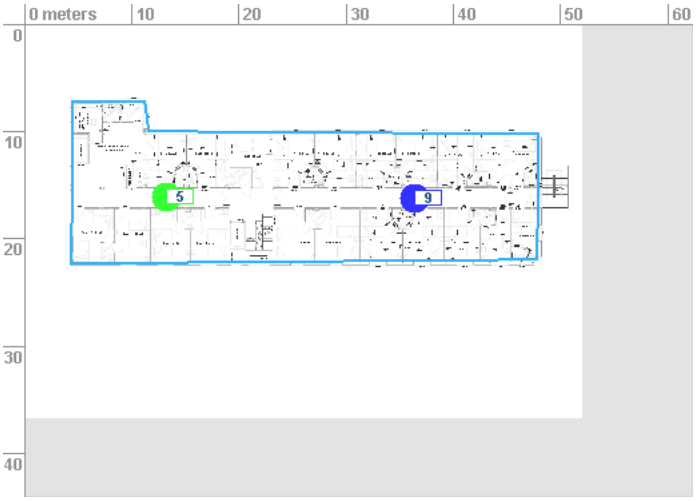
1. Hospital BCN-UOC

1.1 Característiques de l'edifici



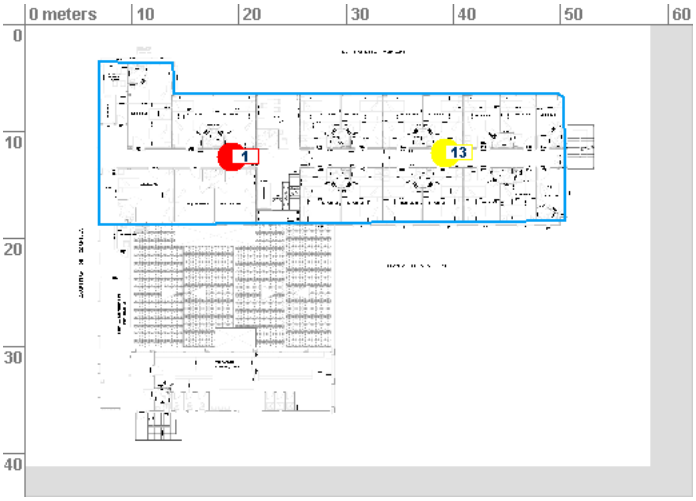
Planta4

Number of APs	2
Service Area	396.16 sq m
Average Area per AP	198.08 sq m
Floor Alignment	
X: 0.00 meters	
Y: 0.00 meters	



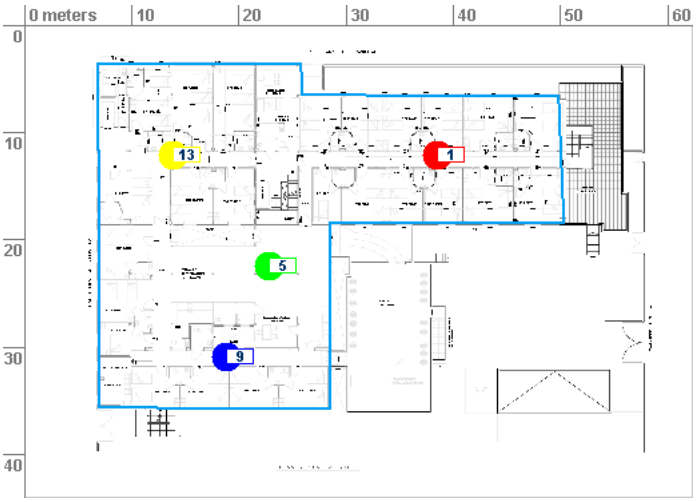
Planta3

Number of APs	2
Service Area	539.72 sq m
Average Area per AP	269.86 sq m
Floor Alignment	
X: 0.00 meters	
Y: 0.00 meters	



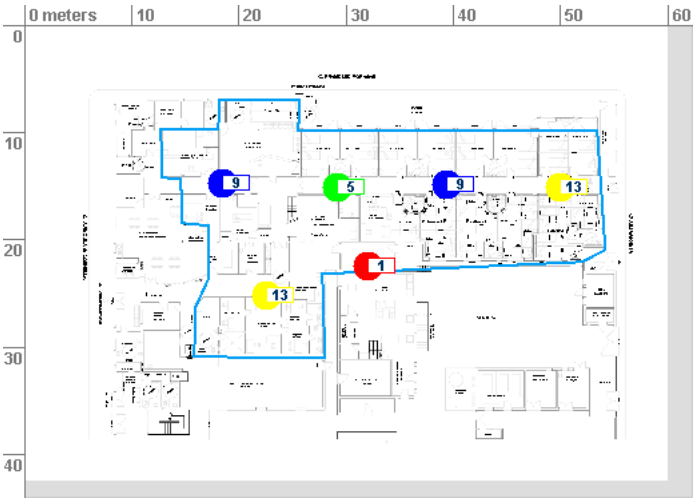
Planta2

Number of APs	2
Service Area	542.03 sq m
Average Area per AP	271.01 sq m
Floor Alignment	
X: 0.00 meters	
Y: 0.00 meters	



Planta1

Number of APs	4
Service Area	936.63 sq m
Average Area per AP	234.16 sq m
Floor Alignment	
X: 0.00 meters	
Y: 0.00 meters	



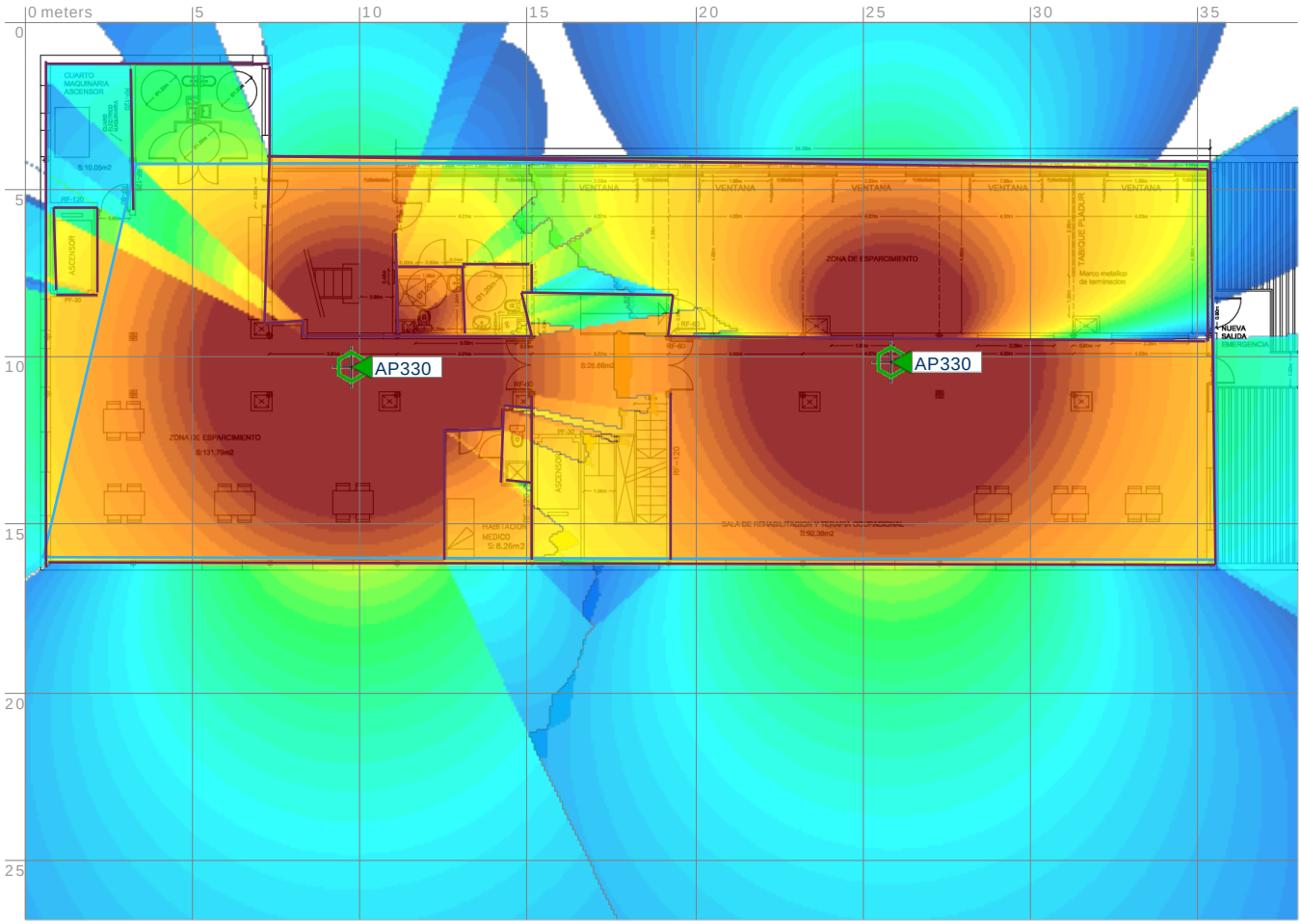
PlantaBaja

Number of APs	6
Service Area	612.34 sq m
Average Area per AP	102.06 sq m
Floor Alignment	
X: 0.00 meters	
Y: 0.00 meters	

1.2 Cobertura Planta 4

El nombre de punts d'accés requerits és de dos

APs on Planta4 (2.4 GHz, RSSI View: -35 -80dBm)



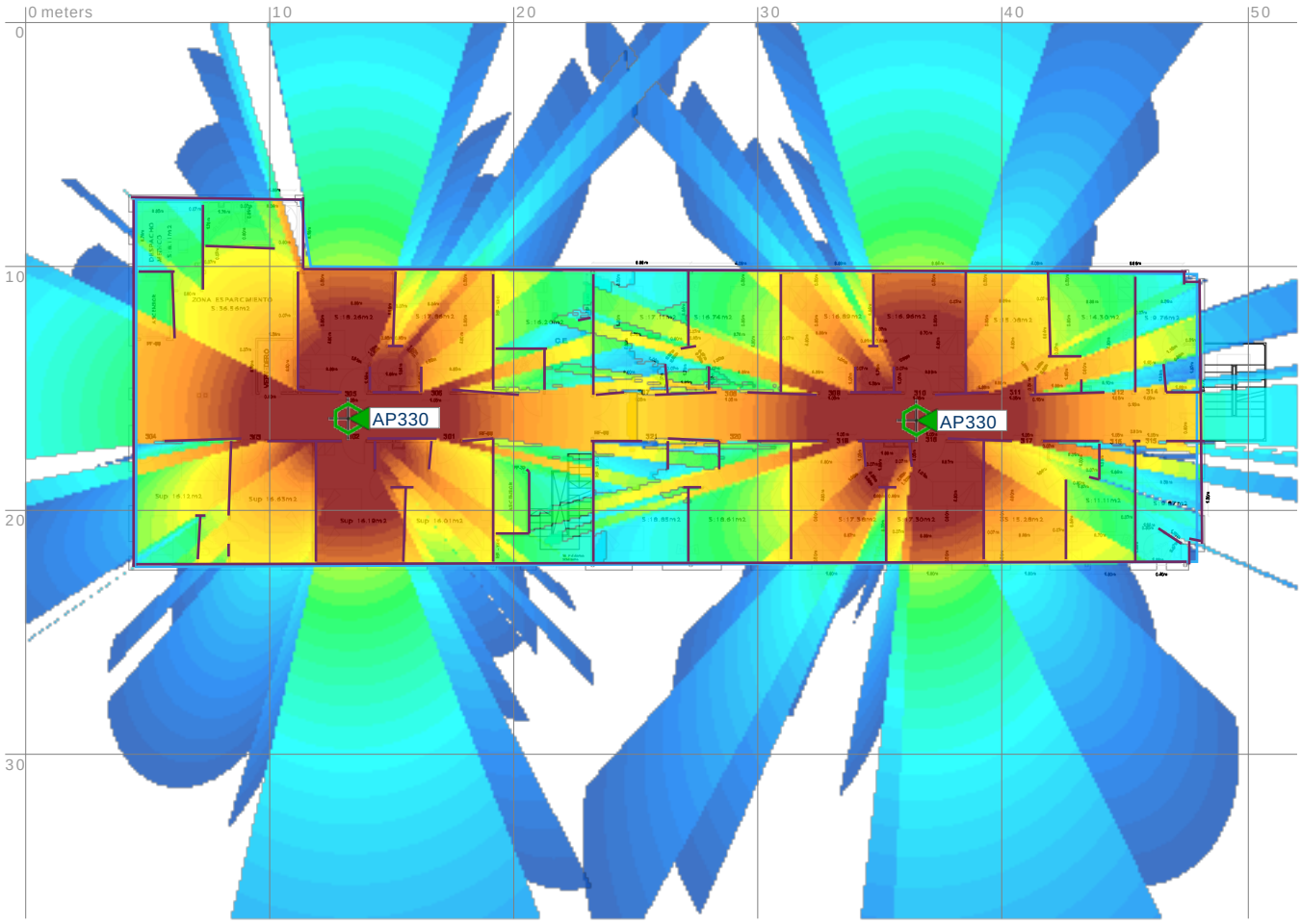
AP Details

Name	Model	Type	2.4 GHz		5 GHz		Description
			Channel	Power	Channel	Power	
AP330	AP330	802.11n	Auto(1)	18 dBm	Auto(36)	15 dBm	
AP330	AP330	802.11n	Auto(13)	18 dBm	Auto(48)	15 dBm	

1.3 Planta 3

El nombre de punts d'accés requerits és de dos

APs on Planta3 (2.4 GHz, RSSI View: -35 -80dBm)



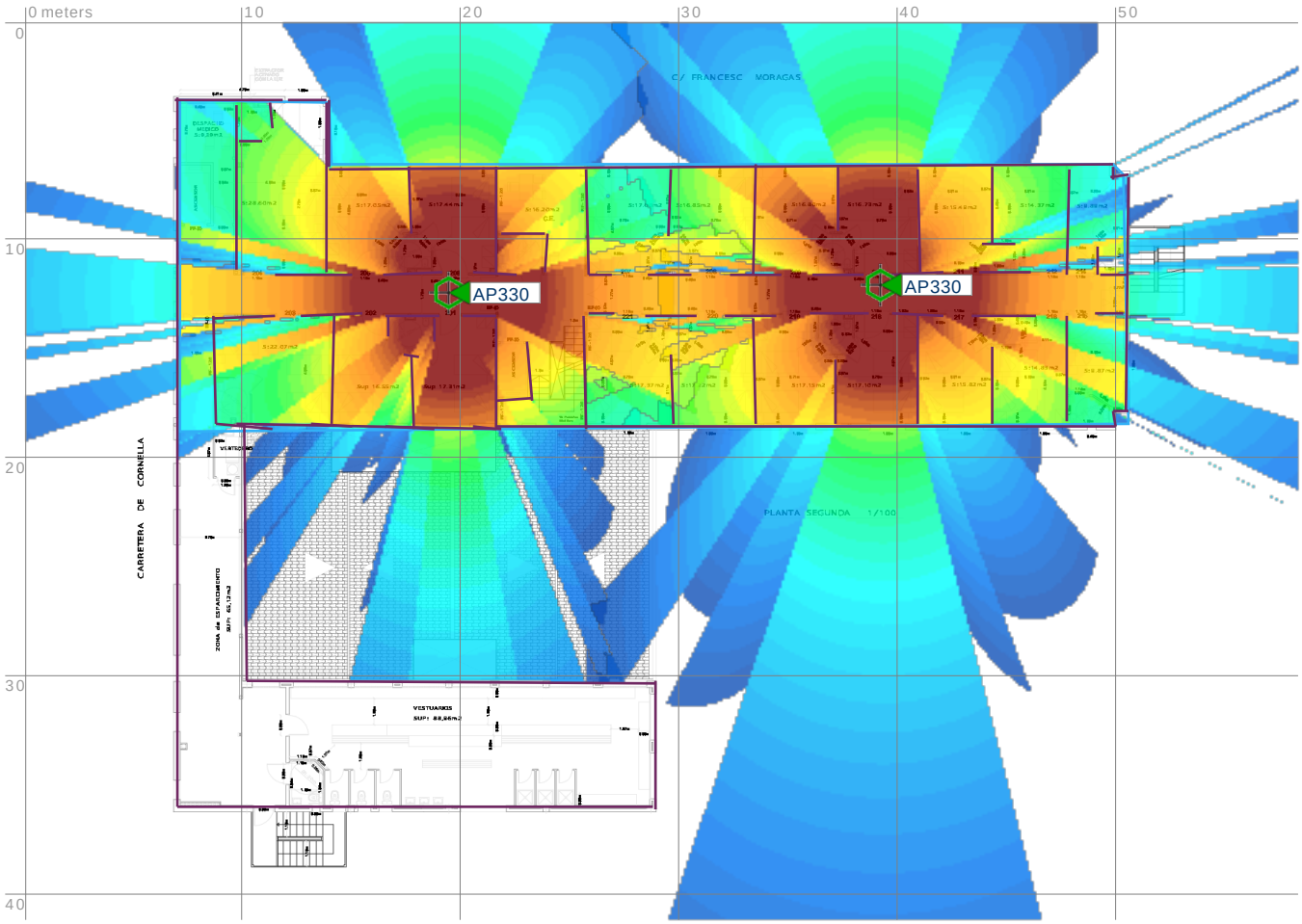
AP Details

Name	Model	Type	2.4 GHz		5 GHz		Description
			Channel	Power	Channel	Power	
AP330	AP330	802.11n	Auto(9)	18 dBm	Auto(44)	15 dBm	
AP330	AP330	802.11n	Auto(5)	18 dBm	Auto(40)	15 dBm	

1.4 Planta 2

El nombre de punts d'accés requerits és de dos

APs on Planta2 (2.4 GHz, RSSI View: -35 -80dBm)



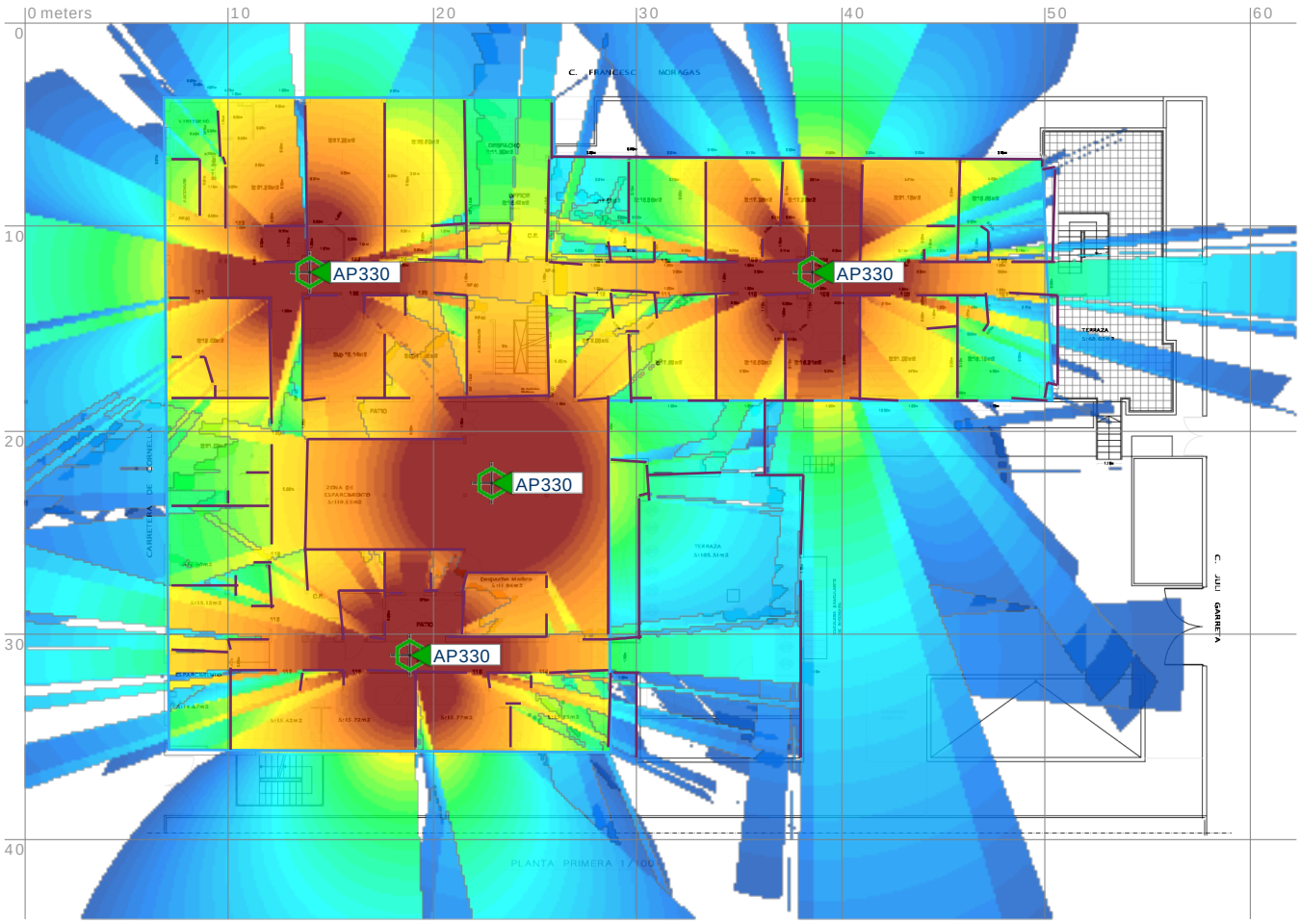
AP Details

Name	Model	Type	2.4 GHz		5 GHz		Description
			Channel	Power	Channel	Power	
AP330	AP330	802.11n	Auto(1)	18 dBm	Auto(36)	15 dBm	
AP330	AP330	802.11n	Auto(13)	18 dBm	Auto(48)	15 dBm	

1.5 Planta 1

El nombre de punts d'accés requerits és de quatre

APs on Planta1 (2.4 GHz, RSSI View: -35 -80dBm)



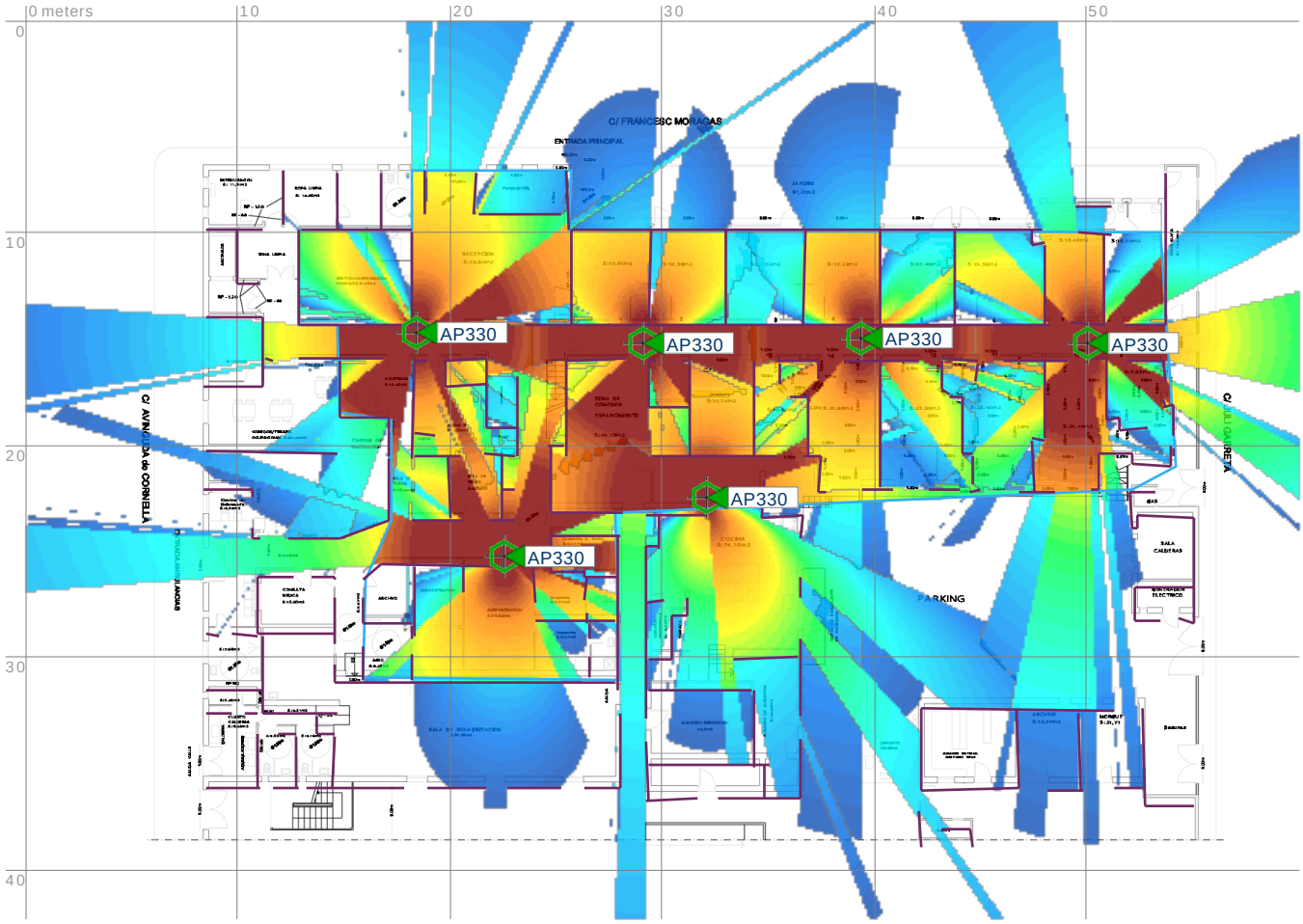
AP Details

Name	Model	Type	2.4 GHz		5 GHz		Description
			Channel	Power	Channel	Power	
AP330	AP330	802.11n	Auto(9)	18 dBm	Auto(44)	15 dBm	
AP330	AP330	802.11n	Auto(13)	18 dBm	Auto(48)	15 dBm	
AP330	AP330	802.11n	Auto(1)	18 dBm	Auto(36)	15 dBm	
AP330	AP330	802.11n	Auto(5)	18 dBm	Auto(40)	15 dBm	

1.6 Planta Baixa

El nombre de punts d'accés requerits és de sis.

APs on PlantaBaja (2.4 GHz, RSSI View: -35 -80dBm)



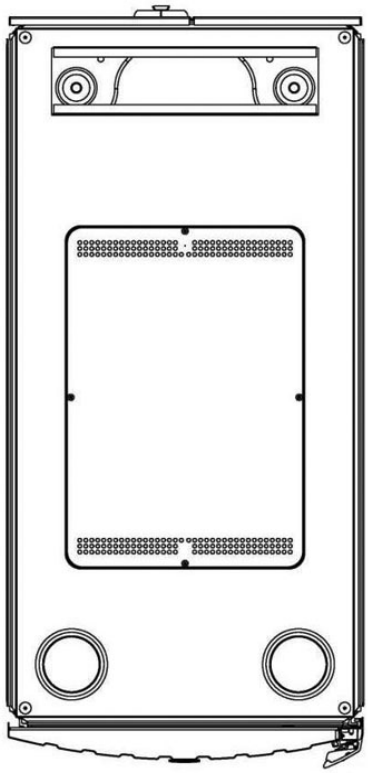
AP Details

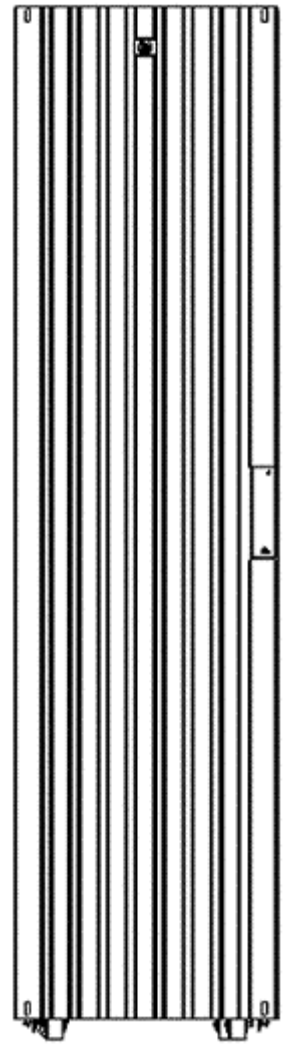
Name	Model	Type	2.4 GHz		5 GHz		Description
			Channel	Power	Channel	Power	
AP330	AP330	802.11n	Auto(1)	18 dBm	Auto(36)	15 dBm	
AP330	AP330	802.11n	Auto(5)	18 dBm	Auto(40)	15 dBm	
AP330	AP330	802.11n	Auto(13)	18 dBm	Auto(48)	15 dBm	
AP330	AP330	802.11n	Auto(13)	18 dBm	Auto(48)	15 dBm	
AP330	AP330	802.11n	Auto(9)	18 dBm	Auto(44)	15 dBm	
AP330	AP330	802.11n	Auto(9)	18 dBm	Auto(44)	15 dBm	

Technical Specifications

10842 G2 Rack (42U) Wide

Dimensions (HxDxW)	**Total Cabinet Area**	199.90 x 100.82 x 80.01 cm
	Shipping (with packaging materials)	215.9 x 121.92 x 110.49 cm
Weight	**Operating**	133.8 kg
	Shipping	151.95 kg
Load	**Static**	908 kg
	Dynamic	908 kg
Color	**Doors**	Graphite Metallic
	Frame	Carbon





suprema

BioEntry Plus

IP based Fingerprint Access Control

Features

Fast and accurate fingerprint identification
* Award winning fingerprint algorithm (No.1 in FVC2004 & FVC2006)
* 1:2000 fingerprint identification in 1 second

Easy installation and connectivity
* Ethernet interface for TCP/IP communication
* Wiegand output configurable up to 64 bits
* Internal relay for direct lock interface

Easy operation and management
* Built-in RF card reader for different user authentication modes (fingerprint and/or card)
* Easy-to-use PC software for access control and time attendance
* Optional standalone user management using command cards
* Template on card to store fingerprint date on a smart card

Slim and elegant design
* Slim design for installation on a door frame
* Multi color LED and multi-tone buzzer for intuitive user interface

Full access control features
* 128 access groups and 128 time schedules
* Anti-passback door zones supporting 32 readers
* Tamper switch and duress finger option

External relay unit
* Secure door control and I/O expansion

Specifications

CPU	400MHz DSP
Memory	4MB flash + 8MB RAM
Fingerprint sensor	500 dpi optical sensor
Identification speed	2,000 match in 1 second
Fingerprint capacity	10,000 templates (5,000 users)
Log capacity	50,000 events
RF card	Proximity (125kHz EM), Mifare (13.56MHz)
Operation modes	Fingerprint, RF card, RF card + fingerprint
Network interface	TCP/IP, RS485
Wiegand output	Configurable up to 64 bits
TTL I/O	2 inputs for exit switch and door sensor
Internal relay	Deadbolt,EM lock,door strike,automatic door
Sound and interface	Multi-color LED and multi-tone buzzer
Operating voltage	12VDC
Size	50 x 160 x 37mm (W x H x D)

Model Information

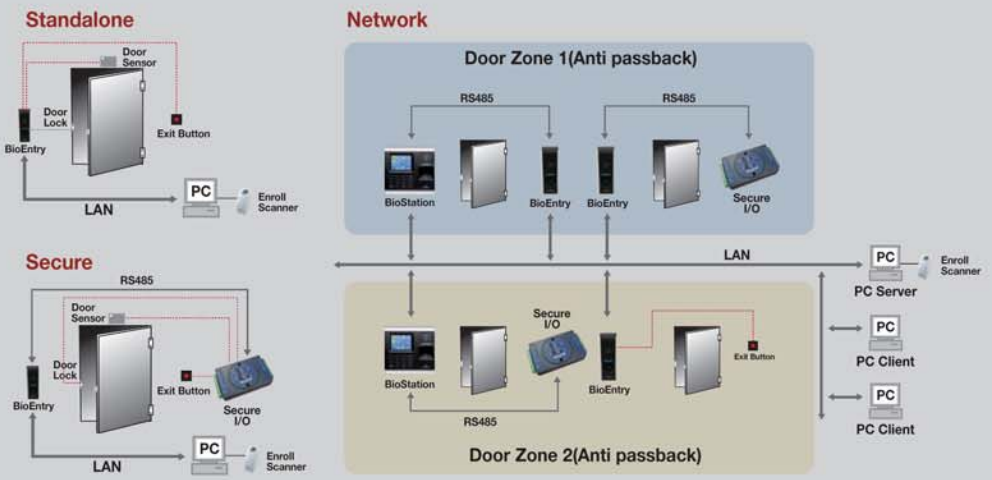
Model	Fingerprint Sensor	
	OC (Optical Sensor)	TC (Capacitive)
BioEntry Plus	BEPL-OC	NA
BioEntry Plus Mifare	BEPM-OC	BEPM-TC

Secure I/O

- Accessory unit for secure door control and I/O expansion
- Encrypted communication with BioEntry Plus for enhanced security

* 16MHz 8bit microprocessor
* 4 digital inputs and 2 relay outputs
* Size : 143 x 82 x 35 mm (W x H x D)

System Configuration



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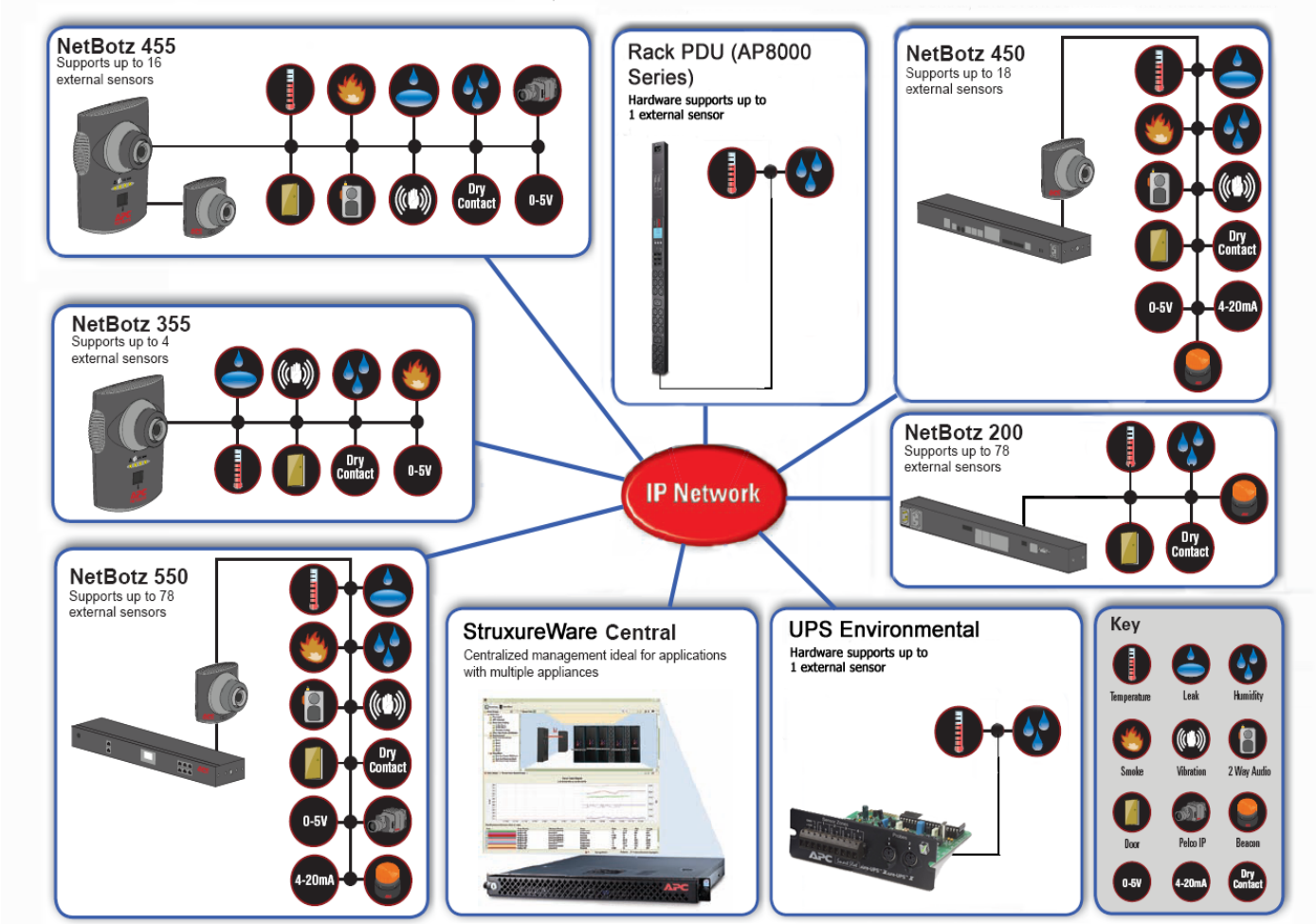
Environmental Monitoring Capabilities

Environmental Capabilities and Sensors



Choosing Sensors

Sensor Type	Part number
Temperature / Temp/Humidity	AP9335T/AP933TH
Camera Pod	NBPD0160
Alarm beacon	AP9324
Smoke	NBES0307
Vibration	NBES0306
Leak/fluid detection	NBES0301
Proximity Card Rack Access	NBPD0171/AP9361
Door contact	NBES0302/NBES0303
Dry contact	NBES0304
Particle sensor	NBES0201
0 to 5 V Cable	NBES0305
4 to 20 mA Sensor Pod	NBPD0129

Alarm beacon - AP9324

Temperature/Temp Humidty- AP9335T/AP9335TH

GSM7228PS

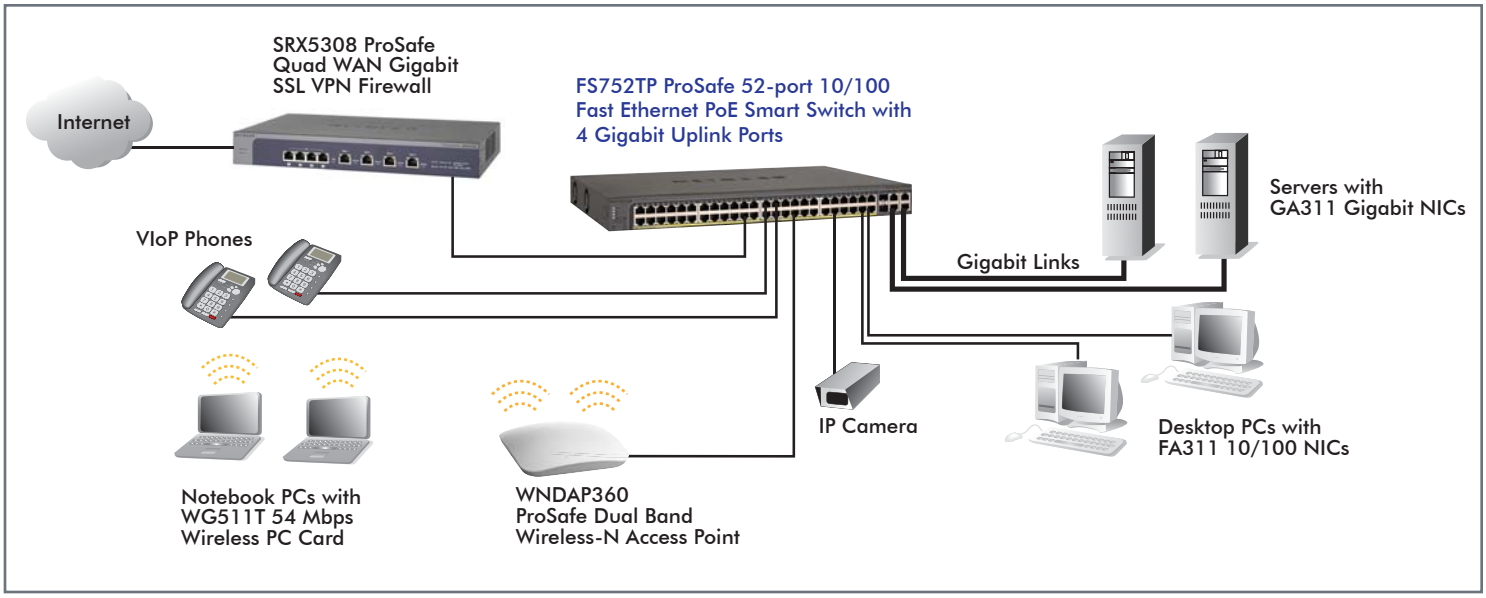
GSM7252PS

TECHNICAL SPECIFICATIONS	
PHYSICAL INTERFACES	
Front • 24 auto-sensing RJ45 10/100/1000 ports • 4 shared SFP ports for Gigabit fiber uplinks (shared with the last 4 RJ45 ports) • 2 independent 10 Gigabit SFP+ ports • USB port (config/firmware files storage) **Rear** • 2 additional 10 Gigabit I/O module bays (for 10 Gigabit uplinks or hardware stacking) • Serial RS-232 port for console **Total** • 24 x Gigabit ports + 4 x 10 Gigabit ports • Same hardware platform as GSM7328S-200	**Front** • 48 auto-sensing RJ45 10/100/1000 ports • 4 shared SFP ports for Gigabit fiber uplinks (shared with the last 4 RJ45 ports) • 2 independent 10 Gigabit SFP+ ports • USB port (config/firmware files storage) **Rear** • 2 additional 10 Gigabit I/O module bays (for 10 Gigabit uplinks or hardware stacking) • Serial RS-232 port for console **Total** • 48 x Gigabit ports + 4 x 10 Gigabit ports • Same hardware platform as GSM7352S-200
POE	
• All 24 Gigabit RJ45 ports are PoE • IEEE® 802.3af (up to 15.4 Watts/port)	• All 48 Gigabit RJ45 ports are PoE • IEEE 802.3af (up to 15.4 Watts/port)
POE+	
• The first 8 Gigabit RJ45 ports are PoE+ • IEEE 802.3at (up to 30 Watts/port)	• The first 8 Gigabit RJ45 ports are PoE+ • IEEE 802.3at (up to 30 Watts/port)
TOTAL POE BUDGET	
• 384 Watts	• 384 Watts
PROCESSOR / MEMORY	
• Processor: MPC8633 @ 666 MHz • System memory: 256 MB (RAM) • Packet buffer memory: 0.75 MB per switch • Code storage (flash): 32 MB	• Processor: MPC8633 @ 666 MHz • System memory: 256 MB (RAM) • Packet buffer memory: 1.5 MB per switch • Code storage (flash): 32 MB
HARDWARE STACKING	
• GSM7228PS/GSM7252PS • GSM7328S/GSM7352S • GSM7328FS • Stack height: 8 switches/384 ports	• GSM7228PS/GSM7252PS • GSM7328S/GSM7352S • GSM7328FS • Stack height: 8 switches/384 ports
PERFORMANCE SUMMARY	
• Switching fabric: 144 Gbps • Throughput: 107.1 Mpps • Forwarding mode: Store-and-forward • Latency (64-byte frames, 10 to 100 Mbps): <35.2µs • Latency (64-byte frames, 1 Gbps): <4.1µs • Latency (64-byte frames, 10 Gbps): <2.0µs • Addressing: 48-bit MAC address • Address database size: 8,000 MAC addresses • Number of VLANs: 1,024 (IEEE 802.1Q) • Number of multicast groups filtered: 1,024 • Number of trunks: 64 trunks, 8-port per trunk • Number of hardware queues for QoS: 8 • Number of static routes: 224 • Number of IP interfaces: 128 • Jumbo frame support: up to 9K packet size • Acoustic noise (ANSI-S10.12): 44 dB @ 25°C ambient temperature • Heat dissipation: 260.49 Btu/hr • Mean time between failures (MTBF): 211,069 hours (~24.1 years) @ 25 °C and 98,705 hours (~11.3 years) @ 55 °C ambient temperature	• Switching fabric: 192 Gbps • Throughput: 285.7 Mpps • Forwarding mode: Store-and-forward • Latency (64-byte frames, 10 to 100 Mbps): <35.5µs • Latency (64-byte frames, 1 Gbps): <4.1µs • Latency (64-byte frames, 10 Gbps): <2.0µs • Addressing: 48-bit MAC address • Address database size: 8,000 MAC addresses • Number of VLANs: 1,024 (IEEE 802.1Q) • Number of multicast groups filtered: 1,024 • Number of trunks: 64 trunks, 8-port per trunk • Number of hardware queues for QoS: 8 • Number of static routes: 224 • Number of IP interfaces: 128 • Jumbo frame support: up to 9K packet size • Acoustic noise (ANSI-S10.12): 44 dB @ 25°C ambient temperature • Heat dissipation: 389.20 Btu/hr • Mean time between failures (MTBF): 169,522 hours (~19.4 years) @ 25 °C and 83,550 hours (~9.5 years) @ 55 °C ambient temperature
L3 SERVICES – ROUTING	
• L2+ static routing (Subnets, VLANs) • 224 IP routes (L3-capable hardware) • 128 IP interfaces (L3-capable hardware) • IP Source Guard	• L2+ static routing (Subnets, VLANs) • 224 IP routes (L3-capable hardware) • 128 IP interfaces (L3-capable hardware) • IP Source Guard
L3 SERVICES - DHCP	
• DHCP server (1,024 clients) • DHCP L2 relay, DHCP snooping	• DHCP server (1,024 clients) • DHCP L2 relay, DHCP snooping

Features at a Glance

Hardware Main Features	Benefits
48 IEEE 802.3af PoE ports	• Supports advanced deployments of Voice over IP (VoIP) telephones, wireless access points (APs) and IP-based surveillance cameras that draw power through an Ethernet connectionReduces installation time and cost
4 IEEE 802.3at PoE Plus ports	• Supports high-power PoE devices such as video phones and wireless N APs.
Four dedicated gigabit ports	• Supports high-speed uplinks or fiber connectivity
Software Main Features	**Benefits**
• Auto Voice and Auto Video VLAN	• Fast and easy deployment for VoIP and video surveillance systems
Comprehensive QoS features: • Port-based or 802.1p-based prioritization • Layer 3-based (DSCP) prioritization • Port-based ingress and egress rate limiting	• Advanced controls for optimized network performance and better delivery of mission-critical traffics such as voice and video
Robust security features: • 802.1x authentication • DHCP Filtering • Port-based security by locked MAC • ACL filtering to permit or deny traffic based on MAC and IP addresses	• Prevent external attacks and block malware while allowing secure access for authorized users
• Static Routing	• Allows for segmentation of the network with internal routing through the switch – reserving the router for external traffic routing only, making the entire network more efficient.
• PoE timer	• Allows IT administrators to increase network security and energy efficiency by remotely turning ports off and on
• NETGEAR Network Management System (NMS200)	• Extensive visibility, granular control and seamless automation across the network for a range of NETGEAR products

Network Diagram



Technical Specifications

• Network Protocol and Standards Compatibility
- IEEE 802.3 10BASE-T
- IEEE 802.3u 100BASE-TX
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3z 1000BASE-X
- IEEE 802.3x full-duplex flow control
- IEEE 802.3af (Power over Ethernet)
- IEEE 802.3at (Power over Ethernet Plus) for the first 4 ports

• Power Supply
- Power consumption: 539W maximum
- 100-240VAC/50-60-Hz universal input
- PoE budget: 384W

• Network Ports
- 48 10/100 Mbps auto sensing Fast Ethernet
- 4 10/100/1000 Mbps auto-sensing gigabit Ethernet switching ports (RJ-45)
- 2 Dual Personality SFP slots

• Performance Specifications
- Forwarding modes: Store-and-forward
- Bandwidth: 17.6 Gbps
- Network latency: <20µs for 64-byte – frames in store-and-forward mode for 100 Mbps to 100 Mbps transmission
- Buffer memory: 1.5 MBytes per system
- Address database size: 4,000 media access control (MAC) addresses per system
  - Addressing: 48-bit MAC address –

NETGEAR®
PROSECURE®

ProSecure® Unified Threat Management Appliance
UTM Series

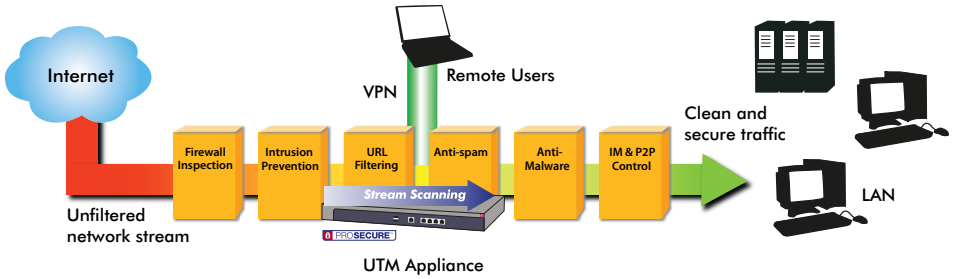
Data Sheet

Unified Gateway Security for Smart IT Networks – Without Compromise

The ProSecure UTM series of all-in-one gateway security appliances combine best-of-breed enterprise-strength security technologies from Commtouch®, Mailshell™, and Sophos™ with patent-pending Stream Scanning Technology to protect businesses against today's Web, email, and network threats. Malware hosted on Web pages, phishing attacks, spam, virus infected emails, hackers, denial-of-service attacks, and other threats are now all part of a regular repertoire of sophisticated blended attacks that bypass traditional firewalls with ease. Because comprehensive network security solutions require an abundance of processing power to examine network traffic in real time, existing all-in-one security solutions often use rudimentary security technologies that trade comprehensiveness for speed. True security must satisfy the requirements in both speed and coverage.

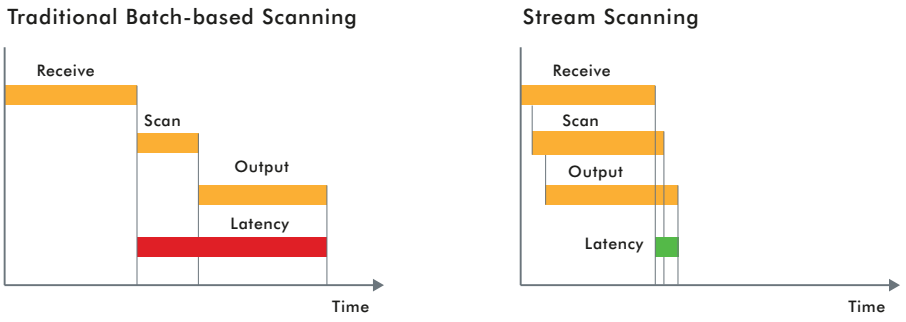
All-in-one Network Security - Redefined

ProSecure Unified Threat Management (UTM) Appliances combine performance with comprehensive security coverage. Patent-pending Stream Scanning Technology enables the ProSecure UTM to utilize virus and malware threat databases from ProSecure and Sophos™ that are over one million signatures in size - up to 400x more comprehensive than legacy all-in-one platforms at a speed that is up to 5x faster than conventional methods. This architecture, combined with best-of-breed hybrid in-the-cloud Web filter and anti-spam technologies along with proven firewall, IPS, and VPN functionality, form the ideal growing business gateway security solution.



Revolutionary Stream Scanning Platform

Given the high performance requirements of scanning latency sensitive Web traffic, incorporating enterprise-grade security software technologies onto traditional all-in-one platforms has been a very difficult task. Traditional batch-based scanning methods introduce large amounts of latency into network traffic and can slow Web browsing to a crawl. All-in-one solutions in the past have tried to overcome this by minimizing the malware signature set, scanning only a select few file types, or by avoiding Web scanning altogether. This exposes an entire vector of the network to malware-based attacks. The ProSecure UTM features patent-pending Stream Scanning Technology which analyses data streams as they enter the network. This significantly reduces latency and allows the use of an extensive malware signature library for scanning – thus offering an unprecedented combination of speed and coverage in an all-in-one solution.



ProSecure UTM Features and Highlights

- **Best-of-breed Anti-malware Engine**
  - Enterprise-class malware scan engine
  - Up to 400 times the coverage of legacy all-in-one solutions
  - Over 1 million malware signatures
  - Hourly automatic signature updates
  - Zero hour heuristic based threat protection
- **ProSecure Patent Pending Stream Scanning Technology**
  - Data streams are processed as they enter the network
  - Low latency Web traffic scanning
- **Distributed Spam Analysis Anti-spam Technology**
  - Hybrid in-the-cloud architecture
  - Gathers threat data from over 50 million global sources
  - New spam is classified and detected within minutes
  - No learning period, works right out of the box
- **Distributed Web Analysis URL Filtering**
  - Hybrid in-the-cloud architecture
  - Hundreds of millions of categorized URLs
  - Real-time classification, 64 categories
  - Per User & Group filtering policies
- **IM and P2P Application Control**
  - Blocks access to public IM clients
  - Blocks peer-to-peer (P2P) clients
  - Preserve productivity and save bandwidth

westcoast labs Checkmark
VPNC CERTIFIED Basic Interop AES Interop
ICSA labs CERTIFIED ANTI-VIRUS
commtouch®
mailshell™
SOPHOS

- **SSL & IPsec VPN Remote Access**
  - SSL VPN - clientless remote access, anywhere, anytime
  - IPsec VPN - secure site-to-site tunnels and client-based remote access
  - No additional licenses to purchase
- **Built-in SPI Firewall**
  - Dual/Quad WAN Gigabit Firewall* provides load balancing and failover
  - Gigabit LAN ports, configurable hardware DMZ port
  - Stateful packet inspection (SPI)
  - Denial-of-service (DoS) protection
  - IPS prevents hackers from penetrating the network perimeter

Simple Setup, Ease of Management

The ProSecure UTM will easily replace any existing firewall or router. A simple 10-step setup wizard guides you through installation and the UTM will be up and running in minutes. Administration is performed through an intuitive Web-based interface. Set granular policies and alerts, check summary statistics and graphical reports, drill down to IP address-level data, and integrate log data with standard network management tools using SNMP. Malware and IPS signature, software, and firmware updates are all handled by the UTM - online and automatically.

For many administrators and IT personnel one of their biggest nightmares is the management of individual licenses or "seats." Buying additional licenses when computers and personnel are added to the network is time-consuming and costly. The ProSecure UTM offers Web and email protection subscriptions **with no "per-user" licensing.**

UTM SERIES COMPARISON

MODEL	UTM5	UTM10	UTM25	UTM50	UTM150
SIZING GUIDELINES					
Average Anti-virus Throughput[1]	15 Mbps	20 Mbps	25 Mbps	45 Mbps	130 Mbps
Stateful Packet Inspection Firewall Throughput[1]	90 Mbps	90 Mbps	127 Mbps	400 Mbps	900 Mbps
Maximum VPN Throughput[1]	40 Mbps	50 Mbps	70 Mbps	200 Mbps	400 Mbps
Maximum Concurrent Connections[1]	8,000	12,000	27,000	40,000	65,000
VLANs	255	255	255	255	255
CONTENT SECURITY					
Web and Email Scanned Protocols	HTTP, HTTPS, FTP, SMTP, IMAP, POP3				
Stream Scanning	●	●	●	●	●
Inbound and Outbound Inspection	●	●	●	●	●
Signature-Less Zero Hour Protection	●	●	●	●	●
Malware Signatures	1.2 Million	1.2 Million	1.2 Million	1.2 Million	1.2 Million
Automatic Signature Updates	Hourly	Hourly	Hourly	Hourly	Hourly
Web Content Filters	Filter By: HTML Body Keywords, File Extension				
Web Object Filters	ActiveX, Java™, Flash, JavaScript™, Proxy, Cookies				
Email Content Filters	Filter By: Subject Keywords, Password-protected Attachments, File Extension, File Name				
Distributed Spam Analysis	●	●	●	●	●
Distributed Spam Analysis Supported Protocols	SMTP, POP3				
Anti-spam Real-time Blacklist (RBL)	●	●	●	●	●
User-defined Spam Allowed/Block Lists	Filter By: Sender Email Address, Domain, IP Address, Recipient Email Address, Domain				
Distributed Web Analysis w/ 64 categories	●	●	●	●	●
Instant Messaging (IM) Control	MSN® Messenger, Yahoo!® Messenger, mIRC, Google Talk				
Peer to Peer (P2P) Control	BitTorrent™, eDonkey, Gnutella				
Maximum Number of Users	Unlimited				
FIREWALL FEATURES					
Stateful Packet Inspection (SPI)	Port/Service Blocking, Denial-of-service (DoS) Prevention, Stealth Mode, Block TCP Flood, Block UDP Flood, WAN/LAN Ping Response Control				
Intrusion Detection & Prevention (IPS)	●	●	●	●	●
WAN Modes	NAT, Classical Routing				
ISP Address Assignment	DHCP, Static IP Assignment, PPPoE, PPTP				
NAT Modes	1-1 NAT, PAT				
Routing	Static, Dynamic, RIPv1, RIPv2				
VoIP	SIP ALG				

MODEL	UTM5	UTM10	UTM25	UTM50	UTM150
DDNS	DynDNS.org, TZO.com, Oray.net				
Firewall Functions	Port Range Forwarding, Port Triggering, DNS proxy, MAC Address Cloning/spoofing, Network Time Protocol NTP Support, Diagnostic Tools (ping, DNS lookup, trace route, other), Auto-Uplink on Switch Ports, L3 Quality of Service (QoS) ,LAN-to-WAN and WAN-to-LAN (ToS)				
DHCP	DHCP Server, DHCP Relay				
User Authentication for VPN	Active Directory, LDAP, Radius, Local User Database				
Security Policies Based on Active Directory with Single Sign-On (SSO)	●	●	●	●	●
PCI Compliance Two Factor Authentication Support	●	●	●	●	●
VPN					
Site to Site VPN Tunnels	5	10	25	50	150
Simultaneous SSL VPN Tunnels	2	5	13	25	75
IPsec Encrypton/Authentication	DES, 3DES, AES(128,192,256 bit)/SHA-1, MD5				
Key Exchange	IKE, Manual Key, Pre-Shared Key, PKI, X.500				
IPsec NAT Traversal (VPN Passthrough)	●	●	●	●	●
iPhone Native VPN Client Support	●	●	●	●	●
Included ProSafe VPN Client Lite Licenses	0	1	1	3	3
SSL Version Support	SSLv3, TLS1.0				
SSL Encryption Support	DES, 3DES, ARC4, AES(128,256 bit)				
SSL Message Integrity	MD5, SHA-1, MAC-MD5/SHA-1, HMAC-MD5/SHA-1				
SSL Certificate Support	RSA, Diffie-Hellman, Self				
SSL VPN Platforms Supported	Windows 2000 / XP / Vista® (32bit), Windows 7 (32 and 64bit), Mac OS® X 10.4.x/10.6.x				
DEPLOYMENT					
VLAN Support	●	●	●	●	●
Dual-WAN Fail-over			●	●	●
Intelligent Traffic Load Balancing			●	●	●
Configuration Wizards	Setup, IPsec VPN, SSL VPN				
LOGGING AND REPORTING					
Management	HTTP/HTTPS, SNMP v2c				
Reporting	Summary Statistics, Graphical Reporting, Automatic Outbreak Alerts, Automatic Malware Notifications, System Notifications				
Logging	Traffic, Malware, Spam, Content Filter, Email Filter, System, Service, IPS, Port Scan, IM, P2P, Firewall, IPsec VPN, SSL VPN				
Log Delivery	Management GUI Query, Email Delivery, Syslog				
HARDWARE					
Gigabit RJ45 Ports WAN/LAN	1/4	1/4	2/4	2/6	4/4
DMZ Interfaces (Configurable)	1	1	1	1	1
Flash Memory/RAM	2 GB/512 MB	2 GB/512 MB	2 GB/1 GB	2 GB/1 GB	2 GB/1 GB
USB Ports	1	1	1	1	1
Certifications	ICSA: Anti-virus VPNC: AES Interop, Basic Interop Checkmark: Anti-Malware, Anti-Spam, Enterprise Firewall, VPN, IPS, URL Filtering				
Major Regulatory Compliance	FCC Part 15 Class A, CE mark commercial, VCCI, C-Tick Class A, CE/LVD, cUL, RoHS, China RoHS				
Storage and Operating Temperatures	Operating Temperature 0°-45° C (32°-113° F), Storage Temperature -20°-70° C (-4°-158° F)				
Humidity	Operation 90% Maximum Relative, Storage 95% Maximum Relative				
Power Input Rating	100-240V, AC/50-60Hz, Universal Input, 1.2 Amp Max			100-240V, AC/50-60Hz, Universal Input, 1.0 Amp Max	
Dimensions (W x H x D) cm	33 x 4.3 x 20.9	33 x 4.3 x 20.9	33 x 4.3 x 20.9	44 x 4.3 x 25.3	44 x 4.3 x 25.3
Dimensions (W x H x D) in	13 x 1.7 x 8.2	13 x 1.7 x 8.2	13 x 1.7 x 8.2	17.3 x 1.7 x 9.96	17.3 x 1.7 x 9.96
Weight kg/lb	2.1/ 4.6	2.1/ 4.6	2.1/ 4.6	2.9/6.4	2.9/6.4

NETGEAR® PROSAFE®

ProSafe® Premium 3 x 3 Dual Band Wireless-N Access Point
WNDAP660

DUAL BAND N450† 2.4 GHz and 5 GHz

Features	ProSafe 3x3 Single Radio, Dual Band Wireless-N Access Point (WNDAP660)
Frequency	2.4 GHz and 5 GHz
Transmit x Receive Radio Chains	3 x 3
Maximum theoretical throughput	450 Mbps
Power over Ethernet (PoE) IEEE 802.3af	●
PoE power consumption	10.51 Watts
Wireless Distribution System (WDS)	
Repeater	●
Bridge point-to-point/multi-point	●
Simultaneous bridge & wireless client association	●
Separate bridge and access point	●
Client Mode	
SNMP	v1, v2c
Antenna	Two (2) Internal 5 dBi Three (3) reverse SMA connectors
User support	Up to 128 users
Security	
Wi-Fi Protected Access (WPA/WPA2), 802.11i	●
Multiple VPN pass-through support	●
MAC address filtering with access control lists–up to 256 users	●
802.1x RADIUS support with EAP TLS, TTLS, PEAP	●
Rogue AP detection	●
Block SSID Broadcast	●
Secure SSH Telnet	●
Secure Socket Layer (SSL)	●
Remote management login	●
Peer-to-peer blocking so users may not access another user's PC	●
MBSSID/VLAN Support	16/17
WPA Support (WPA2 – Enterprise, 802.11i)	●
User Interface	●
Browser-based Interface	●
Accepts accessory antennas	●
Easy ceiling mounting/wall mounting	●
WIDS	●
WIPS	●
Bandwidth management	●
LLDP	●
Bandsteering	●

Wi Fi® CERTIFIED

Advanced Speed and Range with Comprehensive Internet Security

- 3 x 3 multiple-input, multiple-output (MIMO) with three spatial streams
- Dual band concurrent in 2.4 and 5 GHz radio band for maximum wireless throughput
- Stylish and elegant design with easy mounting options (e.g., ceiling, wall and desktop)
- Backward compatibility with 802.11a, 802.11g and 802.11b network devices
- Integrated Power over Ethernet (802.3af and 802.3at PoE) lowers deployment costs
- Deploy wireless coverage over large areas with point-to-point and point-to-multipoint bridging via Wireless Distribution System (WDS)
- Security features: WPA, WPA2, rogue AP detection and 802.1x with RADIUS support
- Internal antennas factory-optimized for maximum RF performance
- Advanced Security with Wireless Intrusion Detection (WIDS) and Wireless Intrusion Prevention (WIPS) support
- 802.11n Beamforming to improve range and maximizes data rates
- Device-based QoS to provide differentiated service level agreement to each user and device type
- Bandsteering to load balance clients between 2.4 and 5 GHz
- Redundant dual Ethernet ports to ensure maximum reliability

Technical Specifications

• Standards
- IEEE 802.11a 5GHz
- IEEE 802.11g, IEEE 802.11b, 2.4GHz
- IEEE 802.11n standard, 2.4GHz and 5GHz
- WMM - Wireless MultiMedia prioritization
- WDS - Wireless Distribution System
- Power over Ethernet (PoE) IEEE 802.3af and 802.3at

• Physical Specifications
- Physical Dimensions (W x D x H): 253.75 x 253.76 x 54.76 mm (10.0 x 10.0 x 2.16 in)
- Weight: 1.5 kg (3.31 lb)

• Physical Interfaces
- Two (2) 10/100/1000BASE-T Gigabit Ethernet (RJ-45) ports with Auto Uplink™ (Auto MDI-X) with IEEE 802.3af and 802.3at Power over Ethernet (PoE) support
- Power adapter: 12V DC, 1.5A; plug is localized to country of sale
- One (1) console port with RJ45 Interface
- Three (3) reverse SMA antenna connectors
- Five (5) LED: Power, Link/ACT, LAN, 2.4 GHz, 5 GHz

• Security
- Wi-Fi Protected Access (WPA, WPA2)
- Wired Equivalent Privacy (WEP) 64-bit, 128-bit, and 152-bit encryption
- IEEE 802.1x RADIUS authentication with EAP TLS, TTLS, PEAP
- Wireless access control to identify authorized wireless network devices
- MAC address authentication
- VPN pass-through support
- Secure SSH telnet
- Security Sockets Layer (SSL) remote management login

• Network Management
- Remote configuration and management through Web browser, SNMP or telnet with command line interface (CLI)
- SNMP management supports SNMP MIB I, MIB II, 802.11 MIB and proprietary configuration MIB

• Advanced Wireless Features
- Wireless Distribution System (WDS)
  - Bridge mode: Point-to-point wireless WDS mode
  - Bridge mode: Point-to-multipoint wireless WDS mode
  - Repeater mode
  - Adjustable Transmit Power Control (TPC) from 100 mW down to 0 mW

NETGEAR® PROSAFE®

ProSafe® 20-AP Wireless Controller WC7520

Data Sheet

Reliable, Secure and Scalable Wireless Controller for Mid-sized Businesses, Schools and Hospitals

The NETGEAR ProSafe 20-AP Wireless Controller WC7520 offers a high-performance and fully-featured Wireless LAN architecture to meet the demands of medium-sized businesses, schools, and hospitals with thousands of users. Focusing on ease-of-use, the WC7520 Controller simplifies wireless deployments and network management with best-in-class wireless reliability, coverage, and performance. The scalable WC7520 Controller enables businesses to grow their wireless network as needed with a dramatic return on investment, with optional licenses that support their changing needs. Via licensing upgrades, the ProSafe Wireless Controller scales up to 50 access points (AP). For larger deployments, the WC7520 Controller is stackable up to three units, supporting up to 150-APs, including controller redundancy. Meeting the next generation needs of larger installations, the WC7520 Controller delivers central wireless management, integrated wireless mobility, robust top-end security and rich converged services such as L2/L3 fast roaming, guest access captive portal and Voice over Wi-Fi support. Built to last, the WC7520 Controller is backed by a Lifetime Warranty and delivers enterprise-class connectivity and secure wireless LAN functionality.

Scalable Architecture

The WC7520 Controller natively supports 20 APs and is upgradable in 10-AP increments up to a total of 50 APs via WC7510L licenses. Stackable up to three controllers, a WC7520 Controller stack can support 150 access points with a single interface. Importantly, the WC7520 offers redundancy for always-on reliability and peace of mind.

Centralized Management

Deployed as an overlay on the existing wired network infrastructure, the NETGEAR ProSafe 20-AP Wireless Controller simplifies the network management by providing a single point of management for the entire wireless network. Easy to set up, the WC7520 Controller discovers all supported access points in the network, even across VLANs and subnets. Once identified, the access points are provisioned to dependent access points in minutes. Building floor plans can be used to visualize live coverage and heat maps of the wireless network.

Robust Security

With identity-based security features such as support for RADIUS, Active Directory and internal or external AAA server, NETGEAR ProSafe 20-AP Wireless Controller truly unifies wired and wireless access without compromising on security. Management VLAN is configurable and up to 8 security configuration profiles (SSID, 802.11i security, VLAN, ACLs, radio parameters) can be active. Rogue AP detection permits rogue APs classification (friendly or hostile). Standard RADIUS compliance enables support for third-party authentication and billing system implementation. Scheduled wireless on/off times permits the wireless network to be completely unavailable during specified non-business hours.

Guest Access, Captive Portal and Logging

Guest access allows restricted access to the network, using an integrated captive portal. Two methods of entry are provided, either assisted or self certified. In the assisted model, the receptionist can create a user name and password for guests in the GUI and the WC7520 Controller hosts a captive portal where guests can enter their pre-configured credentials to gain access to the network. Alternatively, the WC7520 Controller hosts a guest portal where guests can register themselves before entering the network. Backend VLAN policies ensure restricted access to guests, prohibiting them any access to the sensitive data on the corporate network. Guest activity logs are available.

24/7 TECHNICAL SUPPORT*

1-888-NETGEAR (638-4327)
Email: info@NETGEAR.com

NETGEAR PROSAFE LIFETIME WARRANTY* NBD* 3-year on-site service

TECHNICAL SPECIFICATIONS	
SYSTEM INFORMATION AND LIMITS	
Wireless Controller Model Number	WC7520 ProSafe 20-AP Wireless Controller
Supported AP Models	• WNDAP360 ProSafe Dual Band 802.11n Wireless Access Point • WNDAP350 ProSafe Dual Band 802.11n Wireless Access Point • WNAP320 ProSafe 802.11n Wireless Access Point • WNAP210 ProSafe 802.11n Wireless Access Point
Supported Modes	• Wireless-A/B/G/N
Maximum AP Supported per Controller	• 20 (default) • 50 with 3 x Incremental 10-AP License Upgrades (WC7510L)
Maximum Controllers that Can Be Stacked Together	3
Maximum AP Supported per Stacked Setup	150
Maximum Profile Groups per Controller	• 8 • Each access point belongs to only one profile group
Maximum Security Profiles (SSID) per Profile Group	• 8 per radio (2.4 GHz; 5 GHz) • 16 with WNDAP350
Maximum Security Profiles (SSID) per Controller	128 (assuming WNDAP350/WNDAP360 and 8 security profiles per radio)
Maximum Security Profiles per Network (3 Controllers)	512
Maximum Rogue APs Detectable per Controller	512
Maximum Floorplans per Controller	• 3 (default) • Additional floorplans possible with USB local storage (up to a maximum of 18 floorplans)
Number of Captive Portals per Controller	1
Maximum Clients per AP	• WNAP210: up to 32 clients; WNAP320: up to 64 clients • WNDAP350 and WNDAP360: up to 64 clients per radio (128 clients total)
Maximum Clients per Controller	None other than maximum clients per AP
L2 Mobility	L2 fast roaming support between the APs
L3 Mobility	L3 fast roaming support with encrypted tunnelling between the APs and the controller
Maximum VLANs per Controller	• 64 VLANs for SSIDs • 1 configurable management VLAN
IP AND VLANS CONFIGURATION	
DHCP Server/Relay	• Integrated DHCP server • Multiple DHCP server/pool can be added for different VLANs (up to 64)
VLANs for the Wireless Controller	One management VLAN (configurable VLAN ID)
VLANs Access Points / Multiple SSIDs	64 VLANs
VLANs Deployment	The Wireless Controller must have IP connectivity with the access points through the management VLAN. If the Controller and the APs are on different management VLANs, external VLAN routing must allow IP connectivity between the Controller and the APs.

RF PLANNING AND MONITORING	
Integrated Deployment Planning	• Hierarchical view of the network: Floor maps upload and floor maps dimensions input • Automated RF planning algorithm: Computed number of APs required to cover a floor plan • Theorical cloud coverage indicated for each AP for positionning assistance on the floor plan
RF Monitoring	• Coverage computing per floor plan • Alert for any detected coverage holes with mitigation options with neighboring APs • Rogue AP/blacklisted clients triangulation
RF MANAGEMENT	
Automatic Channel Allocation	• Channel automatic distribution to reduce interference • Auto-channel allocation takes into consideration the AP location, interferences, and neighborhood maps for each AP • Modifiable list of corporate channels to be used • Scheduled mode for auto-channel allocation • Automatic mode available in case of high level of interference
Automatic Power Control	• Optimum transmit power determination based on coverage requirements • Automatic power control mode available • Neighborhood scan of RF environment to minimize neighboring AP interference and leakage across floors
Coverage Hole Detection	• Automatic mode • Down APs or compromised RF environment detection with alerts • Self healing: Automatic neighboring AP power increase to fill in for coverage losses
Load Balancing	• AP load monitoring and overload prevention • Client redirection to lightly loaded neighboring APs
Fast Roaming	• Seamless rapid mobility across VLAN and subnets • Includes 802.11i pre-auth and fast roaming • Fast roaming support accross L2, and L3 for video, audio and voice over wireless client
QUALITY OF SERVICE	
WMM Quality of Service	WMM (802.11e) prioritizes traffic for both upstream traffic from the stations to the access points (station EDCA parameters) and downstream traffic from the access points to the client stations (AP EDCA parameters)
WMM Queues in Decreasing Order of Priority	• Voice: The highest priority queue with minimum delay, which makes it ideal for applications like VoIP and streaming media • Video: The second highest priority queue with low delay is given to this queue. Video applications are routed to this queue • Best effort: The medium priority queue with medium delay is given to this queue. Most standard IP application will use this queue • Background: Low priority queue with high throughput. Applications, such as FTP, which are not time-sensitive but require high throughput can use this queue
WMM Power Save Option	WMM power save helps conserve battery power in small devices such as phones, laptops, PDAs, and audio players using IEEE® 802.11e mechanisms
Rate Limiting	• Rate limit per SSID set as a percentage of total available bandwidth
WIRELESS SECURITY	
Client Authentication Protocols	• Open, WEP, WPA/WPA2-PSK • 802.11i/WPA/WPA2 Enterprise with standard interface to external AAA/RADIUS Server • Local ACLs (512 MAC) • MAC ACLs based on local AAA Server or external Radius Server
Distinct AAA Server per SSID	Yes
RADIUS Accounting Protocol	Per Client tracking for: • Bytes Tx/Rx • Connect/disconnect time
LDAP-based Authentication	• Standard interface to external LDAP server/Microsoft® Active Directory Server
Integrated AAA Server	Local database authentication based on WC7520 internal AAA Server
Guest Access	• Integrated captive portal available for client authentication in a security profile • Password based authentification mode: Local user store available, receptionist assigned user name/password • External Radius server mode: External RADIUS authentication for the captive portal clients • Open authentication mode: Guest auto registration with email address • Extraction of logs of guest activity
Captive Portal	Configurable portal page, including image files
Rogue Access Points	• Rogue AP definition: AP with radio SSID oberved by any of the managed APs and seen transmitting on same L2 wired network • Detection and mapping of up to 512 rogue APs

WIRELESS NETWORK MONITORING	
Monitoring Summary	Summary of managed access points status, rogue access points detected, wireless stations connected, Wireless Controller information and wireless network usage
Managed Access Points	AP status for the managed access points and details that includes configuration settings, current wireless settings, current clients and detailed traffic statistics
Rogue Access Points	• Rogue access points reported • Rogue access points in same channel • Rogue access points in interfering channels
Wireless Clients	• Clients statistics and details per AP, per SSID, per floor, per location • Blacklisted clients, roaming clients
Wireless Network Usage	Network usage statistics display plots of average received/transmitted network traffic per managed access point. Three different plots show Ethernet, Wireless 802.11 b/bg/ng and 802.11 a/na mode traffic separately
Heat Maps	• Live coverage and visualization heat maps • Location visualization and device tracking
DHCP Leases	DHCP details for wireless clients
MANAGEMENT	
Management Interface	HTTP, SNMP v1/v2c, telnet, Secure Shell (SSH)
Logging and Reporting	• If available syslog server on the network, the Wireless Controller can send all logs. Logs are also available on the GUI and ready to download (log export file) • Email alerts for events as per configuration to mutiple email addresses
Diagnostics	Managed access points ping
Maintenance	Save/restore configuration, restore to factory defaults, admin password change, add user (read-only), firmware upgrade via Web browser for the Wireless Controller and the managed access points
Dual Boot Image	Supported
SNMP	SNMP v1/v2c
HARDWARE	
Gigabit RJ45 Ports LAN	Switch 4-port 10/100/1000
Flash Memory/RAM	8 MB + 2 GB CF/1 GB DDR2
USB Port	1 port for USB storage • More floor heat maps • Extended statistics history
Major Regulatory Compliance	FCC Class A, CE, WEEE, RoHS
Storage and Operating Temperatures	Operating temperature 0°-45° C (32°-113° F), Storage temperature -20°-70° C (-4°-158° F)
Humidity	Operation 90% Maximum Relative, Storage 95% Maximum Relative
Electrical Specifications	100-240V, AC/50-60Hz, Universal Input, DC 5V/8A (internal power supply)
Dimensions (W x H x D) cm	26.1 x 4.3 x 44
Dimensions (W x H x D) in	10.3 x 1.7 x 17.3
Weight kb/lb	2.912/6.4
System Requirements	Internet Explorer® 5.0 or higher or Mozilla Firefox® 1.0 or higher
Package Contents	ProSafe 20-AP Wireless Controller (WC7520), Ethernet cable, power cord, installation guide, resource CD
Warranty	ProSafe Lifetime Warranty† Next business day onsite hardware replacement support, 3 years (included)**

Cisco MCS 7890-C1 Business Edition 3000 Appliance

Cisco® Unified Communications Solutions unify voice, video, data, and mobile applications on fixed and mobile networks, enabling easy collaboration every time from any workspace.

Figure 1. Cisco MCS 7890-C1 Unified Communications Manager Business Edition 3000 Appliance

The Cisco MCS 7890-C1 Unified Communications Manager Business Edition 3000 Appliance is an easy-to-manage purpose built appliance that integrates the benefits of media processing (for voice calling and mobility) and digital circuit gateway functions on a single system (Figure 1). Consolidating these functions creates a cost-effective solution that is simple to set up, manage, and use, thereby lowering total cost of ownership (TCO) and providing a smooth migration from older, outdated telephony systems to IP communications. Designed for midmarket organizations with smaller IT staffs, the solution provides investment protection with the capacity to grow to up to 300 employees (400 endpoints) and 10 total sites (9 remote sites). The Cisco MCS 7890 comes preinstalled with the Cisco Unified Communications Manager Business Edition 3000 software, integrated dual T1/E1 public-switched-telephone-network (PSTN) interfaces, and an easy-to-use administration and provisioning interface.

Features and Benefits

The Cisco MCS 7890 appliance inherits all the core features and functions of the Cisco Unified Communications Manager Business Edition 3000 application. Some of these core capabilities are highlighted here. For more information, please refer to Cisco Unified Communications Manager Business Edition 3000 Version 8.6 data sheet at: http://www.cisco.com/en/US/products/ps11370/index.html.

Supported Cisco Applications

- Cisco Unified Communications Manager Business Edition 3000

System Capacity and Features

Table 1 lists the system attributes and capacities supported by the Cisco MCS 7890 appliance.

Table 1.

Attribute	Capacity
Processor	D510 Dual Core 1.66-GHz (667-MHz FSB, 1024-KB Layer 2 cache)
Memory included	4.0 GB (667 or 800 MHZ, PC2-6400, NON-ECC, CL6, DDR2 SDRAM; KINGSTON KVR800D2N6/2G)
Maximum memory	4 GB
Hard disk capacity	One 160-GB disk
Hard disk interface type	Serial Attached Technology Attachment (SATA)
Hard disk spindle speed	7200 rpm
Hard disk seek time	13 ms
Hard disk latency	4.2 ms

Attribute	Capacity
Data-transfer rate	3.0 Gbps maximum
Hard disk form size	2.5 in. (6.35 cm)
Network interface card	One 10/100/1000
Digital-signal-processor (DSP) module	1 Texas Instruments TNET2685
Maximum number of users and devices	300 users (400 endpoints or devices)
Total number of sites supported	10
Number of remote sites	9 (centralized call processing)
Maximum number of digital trunks	2 integrated E1/T1 ports on system
Telephony protocols or standards	T-1/E-1 PRI, T1 CAS, E1 CAS(R2)
Mounting mechanism	Wall- and rack-mounted unit
Music-on-hold (MoH) port	Supported (external audio source)
Preload	Yes
OS included	Red Hat 5.5
Basic input/output system (BIOS) type	Flash
Simple swap bays	1 hard disk drive (HDD) in a non-open bay module
Redundant Array of Independent Disks (RAID) controller model	None
Serial ports	1 rear
Parallel ports	0
USB 2.0 ports	2 rear
Video Graphics Array (VGA) ports	1 rear
Dimensions (H x W x D)	2.77 x 14.15 x 10.87 in. (70.4 x 359.4 x 276.15 mm)
Weight (maximum)	7.72 lb (3.5 kg)
Input requirements*	Rated line voltage: 100-127 VAC; 50 or 60 Hz
	Input current: 0.56A
	Leakage current: 0.25 mA
	Power: 54W
	VA rating (VA): 56
	BTU rating (BTU/hr): 184
	Rated line voltage: 200-240 VAC; 50 or 60 Hz
	Input current: 0.29A
	Leakage current: 0.55 mA
	Power: 56W
	VA rating (VA): 59
	BTU rating (BTU/hr): 191
Power-supply output power	Rated steady-state power
Temperature range	Operating: 32 to 104℉ (0 to 40℃)
	Non operating: -13 to 158ºF (-25 to 70ºC)
Relative humidity (RH; noncondensing)	Shipment: 5 to ~95%
Acoustic noise	44 dBA (maximum) for temperatures <90℉ (32.2℃), 55 dBA (maximum) at maximum fan speed
Airflow (cubic feet per minute [cfm])	26.4 cfm (by thermal simulation result)

Cisco Unified IP Phone 7965G

Product Overview

Cisco® Unified Communications Solutions unify voice, video, data, and mobile applications on fixed and mobile networks, delivering a media-rich collaboration experience across business, government agency, and institutional workspaces. These applications use the network as the platform to enhance comparative advantage by accelerating decision time and reducing transaction time. The security, resilience, and scalability of the network enable users in any workspace to easily connect anywhere, anytime, and anyplace, using any media, device or operating system. Cisco Unified Communications is part of a comprehensive solution that includes network infrastructure, security, wireless, management applications, lifecycle services, flexible deployment and outsourced management options, and third-party applications.

The Cisco Unified IP Phone 7965G (Figure 1) demonstrates the latest advances in VoIP telephony, including wideband audio support, backlit color display, and an integrated Gigabit Ethernet port. It addresses the needs of the executive or major decision maker, administrative assistants, and those working with bandwidth-intensive applications on colocated PCs. This IP phone includes a large, backlit, easy-to-read color display (Figure 2) for easy access to communication information, timesaving applications, and features such as date and time, calling party name, calling party number, digits dialed, and presence information. It also accommodates Extensible Markup Language (XML) applications that take advantage of the display. The phone provides direct access to six telephone lines (or combination of lines, speed dials, and direct access to telephony features), four interactive soft keys that guide you through call features and functions, and an intuitive four-way (plus Select key) navigation cluster. A hands-free speakerphone and handset designed for high-fidelity wideband audio are standard, as is a built-in headset connection.

Figure 1. Cisco Unified IP Phone 7965G

Figure 2. Close-Up of Display and Lighted Line Keys

Features and Benefits

The Cisco Unified IP Phone 7965G is designed to grow with your organization and enhancements to your system capabilities. The dynamic feature set allows the phone to keep pace with your requirements through regular software updates. Firmware changes can be downloaded from Cisco.com. No hands-on moves and changes are required with the phone—you can simply pick up the phone and move to a new location anywhere on your network. The Cisco Unified IP Phone 7965G also provides many accessibility features.

Table 1. Cisco Unified IP Phone 7965G Features

Feature	Description/Benefit
Display	5-inch (12.5 cm) graphical TFT color display, 16-bit color depth, 320 x 240 effective pixel resolution, with backlight. Allows for greater flexibility of features and applications, and significantly expands the information viewed when using features such as Services, Information, Messages, and Directory. Display also supports localization requiring double-byte Unicode encoding for fonts.
Wideband Audio	Support for wideband (G.722 codec, adherence to TIA 920), including handset, headset, and speakerphone (see Q&A for details).
Codec Support	G.711a, G.711µ, G.729a, G.729ab, G.722, and iLBC audio compression codecs are supported (see Q&A for details).
Speakerphone	Full-duplex speakerphone with acoustic echo cancellation.
Messages Key	Provides direct access to voicemail.
Directories Key	Ready access to missed, received or placed calls (plus intercom history and directories). Incoming messages are identified and categorized on the display, allowing users to quickly and effectively return calls using direct dial-back capability. Corporate directory integrates with the Lightweight Directory Access Protocol Version 3 (LDAP3) standard directory.
Settings Key	Allows user to adjust display brightness, select background images (if available), and select ringer sounds through the User Preference menu. Network Configuration preferences also can be set up (usually by the system administrator). Configuration can be set up either automatically or manually for Dynamic Host Control Protocol (DHCP), Trivial File Transfer Protocol (TFTP), Cisco Unified Communications Manager, and backup Cisco Unified Communications Manager instances. Other available Settings submenus include Device Configuration, Security Configuration, and Model Information.
Services Key	Allows users to quickly access diverse information such as weather, stocks, quote of the day, or any Web-based information using XML.
Help Button	Online Help gives users information about the phone keys, buttons, and features.
Speakerphone, Mute, and Headset Buttons	Speakerphone includes Speaker On/Off, Microphone Mute, and Headset buttons that are lit when active. For added security, the audible dual tone multifrequency (DTMF) tones are masked when the speakerphone mode is used.
Navigation Cluster with 'Select' Button	Four-way navigation cluster allows users to scroll vertically and horizontally. At the center of the cluster is a 'Select' button that can be used for selection of an in-focus item (for example, to open an underlying menu)
Display Button	Indicates when phone is in power-saving sleep/inactivity mode (button is lit), and can be used to awaken the display. Inactivity period is configured by the system administrator.
Ethernet Switch	Internal 2-port Cisco Ethernet switch allows for a direct connection to a 10/100/1000 BASE-T Ethernet network through an RJ-45 interface with single LAN connectivity for both the phone and a co-located PC. System administrator can designate separate VLANs (802.1Q) for the PC and phone, providing improved security and reliability of voice and data traffic.
Headset Port	Dedicated headset port eliminates the need for a separate headset amplifier and allows the handset to remain in its cradle, making headset use simpler. Both wideband (G.722) and narrowband headsets are supported.
Volume Control	Provides easy decibel-level adjustments for the speakerphone, handset, headset, and ringer. The handset is hearing aid-compatible (HAC). Additional volume control gain can be achieved using an inline handset amplifier.
Adjustable Foot-Stand	Stand is adjustable from flat to 60 degrees to provide optimum display viewing and comfortable use of all buttons and keys. The foot-stand is keyed to match standard wall-jack configurations for wall mounting. Optional wall-mount brackets are also offered.
Expansion Module Support	An optional add-on module, the Cisco Unified IP Phone Expansion Module 7914, provides 14 additional buttons for programming directory numbers or speed dials. Up to two expansion modules may be used.
Multiple Ring Tones	More than 24 defined user-selectable ring tones are available. Ring tones may also be personalized through use of the Cisco Unified Phone Application Suite.
Americans with Disabilities Act (ADA) Features	Handset is hearing aid-compatible and meets Federal Communications Commission (FCC) loudness requirements for the Americans with Disabilities Act (ADA). Section 508 loudness requirements can be achieved using industry-standard inline handset amplifiers such as Walker Equipment W-10 or CE-100 amplifiers. Dial pad is also ADA-compliant.
Quality of Service (QoS) Options	Supports differentiated services code point (DSCP) and 802.1Q/p standards.
Security	Positive device identity through X.509v3 Certificates, digitally signed images, cryptographically secure provisioning, and secure signaling and secure media with AES-128. Cryptography is not enabled by default and may only be enabled through a cryptographically enabled CUCM. The phone also contains an 802.1X supplicant and supports EAPOL pass-through.
Language Support	Built-in support for more than 30 languages (dependent on Cisco Unified Communications Manager version).
Configuration Options	IP address assignment can be statically configured or configured through the DHCP client.

Specification	Description
Dimensions (H x W x D)	8.2 x 10.5 x 6 in. (20.32 x 26.67 x 15.24 cm)
Weight	3.5 lb (1.6 kg)
Phone-Casing Composition	Acrylonitrile butadiene styrene (ABS) plastic in textured dark gray color with silver bezel
Power	Supports IEEE 802.3af PoE (Class 3). 48VDC is required; it can be supplied locally at the desktop using an optional AC-to-DC power supply (part number CP-PWR-CUBE-3=) or power injector (CP-PWR-INJ=). Local power options require a corresponding AC country cord (see Table 6).
Phone Software Requirements	Supported in 8.3(2) and greater
Call Control compatibility	Supported in Cisco Unified Communications Manager Versions 4.1(3)sr5b, 4.2(3)sr2b, 4.3(1), 5.1.1(b), 5.1(2), 6.0(1) and greater Supported in Cisco Unified Communications Express and SRST Version 4.1
Signaling Protocols	Skinny Client Control Protocol (SCCP) and Session Initiation Protocol (SIP) with Cisco call control

Temperature Variable	Description
Operating Temperature	32 to 104°F (0 to 40°C)
Relative Humidity	10 to 95% (noncondensing)
Storage Temperature	14 to 140°F (–10 to 60°C)

Cisco Unified IP Phone Expansion Module 7916

Cisco® Unified Communications is a comprehensive IP communications system of voice, video, data, and mobility products and applications. It enables more effective, more secure, more personal communications that directly affect both sales and profitability. It brings people together by enabling a new way of communicating — where your business moves with you, security is everywhere, and information is always available...whenever and wherever it is needed. Cisco Unified Communications is part of an integrated solution that includes network infrastructure, security, mobility, network-management products, lifecycle services, flexible deployment and outsourced management options, end-user and partner financing packages, and third-party communications applications.

The power of the Cisco Unified Communications family of products extends throughout the enterprise by delivering powerful, converged-voice solutions with the new Cisco Unified IP Phone Expansion Module 7916 extending capabilities to wideband audio phones (Figure 1).

Figure 1. Cisco Unified IP Phone Expansion Module 7916

Button	Line Status
Off (dark)	Line available
Green, steady	Line in use
Red, steady	Line in use by someone else
Amber, flashing	Line ringing
Green, flashing	Call is on hold

Feature	Description
Graphical display	4.3” graphical (TFT) color display, 16-bit color depth, 480 x 272 effective pixel resolution, with backlight. The display also supports localization requiring double-byte Unicode encoding for fonts.
Directory-number and feature buttons	The module has 12 physical buttons (24 with page key).
Page buttons	The two Page buttons are used to access each page of 12 buttons and provide phone status.
Sleep or inactivity mode	When Cisco Unified IP Phone 7965G or 7975G models are in power-saving sleep or inactivity mode, the Cisco Unified IP Phone Expansion Module 7916 is also in sleep or inactivity mode. In addition to the Display button, any button on the Cisco Unified IP Phone Expansion Module 7916 that is pressed will cause the displays to awaken. The inactivity period is configured by the system administrator.

Cisco Unified IP Phone 6945

Product Overview

The Cisco® Unified IP Phone 6945 is an innovative IP endpoint that delivers affordable, business-grade voice communication and support for video communications services to customers worldwide.

Built upon the features offered by the Cisco Unified IP Phone 6941, this Gigabit Ethernet enhanced business IP phone supports wideband audio handset and headset communications to provide clear voice quality in a business environment. The phone also supports Power-over-Ethernet (PoE) Class 1, which is the lowest-power consumption IP phone to save energy and support your green initiatives.

Features and Benefits

Tables 1 through 6 give features and other information about the phone, and Table 7 gives ordering information.

Table 1. Features and Benefits

Feature	Benefit
Gigabit Ethernet switch	The phone has a 10/100/1000BASE-T Ethernet connection through two RJ-45 ports, one for the LAN connection and the other for connecting a downstream Ethernet device such as a PC.
Wideband audio	The phone supports wideband audio (G.722 codec and adherence to TIA 920) **Note:** Wideband audio is supported in the handset and headset only, not in the speakerphone.
PoE Class 1	It supports IEEE 802.3af PoE (Class 1); power consumption does not exceed 3.84 watts.
Lighted Hold key	The key lights, when pressed, to put a call on hold, and stays lit until the held call resumes. The key flashes if one call is held while another is engaged. The key is dark when no calls are on hold.

Feature	Benefit
Lighted Menu key	The key lights, when pressed, to access voicemail messages, call logs, network settings, user preferences, corporate directories, and XML services; it stays lit while menu items are active.
Lighted message waiting indicator (MWI)	The key lights when there is new voicemail, and the light is visible on both the phone chassis and the handset; it stays lit until you process your new voicemail.
Deep-Sleep option	You can save power by cycling power - by time of day and day of week.
Co-branding	The Co-Branding button allows you to include your logo on the Cisco Unified IP Phones 6900 Series phones. Cisco has approved third-party vendors to produce the buttons.
Speakerphone	The full-duplex speakerphone allows for flexibility in placing and receiving calls.
Headset support	An RJ-9 interface to the optional headset offers you additional options for placing and receiving calls.
Graphical display	A white backlit, monochrome, 396 x 162 pixel-based display with an antiglare screen provides scrollable access to calling features and text-based XML applications.
Four soft-key buttons and a scroll toggle bar	Your calling options are dynamically presented; the scroll toggle bar allows easy movement through the displayed information.
Network features	Network features include Cisco Discovery Protocol and IEEE 802.1 p/q tagging and switching.
Volume control	A volume-control toggle provides easy decibel-level adjustments of the handset, monitor speaker, and ringer.

Feature	Benefit
Dual-position foot stand	The display is easy to view and the buttons and keys are easy to use; you can remove the foot stand for wall mounting, with mounting holes located on the base of the phone.
Multiple ring tones	The phone offers seven user-adjustable ring tones.
American Disabilities Act (ADA) features	The hearing-aid-compatible (HAC) handset meets the requirements set by the ADA; it also meets ADA HAC requirements for a magnetic coupling to approved hearing aids. The phone dialing pad also complies with ADA standards.
Signaling protocol support	The phones are supported on Cisco Unified Communications Manager and Cisco Unified Communications Manager Business Edition Versions 7.1(2) and later, compatible with both Skinny Client Control Protocol (SCCP) and Session Initiation Protocol (SIP).
Codec support	G.722, G.711a, G.711, G.729a, G.729b, G.729ab, and Internet Low Bitrate Codec (iLBC) audio-compression codecs are supported.
Voice quality	Comfort-noise generation and voice-activity-detection (VAD) programming is provided on a system basis.
Video communications	Video communications requires Cisco Unified Video Advantage 2.2 and later and the Cisco VT Camera III.
Security features	• Certificates • Image authentication • Device authentication • File authentication • Signaling authentication • Media encryption using Secure Real-Time Transfer Protocol (SRTP) • Signaling encryption using Transport Layer Security (TLS) Protocol • Encrypted configuration files Cryptography is not enabled by default and may only be enabled through a cryptographically enabled CUCM.

Specification	Description
Firmware upgrades	You can download firmware changes from Cisco.com.
Software upgrades	Software upgrades are supported with a Trivial File Transfer Protocol (TFTP) server.
Dimensions (H x W x D)	6.4 x 7.4 x 8.1 in. (164 x 188 x 205 mm)
Weight	Slimline: 37 oz (1039g); Standard: 39 oz (1102g)
Phone casing composition	Polycarbonate acrylonitrile butadiene styerene (ABS) plastic

Power Requirement	Description
IEEE 802.3af PoE	The phones can receive power from IEEE 802.3af-compliant blades.
Local power	The phones can also be powered locally with a power adapter (CP-PWR-CUBE-3=) along with one of the power cords listed in Table 4.

Cisco Unified SIP Phone 3905

Product Overview

The Cisco® Unified SIP Phone 3905 is a cost-effective, entry-level IP phone that addresses the need for basic voice communications with common Cisco Unified Communications features in an attractive design that is also budget-friendly. The phone can fill the communication needs of cubicle, retail, classroom, manufacturing floor and hallway, as well as various wall-mounted deployments.

The single-line Cisco Unified SIP Phone 3905 supports two calls per line. Fixed keys for redial, transfer, and hold/resume, along with a full-duplex speakerphone and two-line display, which comes standard, deliver a more productive, easier-to-use, and flexible endpoint experience. With its dual-port 10/100 Ethernet switch for network and PC connections, the Cisco Unified SIP Phone 3905 offers IT organizations a cost-effective solution to reduce cabling infrastructure and administration costs at the desktop.

The phone is also eco-friendly, taking advantage of reground and recyclable plastics to deliver a more earth-responsible solution.

Features and Benefits

Table 1 lists features and benefits of the Cisco Unified SIP Phone 3905.

Table 1. Features and Benefits

Feature	Benefit
Hardware	
Ergonomic design	The phone offers an easy-to-use interface and provides a traditional telephony-like user experience.
Display	A graphical monochrome display with a resolution of 128 x 32 pixels provides a scrollable two-line intuitive access to phone services and configuration.
Foot stand	A foldable single-position foot stand offers optimum display viewing and comfortable use of keys.
Wall mountable	You can fold the foot stand for wall mounting, with mounting holes located on the base of the phone.
Speakerphone	A full-duplex speakerphone allows for flexibility in placing and receiving calls.
Volume control	The volume control toggle makes it easy to adjust the volume of the handset, speakerphone, and ringer.
Ethernet switch	The phone has a 10/100BASE-T Ethernet connection through two RJ-45 ports, one for the LAN connection and the other for connecting a downstream Ethernet device such as a PC.

Feature	Benefit
Buttons	The phone has the following buttons: • Select, Back, and Two-Way Navigation • Redial, Transfer, and Hold/Resume • Standard dial pad • Mute, Volume Up/Down, and Speakerphone
Firmware	
Signaling protocol	Session Initiation Protocol (SIP) is supported.
Call features	• Adjustable volume levels • Auto barge • Call forward • Call pickup • Call waiting • Call transfer • Conference • Forced Authorization Codes (FAC) • Group call pickup • Message-waiting indicator • Music on hold • Private-line automatic ringdown (PLAR) • Redial • Shared line
Audio codec support	G.711a, G.711µ, G.729, G.729a, and G.729ab.
Voice quality	Comfort-noise generation (CNG) and voice-activity-detection (VAD) programming is provided on a system basis.
Configuration options	• Dynamic Host Configuration Protocol (DHCP) client or static configuration • Support for online firmware upgrades using Trivial File Transfer Protocol (TFTP) • Domain Name System (DNS)
Provisioning and manufacturing	• Web server for configuration and statistics • Real-Time Control Protocol (RTCP) support and monitoring • Syslog

Cisco Unified Communications Manager Support

The Cisco Unified SIP Phone 3905 is supported on the Cisco Unified Communications Manager Version 7.1(5) or later, the Cisco Unified Communications Manager Business Edition 3000 Version 8.6, the Cisco Unified Communications Manager Business Edition 5000 Version 8.5 or later, and the Cisco Unified Communications Manager Business Edition 6000 Version 8.5 or later.

Product Specifications

Table 2 lists the specifications of the Cisco Unified SIP Phone 3905.

Table 2. Product Specifications

Protocols	SIP
Connectivity	10/100BASE-T wired Ethernet LAN port plus switched PC port.
Memory	• 4-MB flash memory • 32-MB synchronous dynamic RAM (SDRAM)
Physical dimensions	205 x 150 x 53.5 mm (in slab mode with the foot stand folded)
Weight	594.3g
Power over Ethernet (PoE)	IEEE PoE 802.3af is supported, Class 1.
Local power	The phone can also be powered locally with one of the power adapters listed in Table 3.
Operating temperature	23 to 113℉ (-5 to 45℃)
Humidity	Nonoperating: 10 to 90%, noncondensing

PC ultraplano HP Compaq Elite 8300

Implementación de PC poderoso, rendimiento eficiente; el PC de sobremesa HP Compaq 8300 Elite ultraoplano proporciona las últimas tecnologías, la potencia y el rendimiento dentro de un diseño de formato flexible y eficiente.

Tecnología de PC fiables para empresas

Incluye la tercera generación de la nueva familia de procesadores Intel® Core™ y el chipset Intel® Q77 Express para un rendimiento robusto en un diseño de formato pequeño, compacto y eficiente de 4 litros.

Incluye soporte para una vPro opcional que activa NIC inalámbrica, así como una gran variedad de discos ópticos y unidades de almacenamiento. El lector opcional Secure Digital (SD) ofrece alta capacidad de almacenamiento externo de datos.

Tecnología Smart Response (SRT) de Intel, una solución con caché de disco, proporciona el rendimiento de una unidad de estado sólido mientras que conserva la capacidad de almacenamiento de una unidad de disco duro de almacenamiento.

Cómodo acceso al audio con puertos de entrada y salida de líneas y puertos USB 3.0 para transferir datos a rápidas velocidades. Cuenta con 1 salida VGA y 2 salidas de video DisplayPort para soporte de doble monitor digital integrado.

SRS Premium Sound™ proporciona una experiencia de audio excepcional, que incluye conferencias de VoIP, transmisiones Web y colaboración. El software HP Virtual Room exclusivo ofrece colaboración cara a cara en todo el mundo.

Capacidad de gestión y seguridad

Datos y credenciales seguros con el Trusted Platform Module (TPM) certificado e integrado de HP. Deshabilite los puertos USB y ranuras para mayor seguridad.

Incluye un completo conjunto de funciones de seguridad basadas en hardware y software, diseñadas para proteger los datos y la inversión de hardware.

Elimine de manera permanente información personal susceptible con las funciones Disk Sanitizer y File Sanitizer de HP, utilice reconocimiento de rostros y teléfonos para establecerse como usuario autorizado y almacenar información de acceso con Credential Manager.

Respaldada por HP

Mantenga un entorno de trabajo uniforme, además de facilidad las transiciones y ayude a reducir los costes de soporte, con un compromiso de estabilidad del ciclo de vida mínimo de 15 meses de HP.

Benefíciese de los HP Custom Integration Services (CIS), que ofrecen servicios de implementación de software and hardware personalizados para sus necesidades empresariales.

Los PC para empresas de HP pasan por un proceso con múltiples niveles de más de 115.000 horas para ayudar a asegurar una inversión duradera.

Confíe en servicio y soporte premiados con una garantía limitada, estándar de 3 años de HP. Una cobertura adicional está disponible a través de los Servicios HP Care Pack.

ESPECIFICACIONES

Formato	PC sobremesa ultraplano
Sistema operativo	Windows® 7 Professional 32 Windows® 7 Professional 64 Windows® 7 Home Premium 64 FreeDOS
Procesador	Intel® Core™ i7-3770S con gráficos HD Intel 4000 (3,10 GHz, 8 MB de caché, 4 núcleos); Intel® Core™ i5-3570S con gráficos HD Intel 2500 (3,10 GHz, 6 MB de caché, 4 núcleos); Intel® Core™ i5-3475S con gráficos HD Intel 4000 (2,90 GHz, 6 MB de caché, 4 núcleos); Intel® Core™ i5-3470S con gráficos HD Intel 2500 (2,90 GHz, 6 MB de caché, 4 núcleos); Intel® Core™ i3-2130 con gráficos HD Intel 2000 (3,40 GHz, 3 MB de caché, 2 núcleos); Intel® Core™ i3-2120 con gráficos HD Intel 2000 (3,30 GHz, 3 MB de caché, 2 núcleos); Intel® Pentium® G870 con gráficos Intel HD (3,10 GHz, 3 MB de caché, 2 núcleos); Intel® Pentium® G860 con gráficos Intel HD (3,00 GHz, 3 MB de caché, 2 núcleos); Intel® Pentium® G640 con gráficos Intel HD (2,80 GHz, 3 MB de caché, 2 núcleos)
Chipset	Procesador Intel® Q77 Express
Memoria	Hasta 16 GB 1600 MHz Ranuras de memoria 2 SODIMM Para sistemas configurados con más de 3 GB de memoria y un sistema operativo de 32 bits, es posible que no esté disponible toda la memoria debido a necesidades de recursos del sistema. La asignación de memoria sobre 4 GB requiere un sistema operativo de 64 bits.
Almacenamiento interno	320 GB hasta 500 GB SATA (7200 rpm) hasta 320 GB SATA SED (7200 rpm) 120 GB hasta 128 GB Unidad SATA de estado sólido hasta 256 GB Unidad de estado sólido SATA de cifrado automático
Soportes extraíbles	DVD-ROM de SATA plano grabadora de DVD SATA SuperMulti plana
Gráficos	Gráficos Intel HD Basic integrados, 2000, 2500 o 4000; ATI Radeon HD 7650A (MXM)
Audio	Sonido con códec Realtek ALC221 de alta definición; Tecnología de gestión de sonido SRS Premium Sound; altavoz interno estándar
Comunicaciones	Conexión de red Intel 82579LM Gigabit (estándar) Conexión de red inalámbrica (opcional) con mini tarjeta Intel Centrino Advanced N6205 PCIe
Puertos y Conectores	4 USB 3.0; 6 USB 2.0; 2 PS/2; 1 VGA; 1 entrada de audio; 1 salida de audio; 1 RJ-45; 1 auricular; 1 micrófono; 2 DisplayPort
Dispositivos de entrada	Teclado estándar HP (PS/2 o USB) Ratón óptico HP con rueda de despl. de 2 botones (PS/2 o USB), Ratón láser HP con rueda de despl. de 2 botones
Software	Microsoft® Office Starter: con funcionalidad reducida Word y Excel® solamente, con publicidad. Sin PowerPoint® o Outlook®. Compre Office 2010 para utilizar el software con todas las funciones; Adobe Flash Player; Ask Search (motor de búsqueda alternativo); HP Marketplace; Suite de seguridad HP ProtectTools; HP Wallpaper; Microsoft Advantage Program; Microsoft Security Essentials; PDF Complete Corporate Edition; WinZip Basic; Yahoo Search (motor de búsqueda alternativo); Entorno de soporte HP EUDI; Ayuda y soporte de HP; HP Recovery Manager; HP Setup v9.0; HP Support Assistant
Seguridad	Trusted Platform Module (TPM) 1.2; seguridad estricta (a través de BIOS); Desactivación de puerto SATA (a través de BIOS); bloqueo de unidades; tecnología de protección de identificación Intel; activación/desactivación de puerto serie, paralelo, USB (a través de BIOS); desactivación de puerto USB en fábrica (opcional); control de inicialización/grabación de medios extraíbles; contraseña de encendido (a través de BIOS); contraseña de configuración (a través de BIOS); sensor de cubierta; admite candados para chasis y dispositivos de bloqueo de cables
Dimensiones	25,2 x 25,4 x 6,6 cm
Peso	A partir de 3,1 kg
Conformidad del rendimiento energético	Disponibles configuraciones con calificación ENERGY STAR®, EPEAT® donde HP registra productos comerciales de escritorio. Consulte en www.epeat.net los detalles para el registro en su país.
Alimentación	135 W, 87% de eficacia, PFC activo (gráficos integrados) 180 W, 87% de eficacia, PFC activo (gráficos discretos);
Soluciones de ampliación	1 PCIe mini; 1 MXM; 1 mSATA Una unidad plana ; Uno de 6,35 cm (2,5")
Garantía	Protegido por HP Services, con garantía estándar 3-3-3. Los términos y condiciones varían en función del país y el modelo de negocio.

Monitor LCD HP Compaq LE2002xi de 50,8 cm (20") con soporte IWC

Convierta su área de trabajo en un lugar productivo y cómodo

Trabaje más rápido y ahorre espacio en su lugar de trabajo con un delgado monitor que cuenta con un flexible soporte de centro de trabajo integrado.

Maximice su espacio de trabajo
El delgado perfil, el tamaño compacto y la retroiluminación mediante LED del monitor LCD HP Compaq LE2002xi con el soporte de centro de trabajo integrado (IWC) permite ubicarlo en cualquier entorno. Conecte un equipo de sobremesa HP t5335z Smart Client o ultracompacto (USDT) a la parte posterior del soporte para liberar valioso espacio en su escritorio. Este potente monitor con retroiluminación mediante LED le ayudará a respetar sus iniciativas medioambientales y aporta estilo y comodidad a su espacio de trabajo.

Reduzca su impacto
HP se preocupa por reducir el impacto sobre el medio ambiente mediante el diseño de pantallas más respetuosas. El HP Compaq LE2002xi incluye una gran variedad de características respetuosas con el medio ambiente, como: • Un panel retroiluminado LED sin mercurio. • Componentes sin BFR/PVC y una pantalla de cristal sin arsénico[1] que permiten un reciclado responsable. • Registrado en EPEAT® Silver[2], cuenta con la certificación ENERGY STAR® y para pantallas TCO, lo que significa que su inversión cumple los requisitos de eficiencia energética y rendimiento medio ambiental requeridos.

Diseño ideal para la oficina
Benefíciese de la pantalla de 50,8 cm (20") en diagonal con una amplia resolución de 1600 x 900, un soporte IWC e innovadoras funciones para aumentar su productividad y proporcionar una visión cómoda. • Un increíble nivel de contraste dinámico de 3.000.000 M: 1, visión de ángulos 160°/170° y tiempos de respuesta rápidos de 5 ms que ofrecen imágenes nítidas y detalladas[3]. • Las entradas duales (DVI-D y VGA) ofrecen diversas opciones de conectividad.

• El software Display Assistant permite evitar robos, ahorrar energía, crear particiones de equipos según convenga y obtener una calidad de imagen personalizada. • La posibilidad de ajustar la altura, inclinación y giro ofrecen una visión cómoda y nítida a distintos ángulos. • Conecte un equipo de sobremesa HP t5335z Smart Client o ultracompacto (USDT) mediante las bases VESA paraahorrar espacio en su lugar de trabajo. • Mantenga los cables en orden gracias al clip de gestión de cables integrado.

Relax con fiabilidad HP
Respaldado por el servicio y el soporte de HP galardonado en todo el mundo, la garantía limitada a tres años de este monitor junto con el programa opcional ampliado HP Care Packs incluye piezas y mano de obra, y permite garantizar que las necesidades futuras de su empresa estén cubiertas.

ESPECIFICACIONES

Ángulo de visualización	170° en horizontal; 160° en vertical
Brillo	250 cd/m²
Relación de contraste	1000:1 estático; 3000000:1 dinámico
Índice de respuesta	5 ms típica
Resolución nativa	1600 x 900
Señal de entrada	1 DVI-D; 1 VGA
Potencia de entrada	Tensión de entrada: De 100 a 240 V CA
Consumo energético	26 W (máximo), 22 W (normal), espera
Dimensiones	con soporte:48,20 x 25,03 x 36,18 hasta 48,63 cm sin soporte:48,20 x 4,75 x 29,41 cm
Peso	5,8 kgcon soporte
Características ergonómicas	Inclinación: De -3 a +20°; Rotación: 360°
Medioambiental	Temperatura operativa:5 a 35°C; Humedad operativa:De 20 a 80% HR
Conformidad del rendimiento energético	Calificación ENERGY STAR®; EPEAT® Silver
Certificación y conformidad	TCO 5.0, VCCI, KC, CECP, FCC, CE, BSMI, ISC, C-Tick, Gost, E-Standy, RoHS, WEEE, ETL, CCC, Energy Star® 5.0, NOM, KCC, BSMI, TUV, Microsoft WHQL, Designación Energía China Nivel 1, EPEAT® Silver
Software	HP Display Assistant
Garantía	Garantía limitada de tres años en piezas, mano de obra y servicio en casa del cliente, incluida la retroiluminación. La disponibilidad varía dependiendo de la región. Son aplicables determinadas restricciones y exclusiones. Para obtener más detalles, póngase en contacto con el servicio de atención al cliente o el soporte de HP

Kit para PC de sobremesa y periféricos: llave maestra

todo lo que necesita para proteger el ordenador de sobremesa y sus periféricos.

K64617M

Descripción producto

Con su largo cable de acero de carbono, su placa de anclaje y el candado con llave de Kensington, el Kit de bloqueo Kensington para ordenador de sobremesa y periféricos tiene todo lo que necesita para proteger su ordenador de sobremesa, dos periféricos, y un ratón y un teclado con cable. Podrá asegurar hasta los dispositivos con ranura de seguridad Kensington.

Características

- Los candados con llave maestra le permiten equipar a sus empleados con sus propios candados personales, disponiendo a la vez de una llave universal para el personal informático
- Todo lo que necesita para proteger su ordenador de sobremesa, dos periféricos, y un ratón y un teclado con cable.
- Sujetacables que sujeta el teclado y el ratón con cable
- La placa de anclaje asegura los equipos sin la ranura de seguridad Kensington
- Bloquee un ordenador de sobremesa y varios periféricos con este práctico kit
- Cinta adhesiva industrial 3M VHB en barra de anclaje para periféricos equipados con ranuras de seguridad de otros fabricantes: 1 pulgada cuadrada (645 mm x 645 mm)
- Incluye adaptadores (2) de ranura K metalizados y de acero estampado y un sujetacables (1)
- Cable de acero de carbono (calidad para aeronaves) multihilo de 2.400 mm de longitud y 5,3 mm de grosor con núcleo de acero templado de carbono
- Incluye dos llaves
- Varias opciones de llaves personalizadas, ideales para las oficinas, los laboratorios y las bibliotecas
- Registro en línea del código de la llave con Register & Retrieve™ y servicio de sustitución

Especificaciones

- **Diseñado para:** PC de sobremesa, Portátiles, Monitores

Información del producto

Profundo	178mm
Ancho	152mm
Alto	25mm
Peso bruto	0.408kg

Información del packing del producto

Profundo	178mm
Ancho	152mm
Alto	25mm
Peso bruto	0.408kg
UPC #	5028252283274
Unidad de Cantidad	1

Información del master carton

Profundo	381mm
Ancho	159mm
Alto	159mm
Peso bruto	4.3kg
UPC #	5028252283281
Unidad de Cantidad	10

Envío de Información

País de origen	CN
Minimum Order Quantity	1
Fecha de Puesta de Sol	10/03/2010

Información General

% Reciclado	0

Galaxy Tab 2 10.1 WiFi P5110 GT-P5110

Plataforma

Sistema Operativo	Android Ice Cream Sandwich 4,0 + TouchWiz
Navegador	Android

CPU

Procesador	Dual Core
Velocidad	1,0 Ghz

Formato

Dispositivos de Entrada	Pantalla táctil

Tamaño y Dimensiones

Dimensiones (AlXAnXProf)	175,3 x 256,6 x 9,7 mm
Peso	581 g

Pantalla

Interna	**Tecnología**	TFT
	Resolución	1.280 x 800 (~149 ppi)
	Tamaño	10,1"

Batería

Estándar	**Capacidad**	7.000 mAh
	Tiempo en conversación	580min (reproducción multimedia)
	Tiempo en espera	2.570 h

Cámara delantera

Resolución de la cámara	3 megapíxeles	
Efectos fotográficos	Escala de grises, sepia, negativo	
Cámara delantera	**Resolución**	VGA

Seguridad

Gestión remota	Sí (Samsung Dive)
DRM	Sí (OMA DRM v1.0)

Vídeo

Reproductor de vídeo	**Formatos soportados**	3gp (H.263 + AMR), H.263, H.264, MPEG4, ASF, WMV y AVI
Grabador de vídeo	**Calidad / Frames per second**	1280x720/25fps
Video Streaming	Sí	

Trabajo y oficina

Visor / Editor de Documentos	Sí (Polaris Office)
Modalidad offline	Sí (modo Avión)
Explorador de archivos	Sí
Comandos por voz	Sí (Búsqueda por voz)

Conectividad

Bluetooth	Sí (3,0)
USB	Sí (2,0 HS)
WiFi	WiFi 802,11 a/b/g/n y WiFi Direct
AGPS	Sí / Navigation
Aplicación PC Sync	Sí (Kies)
DLNA	Sí (AllShare)
Outlook Sync	Sí (mediante Kies)

GALAXY Note 10.1 N8000 GT-N8000

Plataforma

Sistema Operativo	Android Ice Cream Sandwich 4,0
Navegador	Android

CPU

CPU Type	Quad Core
CPU Clock Rate	1,4 GHz

Tamaño y Dimensiones

Dimensiones (AlXAnXProf)	262 x 180 x 8,9 mm
Peso	600 g

Pantalla

Interna	**Tecnología**	TFT
	Resolución	1.280 x 800
	Tamaño	10,1"

Batería

Estándar	**Capacidad**	7.000 mAh
	Tiempo en conversación	2G: hasta 4.310 m; 3G: hasta 2.280 m
	Tiempo en espera	2G: hasta 2.230 h; 3G: 2.020 h

Formato

Método de entrada	**Pantalla táctil / QWERTY / Slider**	Pantalla táctil

Cámara delantera

Resolución de la cámara	5 M
Flash	Sí
Flash LED	Sí
Autoenfoque	Sí
Modo disparo	Un solo disparo / Disparo sonrisa / Panorámica / Animación / Compartir Disparo / Compartir foto de amigo
Efectos fotográficos	Negativo / Blanco y negro / Sepia
Cámara delantera	

Vídeo

Reproductor de vídeo	3 GP / MP4 / MKV / WMV / AVI / FLV
Grabador de vídeo	1.280 x 720 / 30fps

Conectividad

Bluetooth	Sí BT4.0
USB	Sí (2,0 HS)
Conexión como módem	Sí
AP móvil	Sí
DLNA	Sí (AllShare)
Outlook Sync	Sí (mediante Kies)
WiFi	WiFi 802.11a/b/g/n, HT 40
AGPS / SW navegación	Sí / Navigation
Aplicación Sync con PC	Sí (Kies)

Llamadas

Llamada de voz	Sí
Videollamada	Sí

Infinity® Kappa Patient Monitor

Vital signs monitor that supports all patients from adults to neonates, in all acuity levels. Intended for fixed monitoring at the bedside, the standard monitor includes a CPU base unit that is compatible with standard medical-grade, flat-panel displays.

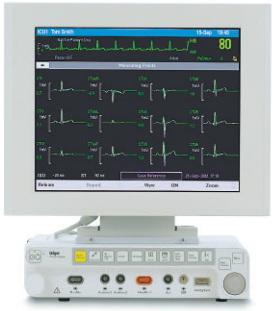

MT-1915-2005

FEATURES

– Works as a standalone device or connects to Infinity Network via DirectNet or wireless adapter for wired or wireless networking
– Scales using Infinity pods and software options

Monitoring Capabilities

Neonatal, pediatric and adult applications


MT-1789-2004

Infinity Kappa
Provides fixed monitoring at the bedside, with a built in power supply.

TECHNICAL DATA

SUPPORTED PARAMETERS

ECG

Displays up to 12 leads	
Available leads	I, II, III, aVR, aVF, aVL, V, V+, V1 – V6 [V, aVR aVF, aVL only with 5- and 6-lead sets, V+ only with 6-lead set, V1 to V6 only with 12-lead pod (12-lead not intended for neonates)], TruST® 12-lead with reduced lead-set (6-wire): I, II, III, aVL, aVR, aVF, dV1, V2, dV3, dV4, V5 and dV6 (indicated for adults and pediatrics).[1]
Measuring range (heart rate)	15 to 300 bpm
Accuracy	±2 bpm or ±1% (whichever is greater)
Frequency ranges	Filter off: 0.05 to 40 Hz display; 0.05 to 125 Hz printer Monitoring filter: 0.5 to 40 Hz; ESU filter: 0.5 to 16 Hz

[1] Optimum performance of TruST leads is based on a minimum 0.3mV amplitude and QRS duration <180 milliseconds on patients with a body surface area (BSA) of 1.5 – 2.5 m². TruST 12-lead reduced lead-set ECG algorithm provides 12-lead monitoring using a standard 6-wire lead-set and standard lead placement for limb leads, V2 and V5. ARIES software option enhances TruST 12-lead monitoring with the addition of 12-lead ST Analysis.

CONTINUING TECHNICAL DATA

QRS Detection Range	
Amplitude	0.5 to 5 mV
Duration	Adult and pediatric: 70 to 120 msec Neonatal: 40 to 120 msec
Alarms	User-selectable upper and lower limits
Pacer detection (adult/pediatric)	Leads: I, II or III Amplitude: ±2 to ±700 mV Width (d_o): 0.2 to 2.0 msec
Accessories	3-, 5- or 6-lead electrode set or 12-lead pod

ST (not intended for neonates)	
Available leads	With 3-lead ST option: Choice of any 3 available leads With ARIES option: Up to 12 leads
ST complex length	892 msec (-300 to +600 msec from fiducial point)
Sample rate	225 samples/sec
Frequency response	0.05 – 40 Hz

Isoelectric measurement point	
Measuring range	Start of ECG complex to fiducial point
Default	QRS onset – 28 msec

ST measurement point	
Adjustment range	Fiducial point to end of ECG complex
Point default	QRS offset +80 msec
Update interval	15 sec, 1 normal beat required
Resolution	±0.1 mm
Trends	Graphical, tabular and graphical mini-trends
INOP Alarm	Yes
Upper and lower ST alarms	±15 mm, ±0.1 mm increments
Duration of ST event to trigger alarm	None, 15, 30, 45, 60 seconds

Arrhythmia Detection	
Adult and Pediatric	Yes
Neonatal	No, only bradycardia is available as a low heart rate alarm in neonatal mode
ARR Mode	User Selectable; OFF, Basic or Advanced
Basic ARR (standard)	Asystole, ventricular fibrillation, ventricular tachycardia and artifact (ARR label displayed to register arrhythmia occurrence)
Advanced ARR (option)	Ventricular run, accelerated idioventricular rhythm, supra-ventricular tachycardia, couplet, bigeminy, tachycardia, bradycardia, pause and also supports PVC/min parameter output.

Respiration	
Sensing leads	I, II (user-selectable)
Measuring method	Impedance pneumography
Auxiliary current	≤ 10μA for any active electrode
Detection threshold	0.15Ω to 4.0Ω in manual mode (user adjustment) 0.2Ω to 1.5Ω in auto mode (automatic adjustment)
Measuring range	0 to 155 breaths per min
Accuracy	±1 breath/min or 2% of rate (whichever is greater)
Apnea detection	For neonatal and pediatric patients
Alarms	User-selectable upper and lower respiration rate

Pulse Oximetry (SpO_2)	
SpO_2 algorithm	Masimo® SET® (Signal Extration Technology) Masimo provides the industry gold standard for motion tolerant pulse oximetry. See additional product datasheet for more detailed specifications.
SpO_2 algorithm	Nellcor™ OxiMax™ [2] See additional product datasheet for more detailed specifications.
SpO_2 algorithm	Dräger's OxiSure® SpO_2 [3]
Dräger's OxiSure® SpO_2	
Connection	MultiMed® pods (SpO_2 port)
Displayed parameters	Saturation (fraction of oxyhemoglobin to functional hemoglobin) and pulse (rate and waveform)
Measuring method	Transmission spectrophotometry
Measuring range	SpO_2: 1 to 100% Pulse: 30 to 250 bpm
Accuracy	SpO_2: 0 to 69% not specified SpO_2: 70 to 100%: ±2% (±3% for neonates; Masimo® LNOP-Ear: ±3.5%; Nellcor® DS100A: ±3%) Pulse: ±3 bpm or ±3% (whichever is greater)
Alarms	User-selectable upper and lower limits for SpO_2 and pulse rate Life-threatening desaturation alarm in neonatal mode only
Accessories	Dräger Medical-approved Masimo or Nellcor sensors Dräger Medical reusable SpO_2 probes (not intended for neonates).
Temperature	
Displayed parameters	Absolute and delta temperatures
Measuring range	Absolute: -5° C to 50° C Delta: 0° C to 55° C
Resolution	0.1° C
Accuracy	Absolute: ±0.1° C Delta: ±0.2° C
Alarms	User-selectable upper and lower limits for absolute and delta values
Accessories	Dräger Medical-approved core and skin probes
Noninvasive Blood Pressure (NBP)	
Displayed parameters	Systolic, Mean and Diastolic pressures
Measuring method	Oscillometric utilizing step deflation
Modes of operation	Manual (single measurement); Continuous (5 minutes) and Interval
Interval times	1, 2, 2.5, 3, 5, 10, 15, 20, 25, 30, 45, 60, 120 and 240 minutes
Heart rate measuring range	30 to 240 bpm
Pressure measuring range	
Adult	Systolic: 30 to 250 mmHg Mean: 20 to 230 mmHg Diastolic: 10 to 210 mmHg
Pediatric	Systolic: 30 to 170 mmHg Mean: 20 to 150 mmHg Diastolic: 10 to 130 mmHg
Neonatal	Systolic: 30 to 130 mmHg Mean: 20 to 110 mmHg Diastolic: 10 to 100 mmHg

CONTINUING TECHNICAL DATA

Cuff pressure	
Default inflation pressure	
Adult	160 mmHg ±10 mmHg
Pediatric	120 mmHg ±10 mmHg
Neonatal	110 mmHg ±10 mmHg
Inflation pressure after a valid measurement	
Adult	(Last Systolic +25 mmHg) ±10 mmHg
Pediatric	(Last Systolic +25 mmHg) ±10 mmHg
Neonatal	(Last Systolic +30 mmHg) ±5 mmHg
Maximum inflation pressure	
Adult	265 mmHg ±5 mmHg
Pediatric	180 mmHg ±10 mmHg
Neonatal	142 mmHg ±10 mmHg
Minimum inflation pressure	
Adult	110 mmHg ±10 mmHg
Pediatric	90 mmHg ±10 mmHg
Neonatal	70 mmHg ±10 mmHg
Connector	Quick-release connector with single airway

Invasive Blood Pressure	
Displays up to 8 pressures	
Measuring method	Resistive strain gauge transducer
Display resolution	1 mmHg
Measuring range	-50 to 400 mmHg (after zeroing)
Frequency ranges	DC to 8 Hz, DC to 16 Hz, or DC to 32 Hz (user-selectable)
Zero balance range	±200 mmHg
Transducer specifications	Dräger Medical-approved transducers with a resistance of 200 to 3000Ω and an equivalent pressure sensitivity of 5μV/V/mmHg ±10%
Accuracy	±1 mmHg or ±3%, exclusive of transducer (whichever is greater)
IBP alarms	User-selectable upper and lower limits for systolic, mean and diastolic pressures
Accessories	Dräger Medical-approved pressure transducers

Cardiac Output	
Parameter display	Cardiac output, Blood Temperature, Injectate Temperature
Measuring method	Thermodilution
Connection	Hemo 2, Hemo 4 or HemoMed™ pods
Measuring range	
Cardiac output	0.5 to 20 L/min
Blood temperature	25° C to 43° C (77° F to 109° F)
Injectate temperature	-5° C to +30° C (23° F to 86° F)
Accuracy	
Cardiac output	±5% (with 0° C injectate)
Injectate temperature	±0.25° C
Degree of protection against electric shock	Type CF
Defibrillation protection	Defibrillation-Proof Applied Part per IEC 60601-1

DISPLAY SPECIFICATIONS

Type	Medical grade independent TFT active matrix LCD (available sizes 15", 17" or 19")
Channels	4 standard, 6, 8 optional
Resolution	800 x 600 pixels
User interface	Easy-to-use menu structure with rotary knob and fixed keys
Sweep Speed	6.25, 12.5, 25 and 50 mm/s ± 10% (accuracy only guaranteed for a 15" display)

Alarms

Priorities	3; High (Life Threatening), Medium (Serious), Low (Advisory)
Audio alarm tones	User Selectable: Infinity, IEC 1[2] or IEC 2 [2]

Connections

MultiMed® cables, Masimo SET® SmartPod®, Nellcor OxiMax SmartPod[2], HemoMed™ Pod, 3 Pod Communication ports, NBP Input, analog output, QRS sync output, RS 232, remote keypad, and Scio® Four modules.

Analog Output

Signals	ECG, arterial blood pressure
Delay	≤25 msec

Infinity Network

Networking method	DirectNet or Wireless
Wireless encyption	None, WEP, WPA2[2]

See individual product datasheets for detailed information.

Physical Specifications

Cooling	Fan
Size H x W x D	102 x 368 x 368 mm (4 x 14.5 x 14.5 in)
Weight	8.4 kg (19 lb)

Information Management Capabilities

Data storage	24 hours of trended parameter information
Data resolution	30-second sampling
Trend tables	1-, 5-, 15-, 30- or 60-minute display formats
Trend graphs	1-, 2-, 4-, 8-, 12- or 24-hour display formats

Electrical Specifications

Power consumption	≤70 Watts (fully loaded)
Patient leakage current	≤10 μA
Protection class	Internal Class 1 power supply (per IEC 60601-1)
Power requirements	100 to 240 V AC, 3 A
Frequency	50 to 60 Hz
Chassis leakage current	300 μA @ 120 V AC 500 μA @ 240 V AC

Infinity® M300 Patient-worn Monitor

Infinity® M300 provides the performance of a full-size patient monitor, packaged in a patient-worn telemetry device for adult and pediatric patients. Built-in ACE® (Arrhythmia Classification Expert) and pacer detection algorithms enhance ECG processing and help to reduce false alarms.

Infinity M300 provides continuous standalone monitoring – even if the patient inadvertently moves out of the network coverage area. Two-way communication between Infinity M300 and the Infinity CentralStation facilitates wireless data exchange and signal integrity. Working together, the Infinity CentralStation and Infinity M300 enhance patient care management by providing fast data access, rapid assessment, decision support and clinical reporting.

FEATURES

- 3- to 6-wire ECG monitoring with TruST™ 12-lead
- Vital information access in color
- Alarms alerts and controls to support the telemetry workflow
- SpO_2 – ready in every device
- True battery management solution
- Wireless networking using commercial WiFi components

Infinity M300
Patient-worn telemetry device

TECHNICAL DATA

SUPPORTED PARAMETERS

ECG	
Available leads	3-wire: I, II, III
Adult/Pediatric	5-wire: I, II, III, aVR, aVL, aVF, V 6-wire: I, II, II, aVR, aVL, aVF, V, V+ 6-wire with Infinity TruST 12-lead: I, II, II, aVR, aVL, aVF, dV1, V2, dV2, dV3, dV4, V5, dV6
Leads analyzed	Any two user-selected ECG leads (simultaneously), or any one user-selected ECG lead
Detected events/rhythms	Asystole, Ventricular Fibrillation, Ventricular Tachycardia, Bradycardia, Ventricular Run, Accelerated Idioventricular Rhythm, Supraventricular Tachycardia, Ventricular Couplet, Ventricular Bigeminy, Tachycardia, Pause, Artifact, PVC/min
HR level alarm adjustment range	20 to 300 bpm
Measurement range	15 to 300 bpm
Accuracy	± 2 bpm or ± 1%, whichever is greater
Degree of protection against electrical shock	Type CF

CONTINUING TECHNICAL DATA

Defibrillation protection	In accordance per IEC 60601-2-27
Bandwidth or resolution	Filter Monitoring: 0.5 – 40 Hz
Sweep speed	25 mm/sec ± 10%
QRS detection	Amplitude: 0.5 – 5.0 mV
	Duration: 40 – 120 ms
Electrosurgery and cautery	Not intended for use during ESU

Pacemaker

Detection leads	I and (II or III)
Detection amplitude	± 2 to ± 900 mV
Detection width	0.1 to 2.0 ms
Precautions	Contains a tiny magnet which generates an extremely low static magnetic field of approximately 2 gauss at 12.7 mm (0.5 in) distance. Please refer to the manufacturer's Instructions for Use of any third party medical devices in the patient vicinity for compatibility.

ST Segment Analysis

Leads analyzed	3-wire: I, II, or III 5-wire: I, II, III, aVR, aVL, aVF, V 6-wire: I, II, III, aVR, aVL, aVF, V, V+ 6-wire with Infinity TruST 12-lead: I, II, III, aVR, aVL, aVF, dV1, V2, dV2, dV3, dV4, V5, dV6
ISO point	Default: - 28 msec
ST measurement point	Default: +80 msec
ST complex	Length: 900 msec (250 samples) Frequency response: 0.05 to 40 Hz
Update interval	15 seconds
ST level alarm adjustment range	-15.0 to 15.0 mm, -1.5 to 1.5 mV
ST accuracy	± 0.1 mm (± 0.01 mV)
ST measurement range	-15.0 to 15.0 mm, -1.5 to 1.5 mV
ST resolution	0.1 mm, 0.01 mV

Pulse Oximetry (optional)

Parameter display	Percentage of functional (oxygen-saturated) hemoglobin (%SpO_2); pulse rate
Measuring method	Absorption-spectrophotometry
Measurement and display range	SpO_2: 1 – 100% Pulse rate: 30 – 250 bpm
Calibration range	70 – 100%
Display update period	2 seconds nominal
Maximum hold from previous update	30 seconds (in the event of artifact or other error)
SpO_2 Alarm Adjustment Range	20 to 100%
Pulse Rate Alarm Adjustment Range	30 to 240 bpm

SpO_2 accuracy [1, 2, 3, 4]	
	0 to 69% not specified 70 to 100% sensor-specific as follows: **Masimo® LNOP® Sensors** LNOP adt, LNOP Pdt, LNOP neo, LNOP DCI, LNOP TC-I, LNOP DCIP, LNOP YI: ± 3% Pulse Rate Accuracy: ± 3 bpm or ± 3% (whichever is greater) Low Perfusion Accuracy, SpO_2: ± 2% Low Perfusion Accuracy, Pulse Rate: ± 3 bpm or ± 3% (whichever is greater) **Masimo® LNCS® Sensors** LNCS DCI®, LNCS DCIP, LNCS Adtx, LNCS Pdtx, LNCS Inf: ± 2% Pulse Rate Accuracy: ± 3 bpm or ± 3% (whichever is greater) Low Perfusion Accuracy, SpO_2: ± 2% Low Perfusion Accuracy, Pulse Rate: ± 3 bpm or ± 3% (whichever is greater) **Nellcor® Sensors** OxiMAX® MAX-A, OxiMAX MAX-AL, OxiMAX MAX-P, DS100A: ± 3% **Dräger Sensors** MS16444 Disposable Foam Pedi, MS16445 Disposable Foam Adt, MS16449 Disposable Vinyl Adt, MS16448 Disposable Vinyl Pedi, MS13235 Reusable Sensor: ± 2%

Notes:

[1] Since pulse oximeter measurements are statistically distributed, only about two-thirds of those measurements can be expected to fall within ± 1 Arms of the value measured by a co-oximeter.

[2] These accuracies have been validated using blood samples obtained from healthy adult volunteers during induced hypoxia studies in the range of 70-100% SpO_2 against a laboratory co-oximeter and ECG monitor.

[3] SpO_2 accuracies are expressed as ± "X" digits between indicated saturation levels. Accuracy of the SpO_2 measurement is specified within 1 Arms of the value measured by a co-oximeter.

[4] The pulse rate accuracy has been validated on healthy adult volunteers during induced hypoxia studies in the range of 70-100% SpO_2 against a laboratory co-oximeter and ECG monitor. This variation equals ± 1 Arms of the pulse rate value measured by the ECG monitor.

User Interface

Controls	6 function keys: alarm pause, view screen, staff alert, record/mark event, up/down scroll
Alarms	Audible & visible alarm indication (user controlled) 3 severity levels: Life threatening, Serious, Advisory

Display

Size/viewing area	5.08 x 5.08 cm (2 x 2 in) diagonal LCD
Resolution	220 x 176 pixels

Communications

Network	IEEE 802.11b/g
Wireless encryption	WEP, WPA2 - Personal Mode
Radio power output	30 mW maximum

Physical Specifications

Size (H x W x D)	142.2 x 76.2 x 30.5 mm (5.6 x 3 x 1.2 in)
Weight	276.4 g (9.75 oz) with battery
Cooling	Convection
Connections	ECG, Communication port for SpO_2 or Programming Cable, Bedside Charger, Central Charger

ECG
Supports 3-, 5-, 6-wire, and 6-wire with Infinity TruST® 12-lead – including MonoLead®, a patented one-wire ECG lead set that prevents tangles.

Color Display
Provides a power-saving color screen to display all monitored ECG leads, heart rate, and pulse oximetry when in use.

Water-resistant
Withstands accidental temporary water submersion because of the device's water-resistant IPX7 rating.

Interface
Provides easy button controls including recording, alarm pause controls, and staff alert alarms.

SpO_2
Enables pulse oximetry on any device as needed – eliminating the expense and inconvenience of separate SpO_2 supported devices*.

Alarms
Sounds alarms and lets you control alarms without having to go to the central station.

Compact Size
Enhances patient comfort with a compact, lightweight design.

Rechargeable
Uses a rechargeable battery cell, eliminating the need for disposable batteries.

Actual size (H x W x D): 5.6 x 3 x 1.2 inches (142.2 x 76.2 x 30.5 mm)

Infinity M300: Evolutionizing patient-worn monitoring

*Infinity M300 supports Masimo, Nellcor and Dräger SpO_2 sensors using Dräger's OxiSure® algorithm.

Infinity® Delta and Delta XL Patient Monitors

With the Delta series, you can monitor the vital signs of adult, pediatric and neonatal patients with various acuity levels. Patented Pick and Go® technology enables the same monitor to stay with the patient at the bedside, on transport and in between – providing continuous monitoring and data collection.


MT-2226-2003

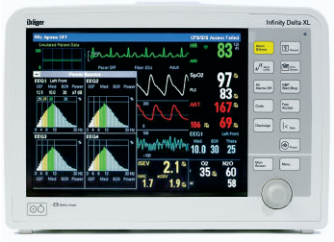
FEATURES

- Eliminates the need for separate transport monitors
- Works as a standalone device or connects to Infinity Network via Infinity Docking Station, DirectNet or wireless adapter for seamless wired to wireless networking
- Scales using Infinity pods and software options

Monitoring Capabilities

Neonatal, pediatric and adult applications


MT-8850-2006


MT-8848-2006

Infinity Delta and Delta XL
Scalable patient monitors that double as transport monitors.

TECHNICAL DATA

SUPPORTED PARAMETERS

ECG

Displays up to 12 leads	
Available leads	I, II, III, aVR, aVF, aVL, V, V+, V1 – V6 [V, aVR aVF, aVL only with 5- and 6-lead sets, V+ only with 6-lead set, V1 to V6 only with 12-lead pod (12-lead not intended for neonates)], TruST® 12-lead with reduced lead-set (6-wire): I, II, III, aVL, aVR, aVF, dV1, V2, dV3, dV4, V5 and dV6 (indicated for adults and pediatrics).[1]
Measuring range (heart rate)	15 to 300 bpm
Accuracy	± 2 bpm or ± 1% (whichever is greater)
Frequency ranges	Filter off: 0.05 to 40 Hz display; 0.05 to 125 Hz printer Monitoring filter: 0.5 to 40 Hz; ESU filter: 0.5 to 16 Hz

[1] Optimum performance of TruST leads is based on a minimum 0.3mV amplitude and QRS duration <180 milliseconds on patients with a body surface area (BSA) of 1.5 – 2.5 m². TruST 12-lead reduced lead-set ECG algorithm provides 12-lead monitoring using a standard 6-wire lead-set and standard lead placement for limb leads, V2 and V5. ARIES software option enhances TruST 12-lead monitoring with the addition of 12-lead ST Analysis.

CONTINUING TECHNICAL DATA

QRS Detection Range	
Amplitude	0.5 to 5 mV
Duration	Adult and pediatric: 70 to 120 msec Neonatal: 40 to 120 msec
Alarms	User-selectable upper and lower limits
Pacer detection (adult/pediatric)	Leads: I, II or III Amplitude: ± 2 to ± 700 mV Width (d_p): 0.2 to 2.0 msec
Accessories	3-, 5- or 6-lead electrode set or 12-lead pod

ST (not intended for neonates)	
Available leads	With 3-lead ST option: Choice of any 3 available leads With ARIES option: Up to 12 leads
ST complex length	892 msec (-300 to +600 msec from fiducial point)
Sample rate	225 samples/sec
Frequency response	0.05 – 40 Hz

Isoelectric measurement point	
Measuring range	Start of ECG complex to fiducial point
Default	QRS onset – 28 msec

ST measurement point	
Adjustment range	Fiducial point to end of ECG complex
Point default	QRS offset +80 msec
Update interval	15 sec, 1 normal beat required
Resolution	± 0.1 mm
Trends	Graphical, tabular and graphical mini-trends
INOP Alarm	Yes
Upper and lower ST alarms	± 15 mm, ± 0.1 mm increments
Duration of ST event to trigger alarm	None, 15, 30, 45, 60 seconds

Arrhythmia Detection	
Adult and Pediatric	Yes
Neonatal	No, only bradycardia is available as a low heart rate alarm in neonatal mode
ARR Mode	User Selectable; OFF, Basic or Advanced
Basic ARR (standard)	Asystole, ventricular fibrillation, ventricular tachycardia and artifact (ARR label displayed to register arrhythmia occurrence)
Advanced ARR (option)	Ventricular run, accelerated idioventricular rhythm, supra-ventricular tachycardia, couplet, bigeminy, tachycardia, bradycardia, pause and also supports PVC/min parameter output.

Respiration	
Sensing leads	I, II (user-selectable)
Measuring method	Impedance pneumography
Auxiliary current	≤ 10μA for any active electrode
Detection threshold	0.15Ω to 4.0Ω in manual mode (user adjustment) 0.2Ω to 1.5Ω in auto mode (automatic adjustment)
Measuring range	0 to 155 breaths per min
Accuracy	± 1 breath/min or 2% of rate (whichever is greater)
Apnea detection	For neonatal and pediatric patients
Alarms	User-selectable upper and lower respiration rate

Pulse Oximetry (SpO_2)	
SpO_2 Algorithm	Masimo® SET® (Signal Extration Technology) Masimo provides the industry “gold standard” for motion tolerant pulse oximetry. See additional product datasheet for more detailed specifications.
SpO_2 Algorithm	Nellcor™ OxiMax™ [2] See additional product datasheet for more detailed specifications.
SpO_2 Algorithm	Dräger’s OxiSure® SpO_2 [3]

Dräger's OxiSure® SpO_2	
Connection	MultiMed pods (SpO_2 port)[4]
Displayed parameters	Saturation (fraction of oxyhemoglobin to functional hemoglobin) and pulse (rate and waveform)
Measuring method	Transmission spectrophotometry
Measuring range	SpO_2: 1 to 100% Pulse: 30 to 250 bpm
Accuracy	SpO_2: 0 to 69% not specified SpO_2: 70 to 100%: ± 2% (± 3% for neonates; Masimo® LNOP-Ear: ± 3.5%; Nellcor® DS100A: ± 3%) Pulse: ± 3 bpm or ± 3% (whichever is greater)
Alarms	User-selectable upper and lower limits for SpO_2 and pulse rate Life-threatening desaturation alarm in neonatal mode only
Accessories	Dräger Medical-approved Masimo or Nellcor sensors Dräger Medical reusable SpO_2 sensors (not intended for neonates).

Temperature	
Displayed parameters	Absolute and delta temperatures
Measuring range	Absolute: -5° C to 50° C Delta: 0° C to 55° C
Resolution	0.1° C
Accuracy	Absolute: ± 0.1° C Delta: ± 0.2° C
Alarms	User-selectable upper and lower limits for absolute and delta values
Accessories	Dräger Medical-approved core and skin probes

Noninvasive Blood Pressure (NBP)	
Displayed parameters	Systolic, Mean and Diastolic pressures
Measuring method	Oscillometric utilizing step deflation
Modes of operation	Manual (single measurement); Continuous (5 minutes) and Interval
Interval times	1, 2, 2.5, 3, 5, 10, 15, 20, 25, 30, 45, 60, 120 and 240 minutes
Heart rate measuring range	30 to 240 bpm
Pressure measuring range	
Adult	Systolic: 30 to 250 mmHg Mean: 20 to 230 mmHg Diastolic: 10 to 210 mmHg
Pediatric	Systolic: 30 to 170 mmHg Mean: 20 to 150 mmHg Diastolic: 10 to 130 mmHg
Neonatal	Systolic: 30 to 130 mmHg Mean: 20 to 110 mmHg Diastolic: 10 to 100 mmHg
Cuff pressure	
Default inflation pressure	
Adult	160 mmHg ± 10 mmHg
Pediatric	120 mmHg ± 10 mmHg
Neonatal	110 mmHg ± 10 mmHg
Inflation pressure after a valid measurement	
Adult	(Last Systolic +25 mmHg) ± 10 mmHg
Pediatric	(Last Systolic +25 mmHg) ± 10 mmHg
Neonatal	(Last Systolic +30 mmHg) ± 5 mmHg
Maximum inflation pressure	
Adult	265 mmHg ± 5 mmHg
Pediatric	180 mmHg ± 10 mmHg
Neonatal	142 mmHg ± 10 mmHg

CONTINUING TECHNICAL DATA

Minimum inflation pressure	
Adult	110 mmHg ± 10 mmHg
Pediatric	90 mmHg ± 10 mmHg
Neonatal	70 mmHg ± 10 mmHg
Connector	Quick-release connector with single airway

Invasive Blood Pressure	
Displays up to 8 pressures	
Measuring method	Resistive strain gauge transducer
Display resolution	1 mmHg
Measuring range	-50 to 400 mmHg (after zeroing)
Frequency ranges	DC to 8 Hz, DC to 16 Hz, or DC to 32 Hz (user-selectable)
Zero balance range	± 200 mmHg
Transducer specifications	Dräger Medical-approved transducers with a resistance of 200 to 3000Ω and an equivalent pressure sensitivity of 5μV/V/mmHg ± 10%
Accuracy	± 1 mmHg or ± 3%, exclusive of transducer (whichever is greater)
IBP alarms	User-selectable upper and lower limits for systolic, mean and diastolic pressures
Accessories	Dräger Medical-approved pressure transducers

Cardiac Output	
Parameter display	Cardiac output, Blood Temperature, Injectate Temperature
Measuring method	Thermodilution
Connection	Hemo2, Hemo4 or HemoMed pods
Measuring range	
Cardiac output	0.5 to 20 L/min
Blood temperature	25° C to 43° C (77° F to 109° F)
Injectate temperature	-5° C to +30° C (23° F to 86° F)
Accuracy	
Cardiac output	± 5% (with 0° C injectate)
Injectate temperature	± 0.25° C
Degree of protection against electric shock	Type CF
Defibrillation protection	Defibrillation-Proof Applied Part per IEC 60601-1

DISPLAY SPECIFICATIONS

Type	Thin Film Transistor-Liquid Crystal Display Active Matrix (TFT-LCD)
Size (Delta)	264 mm (10.4 in.) diagonal
Channels	5 standard, 6, 8 optional
Viewing area	211 x 158 mm (8.3 x 6.2 in.)
Resolution	640 x 480 pixels
Size (Delta XL)	310 mm (12.2 in.) diagonal
Channels	6 standard, 8 optional
Viewing area	246 x 184.5 mm (9.7 x 7.3 in.)
Resolution	800 x 600 pixels
Rotary knob	Easy-to-use menu structure and fixed keys

Alarms	
Priorities	3; High (Life Threatening), Medium (Serious), Low (Advisory)
Audio Alarm Tones	User Selectable: Infinity, IEC 1[2] or IEC 2[2]

Connections

MultiMed® cables, Masimo SET® SmartPod®, Nellcor OxiMax SmartPod[2], HemoMed™ Pod, Pod Communication ports (Delta: 1 standard, 2nd optional; Delta XL: 2 standard), NBP Input, $etCO_2$ module, Infinity Docking Station, analog output, QRS sync output, RS 232, remote keypad, and Scio® Four modules.

Analog Output	
Signals	ECG, arterial blood pressure
Delay	≤25 msec

Infinity Network	
Networking Method	DirectNet, wireless or via Infinity Docking Station
Wireless Encyption	None, WEP, WPA2[2]

Some connections are only accessible via the IDS connection, see individual product datasheets for detailed information.

Physical Specifications	
Cooling	Convection
Size (Delta) H x W x D	253 x 365 x 190 mm (10.0 x 14.4 x 7.5 in.)
Weight (Delta)	5.8 kg (12.7 lbs.)
with external battery	6.4 kg (14.0 lbs.)
Size (Delta XL) H x W x D	272 x 384 x 190 mm (10.7 x 15.1 x 7.5 in.)
Weight (Delta XL)	6.2 kg (13.6 lbs.)
with external battery	6.8 kg (14.9 lbs.)

Information Management Capabilities	
Data storage	24 hours of trended parameter information
Data resolution	30-second sampling
Trend tables	1-, 5-, 15-, 30- or 60-minute display formats
Trend graphs	1-, 2-, 4-, 8-, 12- or 24-hour display formats

Electrical Specifications	
Input voltage	11 to 15 V DC
Power consumption	≤70 Watts (fully loaded)
Patient leakage current	≤10 μA
Protection class	Internally powered (per IEC 60601-1) and for use with specified Class 1 power supplies.
Power requirements	100 to 240 V AC, 3 A
Frequency	50 to 60 Hz
Chassis leakage current	<300 μA @ 120 V AC <500 μA @ 220 V AC

BATTERY SPECIFICATIONS

Internal battery	Battery type: lithium-ion Battery capacity: 180 minutes
Charging time	6.5 hours at 25° C
External auxiliary battery	Battery type: sealed lead-acid Battery capacity: 50 minutes Charging time: 3.5 hours at 25° C
Size (external auxiliary battery)	62 x 182 x 24 mm
H X W X D	(2.4 x 7.2 x .9 in.)
Weight	0.635 kg (1.4 lbs.)

Battery capacity varies with parameter configuration. The battery capacity specified above is under the following load conditions: MultiMed with SpO_2 sensor[4], 2 temperature probes, HemoMed pod with 4 IBP transducers and a catheter, NBP taking measurements every 15 minutes, LCD Transport Brightness at 50%, and no continuous tone being generated.

One Network
rather than two

MT-1351-2017

Patient monitoring data is life-critical. That's why hospitals have traditionally built a second network just to carry that information. Infinity® OneNet – a breakthrough network design from Dräger – offers a smart alternative.

As more medical devices such as patient monitors require network connectivity, it makes sense – strategically and financially – to support them on your existing infrastructure. With Infinity OneNet, you only need one network for patient monitoring and hospital applications: yours.

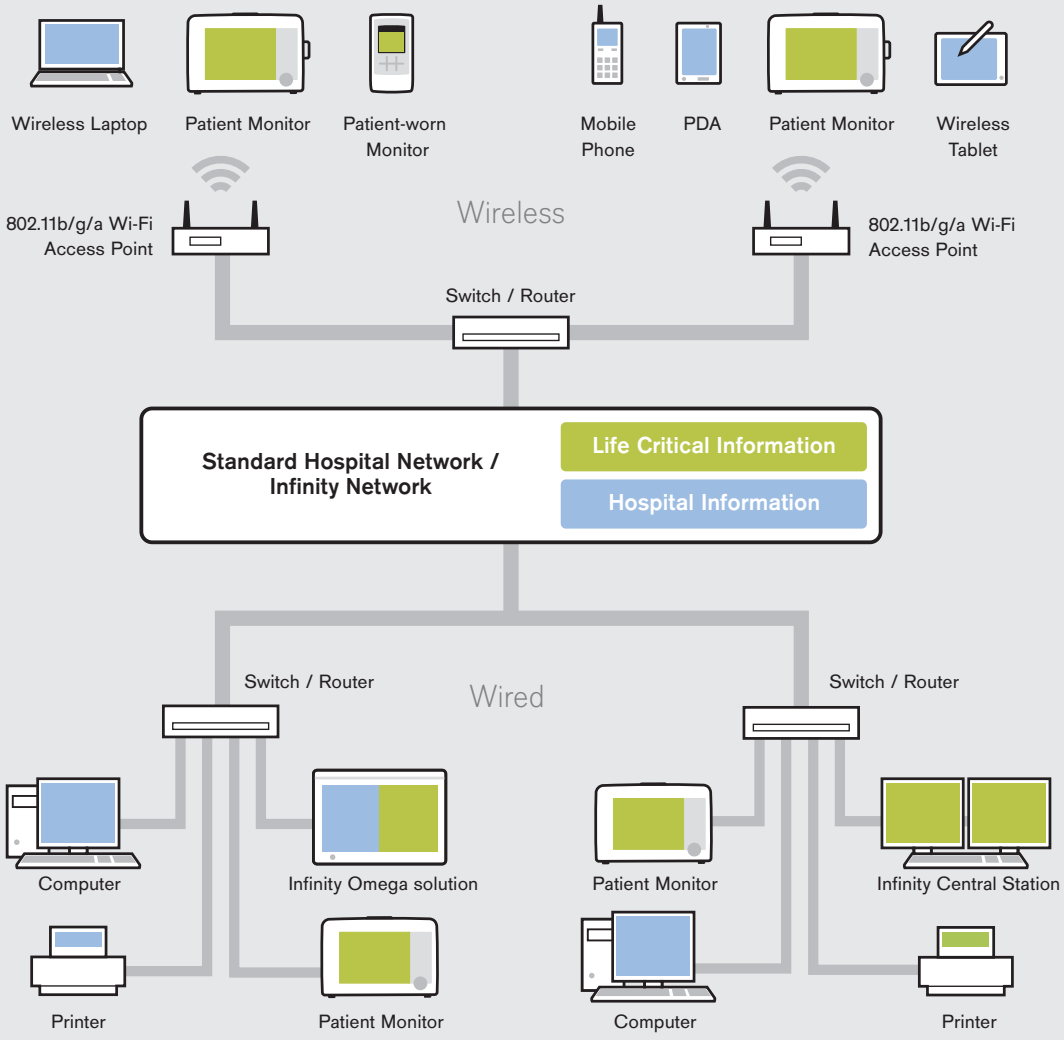
Infinity OneNet is part of the Infinity Network, which links together data from Dräger point-of-care devices. OneNet is a network design that supports both wired and wireless real-time patient monitoring on your existing network.

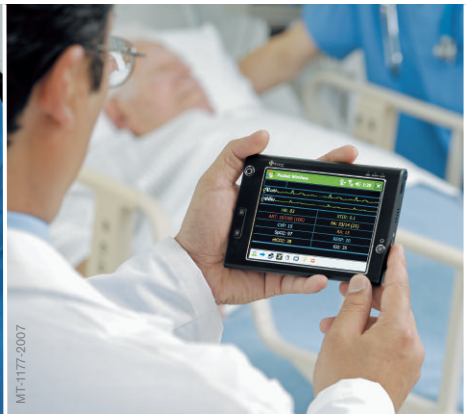
Why support two networks, when all you really need is one? OneNet.

What is OneNet?
Infinity OneNet is a network design that lets you move life-critical patient data on your existing hospital network – safely and securely. As a result, you save the expense of building and maintaining a separate patient monitoring network.

- Enables one shared network
- Supports seamless wired and wireless monitoring
- Optimizes Quality of Service
- Leverages your network investment
- Embraces industry standards

Infinity OneNet Architecture Example





LEVERAGE YOUR EXISTING NETWORK INVESTMENT

Infinity OneNet is designed to provide the Quality of Service (QoS) you need for transmitting life-critical patient data – both wired and wirelessly. And because Infinity OneNet shares the hospital's existing network, it lets you leverage your preferred solutions for security, high availability and reliability.

PROFESSIONAL SERVICES

To make sure that our Infinity OneNet solution meets your requirements, Dräger has teamed up with leading network service providers worldwide. Together, we offer a wide portfolio of Professional Services to help you with network design, upgrade planning, Quality of Service management, security strategies, and enterprise wireless planning.

Infinity OneNet is compatible with components from many of the major network equipment providers that meet industry standards and Dräger's networking requirements.

Dräger allows you to use 802.11 b/g access points and take advantage of open industry standards. That means you can use your existing Dräger validated access points and share them between life-critical patient monitoring and other hospital applications.

DCS-7110 HD Outdoor Day & Night IP Camera

Key Features

- 1/4" Megapixel progressive CMOS sensor
- HD resolution: 1280 x 800 (Megapixel) at 30 fps
- IP-66 certified weatherproof housing
- PoE powered – no need for a separate power supply
- Built-in IR LEDs for Day & Night operation (15 m. illumination distance)
- Built-in IR-Cut Removable (ICR) filter, for enhanced colour rendering in the day and good results in low light conditions
- Simultaneous streaming in H.264, MJPEG and MPEG-4 compression
- Hardware-based motion detection
- Tamper detection
- IPv6 support
- Privacy mask function
- 3GPP support – watch live video from a compatible smartphone
- Digital I/O support for sensors and alarms
- Open Network Video Interface Forum (ONVIF) compliant
- D-ViewCam (DCS-100) monitoring software included (support for up to 32 cameras)

The D-Link DCS-7110 is a high-definition outdoor IP Camera, equipped with a 1/4" Megapixel CMOS sensor and 4 mm F1.5 fixed-focus lens. The DCS-7110 is capable of capturing videos in both dark and light environments with its built-in IR LEDs and removable IR-cut filter, which provides high quality videos day or night. The ICR Filter can be manually applied via the web or set to automatically adjust based on lightning conditions. Capture crisp color images during the daytime and detailed greyscale images at night or in or low-light conditions.

Multiple Video Streams

The DCS-7110 supports simultaneous streaming of H.264, MPEG-4, and MJPEG video to provide both high-quality and bandwidth-efficient compression formats. MJPEG delivers excellent file integrity, ideal for situations which require extensive image detail. H.264 produces a small file size, making it more useful for extended recording or for use in low-bandwidth networks. Additionally, the DCS-7110 supports multicast H.264 streaming, allowing users to view the camera images by subscribing to a multicast group on the network.

Technical Specifications

Video Algorithms Supported	• H.264/MPEG4/MJPEG format compression simultaneously • JPEG for still image • H.264/MPEG-4 multicast streaming	
Hardware Profile	• Sensor: 1/4" Megapixel progressive CMOS sensor • SDRAM: 256 Mbytes • Flash Memory: 128 Mbytes • ICR: Built-in Infrared-Cut filter Removable module	• Lens: 4 mm fixed lens , F1.5 • View Angle: Horizontal 65.4 degrees • IR LED: 15 meter illumination distance and light sensor
Image Features	• Adjustable image size, quality, and bit rate • Time stamp and text overlays • 3 configurable motion detection windows	• 5 configurable privacy masks • Flip & mirror • Configurable brightness, saturation, contrast, sharpness
Number of Ports	• 176x144 @ 30 fps • 320x240 @ 30 fps • 640x480 @ 30 fps	• 1280x720 @ 30 fps • 1280x800 @ 30 fps
Network Protocols	• IPv4, IPv6 • TCP/IP, UDP, ICMP • DHCP Client • NTP Client (D-Link) • DNS Client, DDNS Client (D-Link) • SMTP Client • FTP Client • HTTP / HTTPS • Samba Client • PPPoE • UPnP Port Forwarding	• RTP / RTSP/ RTCP • IP filtering • 3GPP • LLTD • CoS/QoS • SNMP/IGMP • SNMP • IGMP • 802.1x • ONVIF Complian
3GPP Mobile Surveillance	• Packet Video Player 3.0 • QuickTime 6.5 • Real Player 10.5	
System Requirements for Viewing	• Internet Explorer 6 or later	
D-ViewCam™ System Requirements	• Operating System: Microsoft Windows® 7 / Vista / XP	• Web Browser: Internet Explorer 6 or higher • Protocol: Standard TCP/IP
Power Input	• 12 V DC 1.25 A, 24 V AC, 50/60 Hz	• PoE: IEEE 802.3af
Maximum Power Consumption	• 6 W	
Operating Temperature	• -20 to 50 ˚C (-4 to 122 ˚F)	
Storage Temperature	• -20 to 70 ˚C (-4 to 158 ˚F)	

Camera Dimensions

DCS 2210 Full HD Cube IP Camera

Product Highlights:

Remote Monitoring

Remotely monitor a business over the Internet from anywhere

Full HD Resolution

HD resolution (720p) to capture crisp and clear video

High-quality video feeds

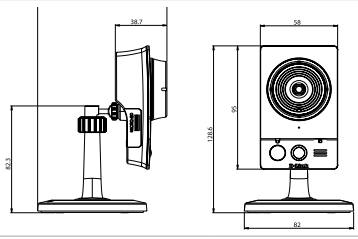
H.264, MJPEG and MPEG-4 compression codec for distribution and recording of high definition video

Features:

- 1/2.7" 2 Megapixel progressive CMOS sensor
- Real-time H.264, MPEG-4 and Motion JPEG compression
- Full HD resolution up to 1920 x 1080
- Fixed lens 6 mm F2.0
- Built-in removable IR-cut filter for day/night surveillance
- Built-in IR LED to support dark environments with 0 lux illumination
- Built-in PIR (passive infrared) sensor for motion detection
- ePTZ for image manipulation
- Supports multiple access lists
- Privacy Mask feature
- Micro SD Card slot
- Built-in motion detection and email alerts.
- 2-way audio support
- 1 digital input / 1 digital output
- PoE (DCS-2210 only)
- WPS (DCS-2230 only)
- IEEE 802.11n (DCS-2230 only)
- WEP / WPA / WPA2 wireless security (DCS-2230 only)
- 3GPP mobile surveillance
- Built-in Samba client for NAS

Technical Specifications

		DCS-2210
Video	Sensor	1/2.7" 2 Megapixel progressive CMOS sensor
	Lens	Fixed length 6 mm, F2.0, 10x digital zoom
	Angle of View	67.4° H, 40.8° V, 75° D
	Image Features	Configurable image size, quality, frame rate, and bit rate Time stamp and text overlays Configurable motion detection windows 3 configurable privacy mask zones Configurable shutter spped, brightness, saturation, contrast, and sharpness
	Video Compression	Simultaneous H.264/MPEG-4/MJPEG format compression H.264/MPEG-4 multicast streaming JPEG for still image
	Video Resolution	16:9 - 1920 x 1080 (up to 15 fps), 1280 x 720, 800 x 450, 640 x 360, 480 x 270, 320 x 176, 176 x 144 (up to 30 fps) 4:3 - 1440 x 1080 (up to 15 fps), 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, 320 x 240, 176 x 144 (up to 30 fps)
Night Vision	Built-in IR-cut Filter	Yes
	Built-in IR Illuminator	Yes (5 m illumination distance)
	Minimum Illumination	0 lux (with IR illuminator)
Audio	Built-in microphone	Yes
	Built-in speaker	Yes
	Audio Codecs	G.726
External Device Interface	MicroSD Card Slot	Yes (SDHC)
	Digital I/O	4 pin-contact terminal block (DC 5V, DI, DO, GND)
	PIR sensor	Yes (5 m.)
Network	Network Protocols	IPv4, TCP/IP, UDP, ICMP, DHCP Client, NTP Client (D-Link), DNS Client, DDNS Client (D-Link), SMTP Client, FTP Client, HTTP / HTTPS, Samba Client, PPPoE, UPnP Port Forwarding, RTP / RTSP/ RTCP, IP filtering, 3GPP, IGMP, ONVIF Compliant
	Connectivity	1x 10/100BaseT (Ethernet) with PoE

		DCS-2210
System Management	Security	Administrator and user group protection Password authentication HTTP and RSTP digest encryption
	System Requirements for Web Interface	Microsoft Windows 7/Vista/XP/2000, Apple MAC OSX 10.3 or above, Linux, Unix Browser: Internet Explorer, Firefox, Netscape, Opera
	Event Management	Motion detection PIR motion detection Event notification and upload snapshots/video clips via HTTP, SMTP, or FTP Supports multiple HTTP, SMTP and FTP servers Multiple event notifications Multiple recording methods for easy backup
	Remote Management	Configuration accessible via web browser Take snapshots/videoclips and save to local hard drive or NAS via web browser
	Mobile Support	Pocket PC or mobile phone with 3GPP playback support
	D-ViewCam™ System Requirements	Microsoft Windows 7/Vista/XP Browser: Internet Explorer 6 or higher Protocol: Standard TCP/IP
	D-ViewCam™ Software Functions	Remote management/control of up to 32 live cameras Viewing of up to 32 live cameras on one screen Supports all management functions provided in web interface Scheduled motion triggered or manual recording options
General	Power Input	5V DC 1.2 A, 50/60Hz or 802.3af PoE
	Max. Power Consumption	2 watts
	Operating Temperature	0 to 40°C
	Storage Temperature	-20 to 70°C
	Humidity	20% to 80% non-condensing
	Weight	69 g
	Certifications	CE, CE LVD, FCC, C-Tick
Dimensions		

NETGEAR®
Connect with Innovation™

6-bay High Performance Storage for Business
ReadyNAS Pro™ *Business Edition*

Data Sheet

Performance, capacity, and ease-of-use

- High-performance architecture for fast data throughput
- Up to 18 TB storage
- Data protection with auto RAID management and online volume expansion
- Works with Windows®, Mac®, and Linux® clients across the network
- Dual Ethernet failover design for high availability
- iSCSI for compatibility with Microsoft Exchange and database servers

The ReadyNAS Pro also features dual redundant Gigabit Ethernet ports for failover protection.

Class-leading Performance

Powered by an Intel® multi-core processor, the ReadyNAS Pro is a powerful NAS for mission-critical business data across a variety of different platforms. The high-performance platform coupled with dual Gigabit Ethernet and jumbo frame support provides enough bandwidth to allow more users to access data storage simultaneously.

RAID

The ReadyNAS Pro is designed to ensure full data redundancy without compromising the system performance. The ReadyNAS Pro supports RAID levels 0, 1, 5, 6, and NETGEAR's patent pending X-RAID2™, with hot spare capability. With RAID 6, the system ensures data integrity even with 2 simultaneous disk failures. The extra disk bays provided by the 6-bay ReadyNAS Pro makes RAID 6 and hot spares practical options worth considering to prevent any prolonged state in which the ReadyNAS data volume is left in an unprotected state.

X-RAID2™ Technology

X-RAID2 is the 2nd generation of ReadyNAS's proven patent-pending Auto-Expandable RAID technology. X-RAID2 automates the volume expansion for you as you scale from 1 drive to 6 drives while keeping your data online. Additionally, as your storage requirement grows, you can replace your disks with larger capacity ones, and X-RAID2 automatically and incrementally expands your storage "vertically." No other NAS devices in this class can do this without reformatting your disks and shuffling your data back and forth.

• Technical Specifications

– Intel multi-core processor
– 1 GB DDR2 DIMM
– Embedded 128 MB flash memory for OS
– 6 Serial ATA II channels
– Hot-swappable trays
– Two 10/100/1000 Ethernet ports with load balancing and failover
– OLED display
– 3 USB 2.0 ports
– Supports Windows, Mac, Linux/UNIX Clients
– DHCP server and print server
– Setup Wizard and easy browser-based interface

• RAID

– X-RAID2 single volume auto expansion
– Multiple volume support for
– hardware-accelerated RAID 0, 1, 5, 6
– Hot spare support
– Hot swap support

• Volumes

– Single volume auto expansion (X-RAID2)
– Advanced volume management
– (Flex-RAID) iSCSI target
– Journaled file system
– User and group quotas

• Network File Services

– CIFS/SMB for Windows
– AFP 3.1 for Mac OS 9/X
– NFS v2/v3 for Linux and UNIX
– HTTP/S for web browsers
– FTP/S support
Rsync

Network Security

– Selectable, user, domain/ ADS modes
–Windows ACL
–Encrypted network logins
Secure Sockets Layer (SSL)

• Network Options

– DHCP or static IP
– WINS
– NTP

• System Management

– Performance options
– Device status
– System configuration backup and restore
– Email alerts and event logs
– SNMP

• Backup

– Integrated Backup Manager
– Programmable backup button
– Remote backup over CIFS/NFS/FTP/ HTTP & Rsync
– Backup to/from USB disks
– CDP (continuous data protection) backup software

• Power-saving Options

– Disk spin-down
– Power-on schedule
– Wake-on-LAN

• Web Browsers Supported

– Internet Explorer 7.0+
– Opera 7.0+; Safari 2.0+
– Mozilla Firefox® 2.0+

Constellation® ES.2

2TB and 3TB Capacity-Optimized Enterprise Hard Drives for Bulk-Data Applications

Key Advantages

- Highest-capacity enterprise drive for demanding data growth[1]
- Fifth-generation SAS and SATA drives designed for 24×7 reliability
- SAS-based, end-to-end data integrity and enhanced error correction for accurate data storage
- Best-in-class enhanced rotational vibration tolerance ensures consistent performance.
- Improved power and cooling efficiencies with low power consumption and enhanced PowerChoice™ technology
- Multi-drive firmware maximized for enterprise system availability
- Robust performance with dual processor and ramp load technologies
- Self-Encrypting Drive (SED) option (AES-256) cuts IT drive retirement costs while securely protecting data where it lives—on the drive.[2]
- FIPS 140-2 Validated™ drives protect *Sensitive but Unclassified and Protected* class data.[2,3]

Best-Fit Applications

- High-capacity bulk-data storage
- Mainstream enterprise external storage arrays (SAN, NAS, DAS)
- Enterprise backup and restore—D2D, virtual tape
- Centralized surveillance
- Cloud storage

Specifications	SATA 6Gb/s
	3TB
Standard Model Number	ST33000650NS
SED (AES-256) Model Number	ST33000651NS[3]
SED (AES-256) FIPS 140-2 Model Number	ST33000652NS[3,4]
Features	
Protection Information	—
Low Halogen	Yes
Cache, Multisegmented (MB)	64
Reliability/Data Integrity	
Mean Time Between Failures (MTBF, hours)	1.2 million
Reliability Rating @ Full 24x7 Operation (AFR)	0.73%
Nonrecoverable Read Errors per Bits Read	1 sector per 10E15
Power-On Hours per Year	8760
Bytes per Sector	512
Limited Warranty (years)[5]	3
Performance	
Spindle Speed (RPM)	7200
Interface Access Speed (Gb/s)	6.0, 3.0, 1.5
Max. Sustained Transfer Rate (MB/s)	155
Seek Time, Average Read/Write (ms)	8.5/9.5
Average Latency (ms)	4.16
Interface Ports	Single
Rotational Vibration @ 1500 Hz (rad/sec^2)	12.5
Power Consumption	
Idle (W)	7.7
Typical Operating, Random Read (W)	10.7
Power Supply Requirements	+12V and +5V
PowerChoice™ Technology	Yes
Environmental	
Temperature, Operating (°C)	5 to 60
Vibration, Nonoperating: <5Hz to 500Hz (Gs)	4.9
Shock, Operating, 2ms (Read/Write) (Gs)	70/40
Shock, Nonoperating, 1ms and 2ms (Gs)	300
Physical	
Height (in/mm, max)[6]	1.028/26.10
Width (in/mm, max)[6]	4.010/101.85
Depth (in/mm, max)[6]	5.787/147.00
Weight (lb/g)	1.543/700
Carton Unit Quantity	20
Cartons per Pallet	40
Cartons per Layer	8

NETGEAR®
PROSAFE™

ProSafe™ 24-port 10/100 Smart Switch with 4 Gigabit Ports and 24 PoE Ports
FS728TP

Data Sheet

Full 24-port PoE Solution Plus Easy Browser-based Management

NETGEAR ProSafe Smart Switches fill the gap between unmanaged and fully managed switches. The family of ProSafe Smart Switches is designed for growing businesses that want control over their network without the cost and complexity of a full Layer 2/Layer 3 management implementation. This PoE-capable Smart Switch, the FS728TP, provides power and data using built-in IEEE 802.3af PoE on all 24 ports. In addition, the FS728TP offers an intuitive Web-based management tool for quick and easy deployment and configuration making it ideal for deploying access points, VoIP phones and IP-based surveillance cameras. This switch is equipped with highly advanced features such as access control lists (ACL), 802.1x port authentication, enhanced QoS, rate limiting and IGMP snooping among others to provide a small and medium-sized business with a network that is geared for growth while providing scalability and reliability. With the utility of 24 10/100 Mbps ports, four copper 10/100/1000 Mbps ports and two combination (copper/hot-swappable small form-factor pluggable (SFP)) Gigabit ports for optional fiber connectivity, growing business networks, classrooms and workgroups can benefit from superior performance and keep up with expanding network needs. This high-performing switch features a non-blocking wire-speed architecture with an 12.8 Gbps switching capacity for maximum data throughput. All 28 RJ-45 ports automatically negotiate to the highest speed and support Auto Uplink™ technology to make the right link.

Technical Specifications

- **Network Protocol and Standards Compatibility**
  - IEEE 802.3 10BASE-T
  - IEEE 802.3u 100BASE-TX
  - IEEE 802.3ab 1000BASE-T
  - IEEE 802.3z 1000BASE-X
  - IEEE 802.3x full-duplex flow control
  - IEEE 802.3af (Power over Ethernet)
- **Power Supply**
  - Power consumption: 256W maximum
  - 100-240VAC/50-60-Hz universal input
  - PoE budget: 192W
- **Network Ports**
  - 24 10/100 Mbps auto sensing Fast Ethernet
  - 4 10/100/1000 Mbps auto-sensing Gigabit Ethernet switching ports (RJ-45)
  - 2 Dual Personality SFP slots
- **Physical Specifications**
  - Dimensions: (w x d x h) 440 x 257 x 43 mm (17.3 x 10.1 x 1.7 in)
  - Weight: 3.57 kg (7.86 lb)

Performance Specifications

- Forwarding modes: Store-and-forward
- Bandwidth: 12.8 Gbps
- Network latency: <4µs for 64-byte frames in store-and-forward mode for 100 Mbps to 100 Mbps transmission
- Buffer memory: 1 MBytes per system
- Address database size: 4,000 media access control (MAC) addresses per system
- Addressing: 48-bit MAC address
- Mean time between failures (MTBF): 237,497 hours (~27 years)
- Acoustic noise: 38.1 dBA

Full-featured, Flexible Power over Ethernet (PoE)

With a total power budget of 192 Watts, customers can choose to plug in up to 24 Ethernet or Fast Ethernet devices and mix in up to 24 802.3af IP-based devices. Power-over-Ethernet (PoE), optimizes the installation and power management of network devices such as wireless access points (AP), Voice over IP (VoIP) phones, and IP-based surveillance cameras. Power-over-Ethernet (IEEE 802.3af) capabilities reduce installation time and costs for many new network productivity devices. Free your wireless AP deployments and IP cameras from the restrictions of power outlet proximity using a standard Cat 5 UTP cable. Enable uninterruptible power supply for all your PoE devices by powering your switch from a UPS device.

Advanced Quality of Service

Priority queuing ensures high-priority traffic gets delivered efficiently, even during congestion from high traffic bursts. Companies implementing network telephony or video conferencing, for example, need to be able to prioritize such voice and video traffic and other real-time applications over less latency-sensitive traffic to ensure reliability and quality. The ability to prioritize traffic ensures quality of latency-sensitive services and applications despite increasing traffic loads. The ProSafe FS728TP provides several advanced QoS features:

- 802.1p based prioritization
- Layer 3-based (DSCP) prioritization
- Rate limiting

- LLDP-MED
- SNMP v1, v2c, v3
- RFC 1213 MIB II
- RFC 1643 Ethernet interface MIB
- RFC 1493 bridge MIB
- RMON group 1, 2, 3, 9
- RFC 2131 DHCP client
- Auto voice VLAN
- DHCP Filtering
- Auto denial-of-service (DoS) protection
- HTTP and HTTPS
- Ping and traceroute
- Power saving when link down
- IEEE 802.1x
- Port-based security by locked MAC addresses
- IP and MAC ACL
- Storm control for broadcast, multicast and unknown unicast packets
- IGMP snooping v1/v2
- Protected Port
- PoE Timer
- Port-based ingress and egress rate limiting
- SNTP
- Port mirroring support (many to one)

Cloudbuilder: La solución más solida del mercado

¿Qué es Cloudbuilder?

Cloudbuilder es la solución de Cloud Hosting te permite instalar y gestionar en cuestión de minutos y desde un único Panel de Control, todos los recursos necesarios para **construir CPDs virtuales**. Una solución escalable, con todo lo necesario que puedas asimilar, sin interrupciones y en tiempo real, picos de demanda y dimensionamiento de servidores, optimizando costes en periodos de menor actividad y sin necesidad de planificaciones previas.

Agrega, elimina, configura, administra, clona servidores según tus necesidades, aplica reglas personalizadas de firewall, balancea cargas y controla todo para que tu proyecto crezca exponencialmente con la inversión justa.

¿Qué ventajas me aporta?

- **Granularidad:** Permite contratar recursos (CPU, memoria RAM y HardDisk) en tramos pequeños. La Nube crece al mismo tiempo que los proyectos.
- **Seguridad:** Protege los proyectos con estrictas medidas de seguridad basadas en la confidencialidad, integridad y disponibilidad.
- **Disponibilidad:** Todos los elementos de red están redundados para evitar fallos e interrupciones en el servicio.
- **Control:** Control de los recursos desde un único y potente panel de gran usabilidad.
- **Flexibilidad:** Soluciones altamente escalables que crecen o se modifican en función de las necesidades de cada proyecto, en tiempo real.
- **Sostenibilidad:** La tecnología Cloud contribuye al ahorro energético gracias a las economías de escala y al aprovechamiento intensivo de las estructuras y la energía.
- **Ahorro:** Sistema de pago por uso del servicio contratado y reducción de costes en inversión de hardware y en adquisición de licencias de software.
- **Calidad:** Total fiabilidad y las máximas garantías de trabajar con el hardware de mayor calidad: servidores IBM y la tecnología de virtualización pionera y referente en el mercado de VMware vSphere 4.
- **Soporte:** Técnicos expertos, en castellano y las 24 horas, todos los días del año.

¿Qué me permite hacer Cloudbuilder?

- Disponer de completa **libertad** y total **autonomía**.
- Elegir entre diferentes servicios de **balanceo**.
- Gestionar **plantillas**.

- Crear grupos de **conectividad**.
- Hacer uso de **almacenamiento compartido NFS y CIFS**.
- Utilizar **Red Privada Virtual** (VPN), **Red Privada** (VLAN).
- Gestionar **IP Públicas**.
- Configurar de **políticas de backup** para servidores.
- Controlar de forma detallada el **consumo en tiempo real**.
- Personalizar políticas de **firewall**.
- Establecer reglas con "**Action Engine**".
- **Logs** de actividad y **gestión de usuarios**.
- **Monitorizar** el estado de los servidores y sus recursos.

Descubre todos los recursos y funcionalidades del Panel de Control

A continuación, haremos un breve repaso sobre las categorías principales que se muestran en el Panel de control y así poder tener una visión global de sus funcionalidades:

Servidores

Crea tantos servidores como sean necesarios de forma rápida y sencilla. Desde el apartado "**Servidores**", se podrán dar de alta servidores Estándar y Premium.

Principales características por tipo de servidor:

Características	Estándar	Premium
Recursos mínimos a contratar por servidor	1 vCPU, 0,5 GB RAM, 50 GB Disco	1 vCPU, 0,5 GB RAM, 50 GB Disco
Recursos máximos a contratar por servidor	4 vCPU, 8 GB RAM, 500 GB Disco	8 vCPU, 128 GB RAM, 2000 GB Disco
Almacenamiento con nivel de servicio	No	Sí
Cambio de recursos en caliente	No	Sí*
Disponibilidad del Servicio	Alta	Excelente
Clonar el servidor en caliente	No	Sí
Crear plantilla de servidor en caliente	No	Sí
Ampliar disco	Sí	Sí
Snapshots	1 por periodo de 1 día	1 por periodo de 3 días
Incluir en Red Privada	No	Sí

* Si el SO lo soporta.

En la creación de un servidor se podrán seleccionar los siguientes parámetros:

- **vCPU** o Virtual CPU: es la medida de procesamiento asociada al servidor. Cada vCPU es equivalente a un procesador Intel Xeon de 2 GHz de 2010.
- **RAM**: memoria RAM que desea para su servidor. Se contrata en tramos de 512 MB.
- **Disco duro**: tamaño (medido en GB) del disco duro configurado. El tamaño mínimo del disco es de 50GB.
- **Nivel de servicio**: representa el rendimiento del disco duro contratado. Cuanto mayor sea el rendimiento, mayor será el número de operaciones de lectura/escritura por segundo que soporta el disco. Solo está disponible para servidores Premium.

Actualmente están disponibles las siguientes arquitecturas en versiones Linux y Windows:

- **Arquitectura monolítica:** consta de un solo servidor.
- **Arquitectura semi-distribuida:** dos servidores, uno actuando como frontend y otro como backend.
- **Arquitectura distribuida:** consta de un balanceador, 3 servidores (dos de ellos actuando como frontend y otro como backend) y un almacenamiento compartido actuando con filer.

Gestión de IP's públicas:

Con **Cloudbuilder** se pueden crear nuevas IP's públicas para asignar a los diferentes servidores o balanceadores.

Agrupación de servidores:

La agrupación de servidores establece una organización lógica de los servidores de **Cloudbuilder** lo que facilita la gestión de la infraestructura: crea grupos y subgrupos para clasificar y ordenar los servidores, diferencia roles de máquinas (frontend, back-ends, etc.) o servidores de distintos clientes y/o configuraciones, etc.

Grupos de conectividad:

Cloudbuilder permite establecer conectividad entre servidores de forma sencilla. Todos los servidores que estén en un mismo grupo de conectividad podrán establecer conexiones entre sí, sin filtros en el firewall.

Políticas de firewall:

Cloudbuilder puede asignar políticas de firewall de forma sencilla para posteriormente aplicarlas a uno o más servidores. Es posible asignar reglas para rangos de IPs y permitir el acceso a una, todas o un rango de IPs. Los protocolos soportados son TCP, UDP e ICMP.

Balanceadores:

Cloudbuilder permite crear balanceadores para repartir la carga de tráfico entre los servidores. Es posible establecer el balanceo para protocolos TCP y UDP entre otros y establecer condiciones:

- **Health-check:** basadas en chequeo del puerto TCP, HTTP o sin opción de chequeo.
- **Establecer persistencia.**
- **Tipo de balanceo:** Least connections o Round Robin.

Backup:

Cloudbuilder ofrece la posibilidad de hacer copias de seguridad completas de las máquinas y/o discos de almacenamiento compartido.

Se puede elegir entre diversos tipos de backup:

- **Semanal**: se hace una copia diaria del servidor con una retención de una semana. Esto significa que existe la posibilidad de recuperar el estado del servidor de cualquiera de los últimos 7 días.
- **Mensual**: se hace una copia diaria del servidor con una retención de un mes. Esto significa que existe la posibilidad de recuperar el estado del servidor de cualquiera de los últimos 30 días.
- **Anual**: se hace una copia diaria del servidor con una retención de un año. Esto significa que existe la posibilidad de recuperar el estado del servidor de cualquiera de los últimos 30 días y para periodos anteriores se guardará únicamente la copia de uno de los días del mes.

Hardware dedicado:

Cloudbuilder ofrece la posibilidad de disponer de hardware dedicado para la creación de infraestructuras virtuales. Es posible solicitar servidores Host, balanceadores, firewalls y cabina de discos, donde solo se desplegará únicamente una infraestructura, sin que sea compartida por otros clientes.

Cloud Híbrido:

Cloudbuilder Híbrido permite integrar servidores en la Nube con otros que pueden estar en el Data Center de Arsys o in-house. Es decir, permite integrar en una misma infraestructura de los servidores virtuales de su **Cloudbuilder** con otros servidores físicos.

En **Cloudbuilder Híbrido** las bases de datos podrían estar sobre servidores dedicados físicos y conectarlos a una cabina de datos mediante tecnología iSCSI. A nivel de comunicaciones, la conexión a la plataforma Cloud se puede realizar a través de una línea dedicada o una VPN. De esta forma, es posible disfrutar de todas las posibilidades del outsourcing tradicional y de todas las ventajas de una solución Cloud.

VPN:

Cloudbuilder ofrece 4 tipos distintos de VPN para securizar las comunicaciones que se realice a los servidores:

VPN Access SSL:
Conexión a los servidores de forma segura sin necesidad de hardware adicional a través del software OpenVPN. Hay que instalar OpenVPN y unos certificados descargables desde el panel en el ordenador con el que se quiera acceder a los servidores de **Cloudbuilder** de forma segura. Una vez correctamente instalado podrá conectarse con los servidores mediante un túnel cifrado.

VPN Access IPSec:
Se crea un túnel cifrado entre la oficina y los servidores alojados en Arsys. Es necesario disponer de un terminador de túneles en las oficinas o un router compatible y configurarlo con los parámetros que desde Arsys proporcionaremos. Esta VPN es recomendada cuando se quiere que todos los equipos de una red se conecten a los servidores de **Cloudbuilder** de forma cifrada.

VPN Network:
Con esta VPN se podrá crear una red segura y cifrada entre los servidores alojados en tu oficina y los de Arsys. Desde aquí se gestiona el direccionamiento IP de los equipos y son visibles como si estuvieran también en las oficinas. Es necesario tener un terminador de túneles en las propias oficinas y configurarlo con los parámetros que proporcione Arsys. Esta VPN es la recomendada cuando se desee que los servidores de **Cloudbuilder** se comporten igual que los servidores de red y puedan imprimir en las impresoras de la oficina, compartir carpetas con los equipos...

VPN MPLS:
Con esta VPN podrás interconectar tus oficinas de forma segura a través una red aislada, confiable e independiente de Internet. La VPN MPLS también permite establecer una QoS para priorizar un tráfico determinado (por ejemplo VoIP). Este servicio es instalado y configurado en cada una de las sedes por Arsys, de forma que no es necesario preocuparse por ninguna de esas tareas de puesta en marcha ni mantenimiento.

Almacenamiento compartido:

Cloudbuilder permite crear de forma sencilla volúmenes de almacenamiento compartido. Estos volúmenes están disponibles en tecnologías NFS o CIFS y discos SATA o Fibre Channel. Los discos pueden ser creados con tamaños que van desde 50GB a 2TB.

Red Privada:

Cloudbuilder permite crear redes privadas (VLAN dedicada) con el fin de dotar a los servidores de una interfaz de red privada adicional. El direccionamiento IP de esta interfaz se puede gestionar.

Monitorización:

Cloudbuilder dispone de un servicio de monitorización para los servidores. Existen dos tipos monitorización:

Monitorización Estándar: servicio gratuito que monitoriza el estado (encendido/apagado) del servidor y los recursos CPU, RAM y transferencia. A través del panel recibirá avisos cuando se produzca una alarma y en el caso de encendido/apagado del servidor también recibirá notificación por mail. En el panel podrá ver el estado actual de cada uno de los recursos, un apartado de gráficas con la evolución temporal y un histórico de los eventos generados durante el último mes. Los umbrales de generación de alarmas no son editables y se han definido como:

	Warning	Critical
CPU	90%	95%
Memoria	90%	95%
Transferencia	1000 Kbps	1500 Kbps

Monitorización Avanzada: servicio con coste que, a las funcionalidades de la Monitorización Estándar, añade la monitorización del Disco y cualquier Puerto (TCP) y Proceso del sevidor. También se podrán gestionar los umbrales (del tipo Advertencia/Warning y Crítico/Critical) y parámetros que generarán las alarmas (si el puerto responde o no o el proceso está en ejecución o no). En el panel se podrá ver el estado actual de cada uno de los recursos, puertos y procesos, un apartado de gráficas con la evolución temporal y un histórico de los eventos generados durante el último año.

Action Engine:

Cloudbuilder dispone de potente motor de acciones que permite establecer la realización de acciones en función de condiciones preestablecidas.

Así por ejemplo, se pueden crear reglas sencillas como, establecer que se aumente la RAM de uno de sus servidores si el uso de su RAM supera el 80% de uso durante más de 15 minutos, pero también mucho más complejas, como por ejemplo crear un nuevo servidor, incluirlo en un balanceador y aumentar RAM y CPU.

Logs de actividad:

El log de actividad hace un seguimiento de las acciones realizadas, el porcentaje de avance de las mismas y la confirmación de que el proceso ha finalizado correctamente.

El log de actividad tiene dos modalidades:

Modalidad básica: Esta modalidad es una ventana desplegable que muestra información básica de los procesos que puede ser consultada desde cualquier punto del panel de control. En esta ventana solo muestra las acciones que se hayan ejecutado recientemente y puede mostrarse u ocultarse a voluntad.

Modalidad detallada: A esta modalidad se accede desde un punto del apartado "**Datacenter**" del panel de control. Por defecto muestra las últimas 5 acciones realizadas del día actual, pero puede mostrarse hasta 100 simultaneas y también seleccionar un periodo concreto, estableciendo las fechas desde/hasta y un rango horario. La lista de acciones puede ser también exportada en formato csv en el caso de que se quiera realizar un análisis detallado.

Este apartado muestra al seleccionar un proceso, una información más detallada del mismo. Esta información es distinta dependiendo de la acción realizada.