

WiNOC Hotel HSIA Solution Features and Benefits

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1. Introduction

WiNOC Hotel Internet Service Operations Support System is a total solution designed for hospitality for offering carrier grade Internet service for guests. The solution includes hotel FOS/PMS integration, guest Internet access authentication, authorization, accounting and billing, electronic map-based graphical network device management, role-based system administration interfaces, lawful intercept of guest Internet access tracking, secure wireless intranet access control for hotel staff, etc.

The innovative system design integrates “account management” and “network equipment management” so the system acts as a substitute network administrator that automatically monitors the network’s operation and generates alerts. For reception staff with no professional IT knowledge, the system may also provide them with updates and suggestions at the administrative interface or troubleshoot guests’ connection problems. By supporting fully automated account management and integration with the existing hotel service processes, the system offers an effective way to reduce a hotel’s operating costs.

1.1. Benefits

The system is not only designed for IT but also all the parties involving hotel HSIA service. The Fig. 1: WiNOC benefits diagram describes the benefits of the solution to these parties.

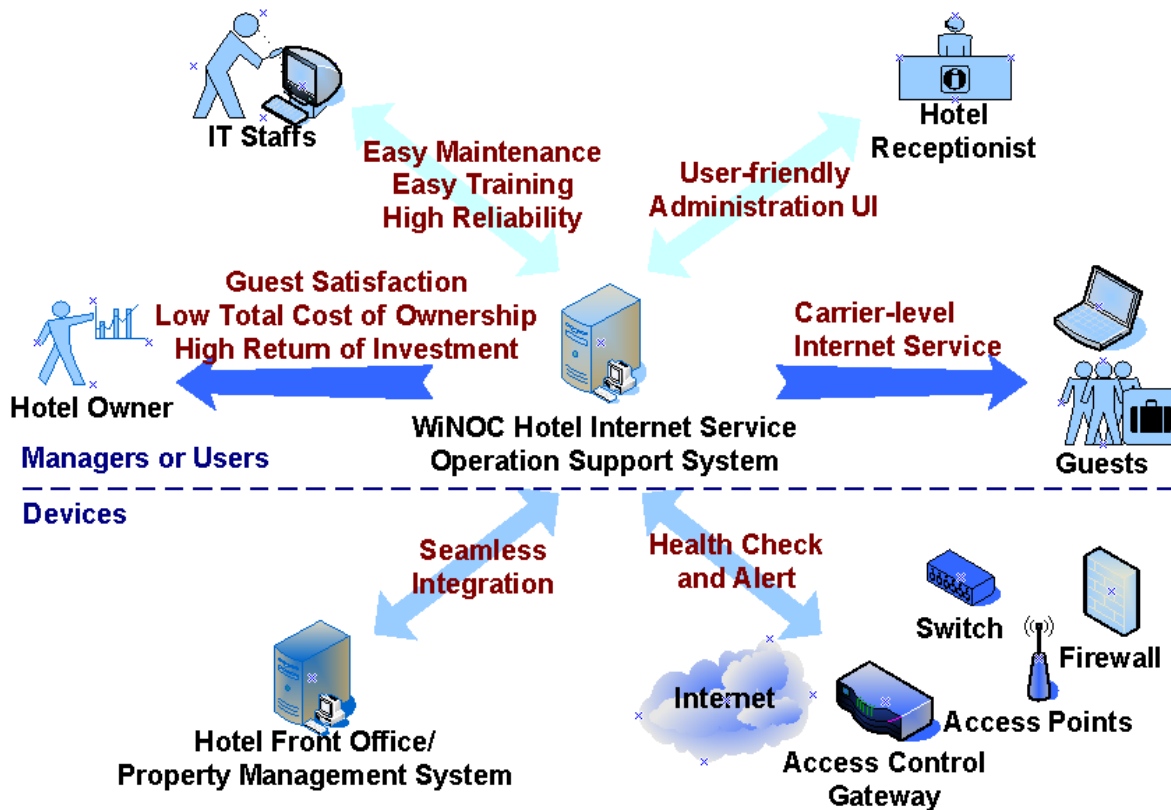


Fig. 1: WiNOC benefits

1.2. Reference Sites

- 台北遠東飯店 Shangri-la Taipei, Far-Eastern Plaza Hotel (2006/5/18 go-live)
<http://www.shangri-la.com/>
- 高雄漢來飯店 Grand Hi-Lai Hotel, Taiwan Kaohsiung (2007/10/1 go-live)
<http://www.grand-hilai.com.tw/>
- 澳門美高梅金殿酒店 MGM Grand Macau (2007/12/18 go-live)
<http://www.mgmgrandmacau.com/>
- 北京威尼斯人安德森中心酒店 Venetian Beijing (pending go-live)
- 高雄義大皇冠假日飯店 Crowne Plaza Kaohsiung E-DA World (2010/4/8 go-live)
- 台北時代國際飯店 W Hotel Taipei (2011/2/18 go-live)

2. Solution Network Architecture

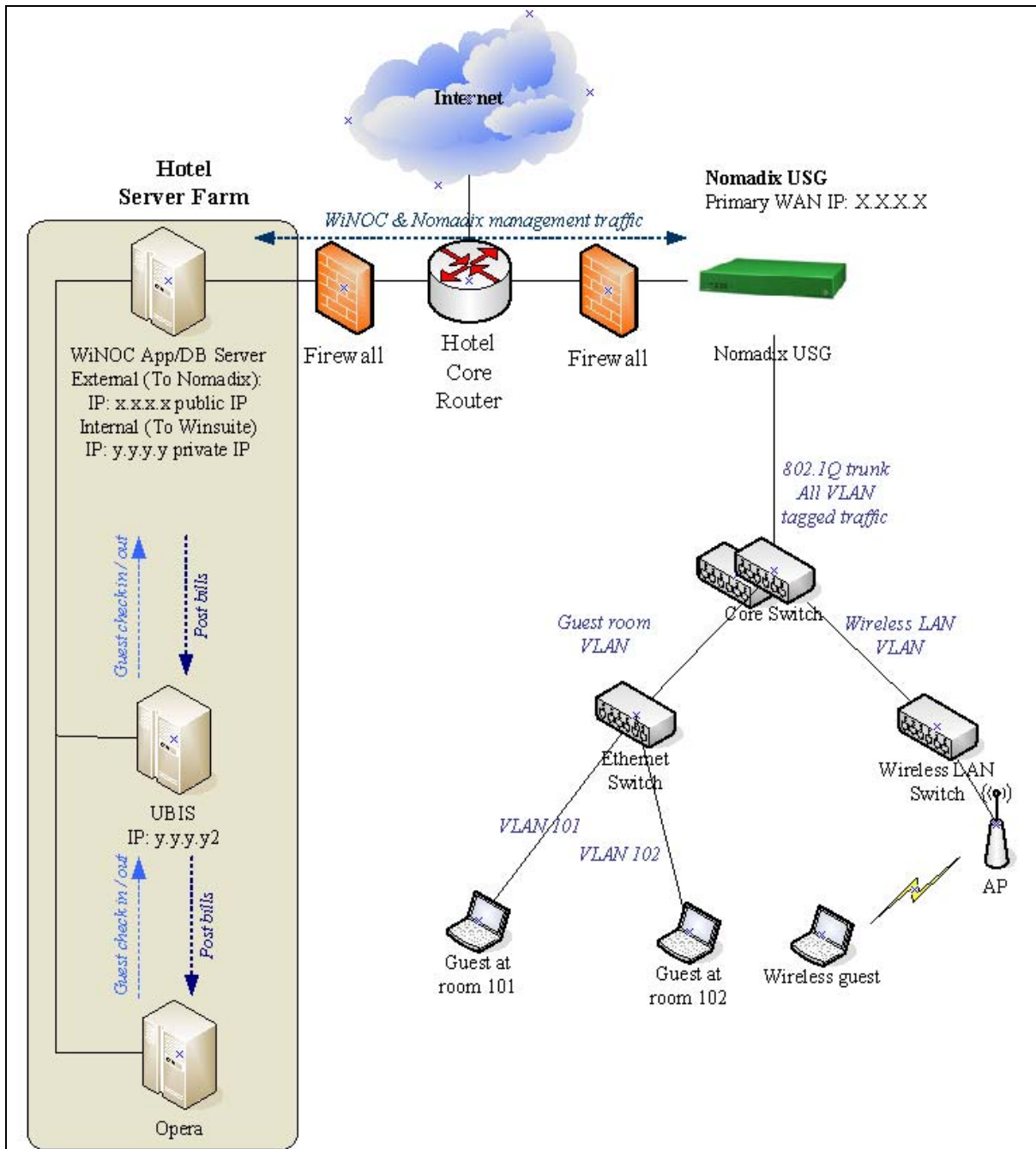


Fig. 2. Solution network architecture

The network architecture of WiNOC Hotel HSIA Solution is composed of the following facilities:

- **UBIS (Universal billing and interface system):** The Micros-Fidelio Opera system and the FCS UBIS HSIA interface, which communicates with WiNOC via TCP/IP.
- **WiNOC:** The WiNOC hotel HSIA management system, which integrates with FCS UBIS/Micros-Fidelio Opera via TCP/IP for billing records synchronization. Also, WiNOC

works with Nomadix Gateway to redirect hotel Welcome portal for guest to purchase and log in HSIA service, control bandwidth utilization, assign public IP addresses, etc.

- *Firewall*: The device that protects guest network and WiNOC from being hacked by malicious guests.
- *Wired LAN*: Wired network in the hotel. The Ethernet switch should support IEEE 802.1q VLAN tagging feature. Each room number should map to a specific VLAN ID of the hotel network for controlling.
- *Wireless LAN*: Wireless network in the hotel.
- *Nomadix Gateway*: The Nomadix access control gateway or USG (User Subscription Gateway) or NSE (Nomadix Service Engine) in Nomadix terms. It works with WiNOC to authenticate guests trying to access the Internet and control bandwidth utilization.

3. Solution Features and Advantages

3.1. For Hotel Guests

A. Plug-and-Play for any IP, DNS, HTTP Proxy, SMTP configuration

Nomadix™ patented DAT functionality offers a true “plug-and-play” solution that provides transparent broadband network connectivity—covering all PC configurations (static IP, DHCP, DNS, and proxies), and ensuring that the hotel guests get access to Internet.

Nomadix™ SMTP redirection feature enables to allow hotel guests to send and receive email when not connected to their SMTP home server. SMTP relay service is required to enable SMTP redirection function. Nomadix™ provides year of Nomadix™ SMTP Relay Service for hotel to purchase. However, this service is not required if the hotel's local ISP offers similar SMTP relay service packaged together with the Internet bandwidth service.

B. Support various VPN application

Nomadix™ patent-pending iNAT feature creates an intelligent mapping of IP Addresses and their associated VPN tunnels for providing seamless VPN connectivity for guests. (Auto-assign different public IP addresses in the iNAT pool for guests from the same company connect to the same VPN server.)

C. Share Purchased Account

WiNOC enables the guests to share purchased account to log in different time slot. The online session of the previous logged-in laptop will be terminated once another laptop logs in successfully using the same account. The guests could also purchase the second account for the second laptop accessing Internet concurrently. The maximum number of

purchasable accounts of each room is up to three.

D. Bandwidth Management

The Nomadix™ Bandwidth Management feature enables service providers and network administrators to limit bandwidth usage on a per device (MAC Address/User) basis. This ensures every user has a quality experience by placing a bandwidth ceiling (limit) on each device accessing the network so every user gets a fair share of the available bandwidth.

The WiNOC policy-based bandwidth management feature enables bandwidth control on a per guest basis such as for normal guests 512/512 kbps and for VIP guests 1M/1M. The guest VIP level could be integrated with Opera Guest VIP code to assign VIP bandwidth to VIP guests transparently. The bandwidth limitation will be applied to Nomadix™ after the guest is logged in. And, the WiNOC definable HSIA access plan could also be specified the up/download bandwidth limitation respectively (See Fig. 3).

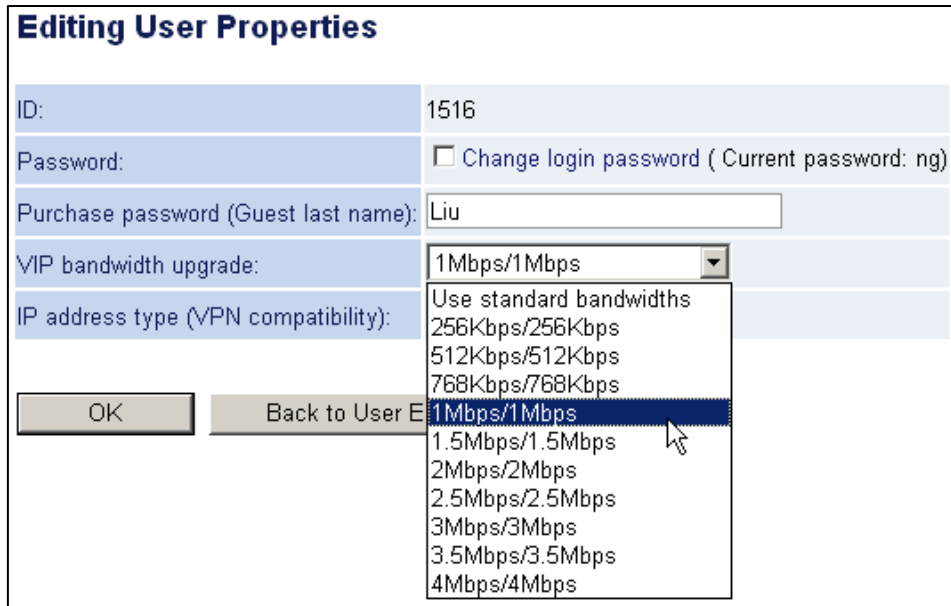
Prepaid Policy

Max download bandwidth:	<input type="text" value="64"/>	Kbps	<input type="button" value="v"/>	
Max upload bandwidth:	<input type="text" value="64"/>	Kbps	<input type="button" value="v"/>	
Usable time:	<input type="text" value="0"/>		Minute(s)	<input type="button" value="v"/>
Charge:	<input type="text" value="0"/>		US Dollar(s)	<input type="button" value="v"/>

ID	Max Download BW	Max Upload BW	Usable Time (day.hh:mm:ss)	Charge
1	256 Kbps	256 Kbps	01:00:00	300 NTD
3	256 Kbps	256 Kbps	1.00:00:00	600 NTD
5	256 Kbps	256 Kbps	2.00:00:00	1200 NTD

Fig. 3: WiNOC definable HSIA access plan with bandwidth control

WiNOC also enables the hotel to assign higher VIP bandwidth to a specific user account or room for guest's special needs via WiNOC user-friendly administration interface (see Fig. 4).



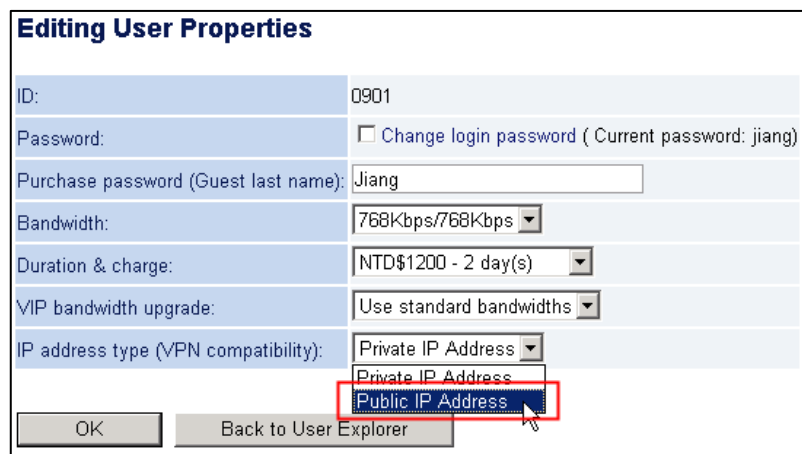
Editing User Properties	
ID:	1516
Password:	<input type="checkbox"/> Change login password (Current password: ng)
Purchase password (Guest last name):	Liu
VIP bandwidth upgrade:	1Mbps/1Mbps
IP address type (VPN compatibility):	Use standard bandwidths 256Kbps/256Kbps 512Kbps/512Kbps 768Kbps/768Kbps 1Mbps/1Mbps 1.5Mbps/1.5Mbps 2Mbps/2Mbps 2.5Mbps/2.5Mbps 3Mbps/3Mbps 3.5Mbps/3.5Mbps 4Mbps/4Mbps
<input type="button" value="OK"/> <input type="button" value="Back to User Explorer"/>	

Fig. 4: Upgrade the VIP guest's bandwidth via WiNOC

E. Allocating Public IP Addresses for Special Internet Applications

Although the majority of Internet applications such as VPN client software programs can be run on computers using private IP addresses, some special Internet application programs can't and they work properly only on computers with public IP addresses.

With WiNOC user-friendly administration interface, when the guest HSIA account of WiNOC is configured to support the IP Up-Sell functions of Nomadix Gateway (see Fig. 5), public IP addresses can be allocated to guests who have special VPN needs. Usually, private IP addresses are allocated so that the precious public IP address pool is conserved.



Editing User Properties	
ID:	0901
Password:	<input type="checkbox"/> Change login password (Current password: jiang)
Purchase password (Guest last name):	Jiang
Bandwidth:	768Kbps/768Kbps
Duration & charge:	NTD\$1200 - 2 day(s)
VIP bandwidth upgrade:	Use standard bandwidths
IP address type (VPN compatibility):	Private IP Address Private IP Address Public IP Address
<input type="button" value="OK"/> <input type="button" value="Back to User Explorer"/>	

Fig. 5. Allocating public IP address to account 0901 via WiNOC

F. Room independent VLAN protection

Each room can be configured to be on its own VLAN and each public area can also be configured to be on its own VLAN. Then, the system can log the specific location where

the guest is accessing the hotel HSIA. However, when the guest computer of a specific room is infected with viruses, the VLAN of this room can be switched off and the infected computer will not affect the whole guest room network.

3.2. For Hotel Operation and Customer Service

A. User-friendly welcome portal provides maximal branding benefits

WiNOC provides welcome portal log-in and purchase pages customization service for the hotel guests' pleasant experience. The welcome portal could be design to follow the hotel's standard of artwork and procedures. The service purchase page allows guests to choose from different service plans, and it is multilingual support according to hotel's requirement (See Fig. 6 and Fig. 7).



Fig. 6. Japanese version of the welcome log-in page

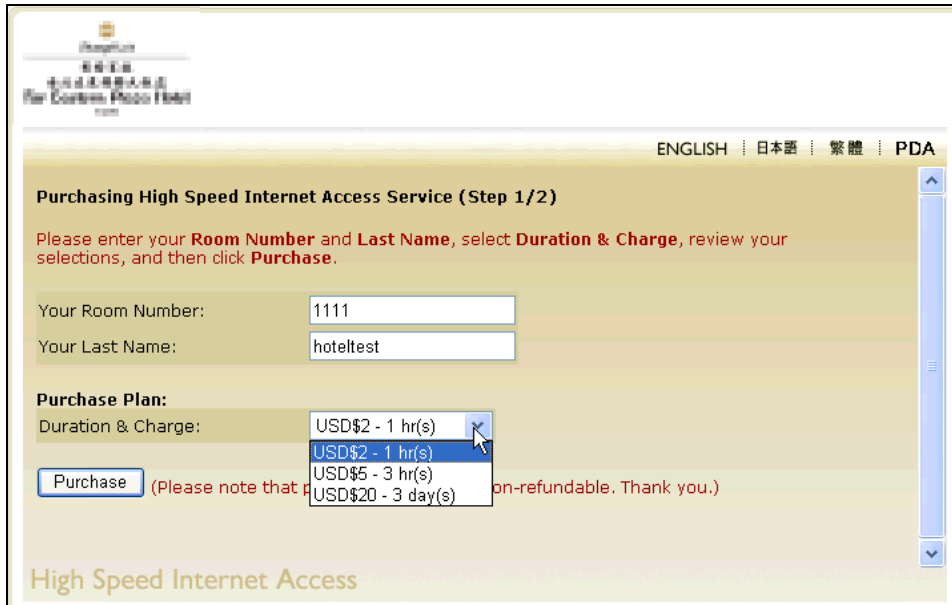


Fig. 7. English version of the purchase page

B. Guest self-service purchase and log-in

For saving hotel customer service loading, the checked-in room guest can purchase self-service plan via room wired Internet connection based of detection of the room number using the VLAN ID. After purchasing and signing in, the guest is given a user-name and password that they can use to sign in the hotel's room wireless Internet, public area wireless Internet and public area wired Internet.

The checked-in room guest can purchase self-service plan using his/her last name and room number as verification via the hotel's room wireless Internet, public area wireless Internet and public area wired Internet connection. After purchasing and signing in, the guest is given a username and password that they can use to sign in the hotel's room wired Internet.

C. Flexible billing policies

WiNOC allows the hotel to differentiate fees for various levels of Internet access service. Support flexible and definable billing policy such as different usable time different rate, different location (room) different rate, different guest VIP level different rate, different account type different rate and different bandwidth different rate.

D. Hybrid control of free public Internet and charged Internet with quality-guaranteed

WiNOC enables the hotel to provide free Internet to anonymous public guests for promotion purpose and also provide quality-guaranteed Internet access to the hotel guests who have paid for hotel services. The paid guests could obtain bigger bandwidth and longer session time without interrupt than the anonymous guests.

For the guest wants free Internet access, he/she just needs to accept the hotel term of use agreement to get the free but resource-limited Internet access service at the hotel wireless coverage area. For the guest needs quality-guaranteed Internet access, the

room guest could purchase the access plan at room using the room number and last name. The other public users could purchase access plans by front office or business center receptionist help.

E. Change room transparently to guests

Automatically move the purchased accounts to new room once the guest is changed room by any reason. The remaining time and the password of the purchased account will be kept and moved.

F. File-Explorer-Like administration interface

User-friendly and File-Explorer-Like Web-based administration interface for hotel IT, front desk and business center staffs easy to be trained and learned (Multilingual support). Web-based management interface could be accessed by any computer on the Internet or the intranet.

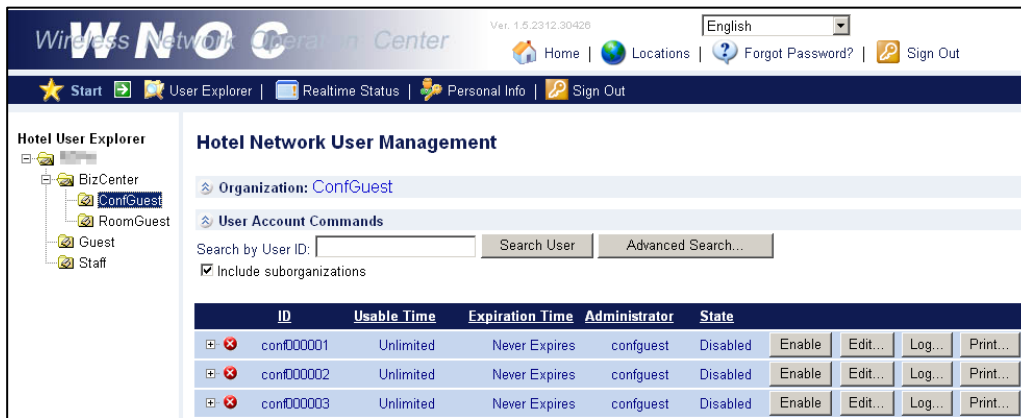


Fig. 8: File-Explorer-Like administration interface

G. Flexible and definable role-based administration authorization control

Support to apply hotel authorization policy such as IT has full permissions, front desk has limited permissions and auditor has read-only permission.

Adding an Organization

Organization name:	<input type="text" value="BizCenter"/>
Organization administrator ID:	<input type="text" value="bc"/> <small>ID must consist of a-z, 0-9 and underscores, and be 2-10 letters long.</small>
Password:	<input type="password" value="*****"/> <small>Password must be 5-10 letters long.</small>
Organization administrator permissions:	<input checked="" type="checkbox"/> Add Organizations <input checked="" type="checkbox"/> Delete Organizations <input checked="" type="checkbox"/> Edit Organizations <input checked="" type="checkbox"/> View Organization Reports <input checked="" type="checkbox"/> Add a Single User <input checked="" type="checkbox"/> Add Multiple Users <input checked="" type="checkbox"/> Delete Users <input checked="" type="checkbox"/> Edit & Move Users <input checked="" type="checkbox"/> View Per-User Reports <input checked="" type="checkbox"/> Import User Lists <input checked="" type="checkbox"/> Export User Lists <input checked="" type="checkbox"/> Print Users <input checked="" type="checkbox"/> View User Realtime Statuses <input checked="" type="checkbox"/> Add Device Guests <input checked="" type="checkbox"/> Add Hotel Administrators

Fig. 9: Role-based administration authorization control

H. Definable temporary accounts for non-checked-in-room guests

Hotel BC or FO administrators could enable and print a temporary account via the Web-based Interface to sell or give away to allow non-checked-in-room guests to access public area wired or wireless Internet without charge to their room using the credentials on the print-out sheet.

<input type="button" value="Edit Users..."/> <input type="button" value="Print Users..."/>										
All	ID	Name	Usable Time	Expiration Time	State					
<input type="checkbox"/>	bc001205		24 hr 0 min 0 sec	Never Expires	Disabled	<input type="button" value="Enable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
<input type="checkbox"/>	bc001206		24 hr 0 min 0 sec	Never Expires	Disabled	<input type="button" value="Enable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
<input type="checkbox"/>	bc001207		24 hr 0 min 0 sec	Never Expires	Disabled	<input type="button" value="Enable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
<input type="checkbox"/>	bc001208		24 hr 0 min 0 sec	Never Expires	Disabled	<input type="button" value="Enable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
<input type="checkbox"/>	bc001209		24 hr 0 min 0 sec	Never Expires	Disabled	<input type="button" value="Enable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>

Guest Information of High Speed Internet Access Service

Full name:	
User ID:	bc001205
Password:	rw6dz
Available time:	1 day(s)0 hr 0 min 0 sec
Expiration date:	Unlimited

Fig. 10: Temporary accounts for non-checked-in-room guests

For conference event, also support batch account properties editing (account enable/disable state, password and access plan) and batch account information printing (account ID, password, usable minutes and expiration time etc) via web-based administration user interface.

I. Detailed event logs of guest’s status for troubleshooting

WiNOC provides several event logs for tracking “guest purchasing Internet access service”, “guest changing password”, “business center administrator purchasing Internet access service on guest’s behalf”, “business center administrator changing guest password”, etc. Information recorded in these logs is extremely useful when troubleshooting.




S/N	Type	Time	Source	Category	Account ID	Event	User	Computer	Description
688800		4/13/2007 9:08:55 PM	WNOC	ServicePurchase	3510	1	(User)	HSIA_WNOC	Hotel guest purchase Internet service succeeded . Access plan ID: 2; Bandwidth: 768Kbps/768Kbps; Duration: 1440 min; Charge: NTD\$600 Login password: kreiling; IP Up-Sell: False
688799		4/13/2007 9:08:22 PM	IAS	AccessReject	3510	1	N/A	hsia_wnoc	User "3510 (00-18-DE-83-E7-FC)" rejected by IAS
688798		4/13/2007 9:08:22 PM	IasExAuth	AccessRequest	3510	1	N/A	hsia_wnoc	User "3510 (00-18-DE-83-E7-FC)" rejected because nonstopped accounting account expired

Fig. 11: WiNOC detailed event log for troubleshooting

J. Seamless integration with hotel FOS/PMS

Integration with UBIS so that WiNOC’s internal room status and billing database and hotel FOS/PMS database can be synchronized. UBIS supports to integrate with various major FOS/PMS system in the market.

K. Bar Internet service without deposit

If the guest is checked in without deposit, the hotel operator could manually bar the HSIA service of the room. After the service is barred, the guest could not purchase a plan and access Internet. This feature could be also integrated to bar or unbar the HSIA service of specific room by the parameter sending from FOS/PMS.

3.3. For Hotel IT Support

A. Prevent hotel guest network from P2P application DoS attacks

To help prevent hotel guest network from becoming a victim of Denial of Service (DoS) attacks, Nomadix™ offers you peace of mind with its unmatched Session Rate Limiting (SRL) and dynamic MAC filtering functionality. With session rate limiting enabled, each guest only receives a certain number of sessions they can open in a set time period. If they exceed this limit, no new sessions will be allowed until the time interval elapses and the user can gain more sessions.

B. Lawful Intercept of guest Internet access tracking

The Nomadix™ provides tracking logs, which can be enabled to monitor all the port assignments for the users accessing a public network. These tracking logs enable you to trace-back to a particular MAC address and Username based on port and IP information available to an external site that has been attacked, hacked or used in an illegal fashion.

WiNOC build-in Syslog server enables the hotel to store and manage the Nomadix lawful intercept tracking logs in the database server. WiNOC build-in RADIUS server also keeps guest's log-in/log-out time, MAC address, IP address, port number, transmitted bytes and usage time in database for tracking, statistics and analysis. (See Fig. 12)

Login Time	Logout Time	Used Time (sec)	In Data (KB)	Out Data (KB)	Location	Region	MAC Address
11/17/2008 5:55:05 PM					MachineRoom	FEPH	00-17-42-85-34-47
11/17/2008 9:30:43 AM	11/17/2008 2:30:48 PM	18005	2228	8719	MachineRoom	FEPH	00-17-42-85-34-47
11/16/2008 12:22:46 AM	11/17/2008 9:30:23 AM	119257	24024	527307	MachineRoom	FEPH	00-1A-80-D7-27-5E
11/14/2008 9:49:41 PM	11/16/2008 12:22:46 AM	95585	12072	45324	MachineRoom	FEPH	00-17-42-85-34-47
11/13/2008 4:51:51 PM	11/14/2008 8:43:52 AM	57121	6436	11441	MachineRoom	FEPH	00-17-42-85-34-47

Msg
INFO [AG 5000 v2008.3.033] LI: conSTR,2010-02-16T11:00:09.87Z,00:1D:09:CE:C8:79:5(10.2.1.115:3499),R(192.168.1.150:161),X(122.146.192.195:34967),UDP,Kaohsiung,RA
INFO [AG 5000 v2008.3.033] AAA: 4303 update_Timer_Timeout expired_time_entry_reused 00:26:BB:CB:37:9E sent_bytes:15624 rcvd_bytes:202377
INFO [AG 5000 v2008.3.033] LI: subEND,2010-02-16T11:00:14.30Z,00:26:BB:CB:37:9E,,,,,Kaohsiung,free room,,,2527
INFO [AG 5000 v2008.3.033] AAA: 4303 update_Timer_Timeout expired_time_entry_reused 00:17:9A:FA:20:59 sent_bytes:2616 rcvd_bytes:0
INFO [AG 5000 v2008.3.033] LI: subEND,2010-02-16T11:00:14.65Z,00:17:9A:FA:20:59,,,,,Kaohsiung,free room,,,4007
INFO [AG 5000 v2008.3.033] LI: conSTR,2010-02-16T11:00:14.67Z,00:1E:8C:4B:C7:ED,5(10.2.0.185:1426),R(69.63.178.143:80),X(122.146.192.195:34968),TCP,Kaohsiung,free
INFO [AG 5000 v2008.3.033] LI: conEND,2010-02-16T00:58:06.70Z,00:1F:16:1A:7F:00,5(10.2.0.253:3957),R(66.220.145.11:80),X(122.146.192.195:35023),TCP,Kaohsiung,,,,
INFO [AG 5000 v2008.3.033] LI: conEND,2010-02-15T18:01:04.70Z,00:1F:16:1A:7F:00,5(10.2.0.253:3958),R(69.63.178.119:80),X(122.146.192.195:35024),TCP,Kaohsiung,,,,

Fig. 12: Lawful Intercept of guest Internet access tracking

C. Manage multiple Nomadix boxes

According to the hotels' business strategy and billing policy, WiNOC enables the hotel to manage multiple Nomadix boxes which might be located within the same hotel or in different hotels. The hotel guest HSIA account roaming between the Nomadix boxes could be supported. The hotel guest could access Internet with the same username within these hotels or locations of a hotel.

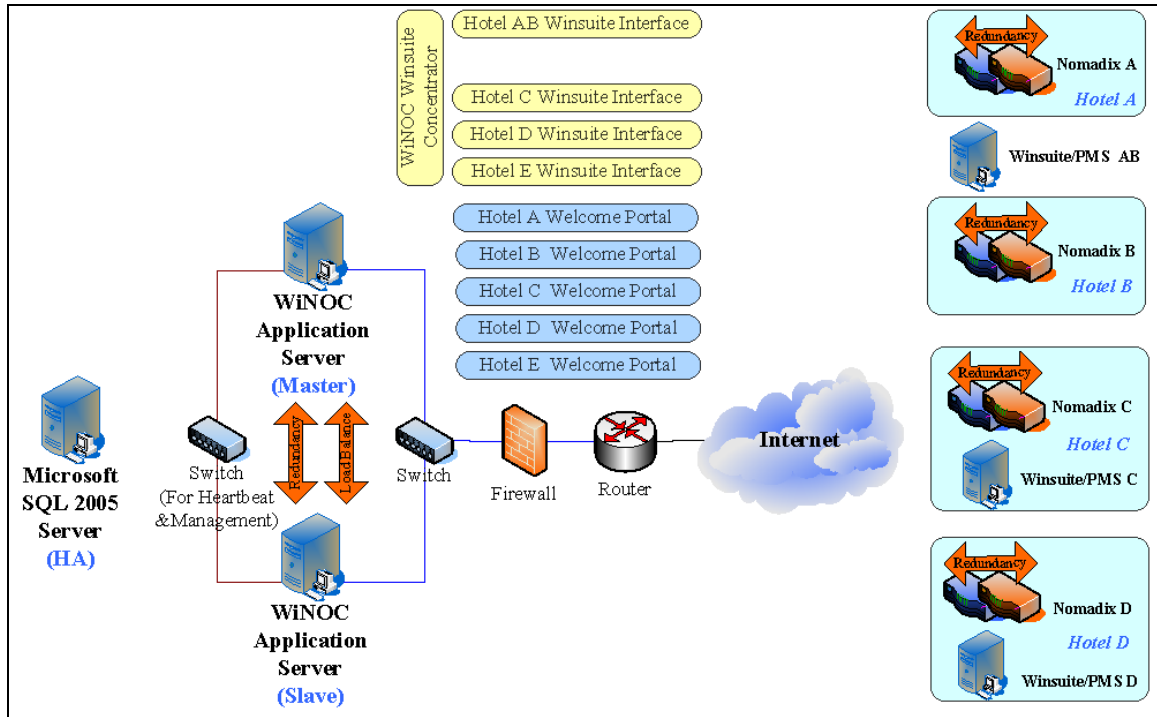


Fig. 13: Manage multiple Nomadix boxes

D. Network devices monitoring and management

WiNOC device health monitoring function supports background network devices (such as Nomadix, Firewall, Ethernet switch and AP) health monitoring and anomaly alerting by Email. WiNOC device status monitoring feature enables SNMP-based device status and performance statistics reporting and analysis.

Hotel IT specialists can scan floor plans as JPG, GIF, or PNG files and upload them to WiNOC. Then, the positions of the wireless access points can be marked on the floor plans, so that these devices can be managed graphically and easily.



Fig. 14. Managing network devices graphically

N	CheckTime	Device Number	Ping	HTTP	TCP	SNMP																								
5889518	12/17/2008 5:00:50 PM	1500	NG	NG	NG	NG																								
5888776	12/17/2008 3:14:10 PM	1500	OK	OK	OK	OK																								
5888011	12/17/2008 1:23:56 PM	1500	OK	OK	OK	OK																								
5887245	12/17/2008 11:30:49 AM	1500	OK	OK	OK	OK																								
5886500	12/17/2008 9:45:34 AM	WiNOC in YesTurnkey Office Alert																												
5885738	12/17/2008 7:56:53 AM	-- Result --																												
5884987	12/17/2008 6:06:01 AM	Failed Devices:																												
5884236	12/17/2008 4:16:25 AM	<table border="1"> <thead> <tr> <th>Device ID</th> <th>Device Name</th> <th>IP Address</th> <th>Ping Check</th> <th>HTTP Check</th> <th>SNMP Check</th> <th>TCP Check</th> <th>Location</th> </tr> </thead> <tbody> <tr> <td>ND001</td> <td>portforwardingAP</td> <td>140.124.250.2</td> <td>OK</td> <td>NG</td> <td>NG</td> <td>NG</td> <td>\\TopRoot\NTUU\BuildingA\Machine Room</td> </tr> <tr> <td>AG001</td> <td>AG</td> <td>lesaintmaurice.dyndns.org</td> <td>NG</td> <td>NG</td> <td>NG</td> <td>NG</td> <td>\\TopRoot\BestWestern\Best Western Le Saint</td> </tr> </tbody> </table>					Device ID	Device Name	IP Address	Ping Check	HTTP Check	SNMP Check	TCP Check	Location	ND001	portforwardingAP	140.124.250.2	OK	NG	NG	NG	\\TopRoot\NTUU\BuildingA\Machine Room	AG001	AG	lesaintmaurice.dyndns.org	NG	NG	NG	NG	\\TopRoot\BestWestern\Best Western Le Saint
Device ID	Device Name	IP Address	Ping Check	HTTP Check	SNMP Check	TCP Check	Location																							
ND001	portforwardingAP	140.124.250.2	OK	NG	NG	NG	\\TopRoot\NTUU\BuildingA\Machine Room																							
AG001	AG	lesaintmaurice.dyndns.org	NG	NG	NG	NG	\\TopRoot\BestWestern\Best Western Le Saint																							
5883500	12/17/2008 2:29:16 AM																													
5882730	12/17/2008 12:38:13 AM																													

Send alerting message by Email

Fig. 15. Health monitoring and anomaly alerting by Email

E. Secure Wireless Intranet Access Control for Internal Operation Needs

For hotel operation needs, the WiNOC provides the hotel internal staff with several authentication methods for different kind of mobile application. IEEE802.1x / PEAP method is for the application requires high transmitting security; MAC address authentication is for the mobile device with limited function to support advanced authentication method (such as Wi-Fi phone, RFID mobile reader); For these authentication methods, it's required the access points to support multiple SSIDs/VLANs, IEEE802.1x/PEAP authentication and RADIUS MAC authentication function.

Besides assigning the session timeout, idle timeout and bandwidth limitation, the VLAN ID could be assigned to individual user account (staff account, manager account, vendor ac-

count) according to the account group or the authentication method (IEEE 802.1x/PEAP, Web-redirection). The user would be authorized the privilege of hotel network access by the assigned VLAN ID. For example, the vendor account could only be allowed to access Internet and the staff account could only be allowed to access Intranet with highly data-encrypted security.

Note: For WiNOC VLAN assignment, it's required the access point and WLAN switch to support RADIUS standard or vendor specific attribute for user-based VLAN assignment.

User Type	SSID	SSID Broadcast	Authentication Method	Authorization
Guest	Guest	Broadcast	UAM (Web redirection)	VLAN_GuestWireless VLAN_GuestRooms, Internet access only
Staff	Staff	Hidden	IEEE802.1x/PEAP	VLAN_StaffWireless, Intranet access
Wi-Fi Phone	VoIP	Hidden	RADIUS MAC	VLAN_VoIP, VoIP network access only
RFID Device	RFID	Hidden	RADIUS MAC	VLAN_RFID, RFID network access only

Fig. 16 The authorization table for different user group or authentication method

F. Various Monitoring Reports

- **HSIA account searching and monitoring** user friendly searching, monitoring, troubleshooting and guest account properties change user interface.

Search by User ID: <input type="text" value="411"/>		<input type="button" value="Search User"/>	<input type="button" value="Advanced Search..."/>							
<input checked="" type="checkbox"/> Include suborganizations										
<input type="button" value="Edit Users..."/>		<input type="button" value="Print Users..."/>								
All	ID	Name	Usable Time	Expiration Time	State					
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	4114	DERRY MR WILLIAM JAMES	9 hr 20 min 1 sec	2/24/2010 9:44:51 PM	Online	<input type="button" value="Terminate"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	4112		23 hr 14 min 36 sec	Never Expires	Disabled	<input type="button" value="Enable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	4110	RUETZ MR JAMES PETER	21 hr 43 min 39 sec	2/25/2010 10:08:29 AM	Offline	<input type="button" value="Disable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	4111	TELGE MR JUERGEN	0 hr 0 min 0 sec	2/22/2010 11:17:32 AM	Expired	<input type="button" value="Disable"/>	<input type="button" value="Edit..."/>	<input type="button" value="Log..."/>	<input type="button" value="Event..."/>	<input type="button" value="Print..."/>
Total: 4										

- **System Event Viewer** including the events about PMS check-In/out, guest name update, room move record, guest log-in/out, guest password error, guest VIP bandwidth upgrade, guest public IP allocation etc.

Event Viewer										
Query By Date & time										
Last <input checked="" type="radio"/> 1 day <input type="radio"/> 1 week <input type="radio"/> 1 month										
<input type="radio"/> <input type="text"/> / <input type="text"/> / <input type="text"/> (yyyy/mm/dd)										
<input type="radio"/> <input type="text"/> / <input type="text"/> (yyyy/mm)										
<input type="radio"/> <input type="text"/> / <input type="text"/> / <input type="text"/> (yyyy/mm/dd) ~ <input type="text"/> / <input type="text"/> / <input type="text"/> (yyyy/mm/dd)										
<input type="button" value="Query"/> <input type="button" value="Cancel"/>										
S/N	Type	Time	Source	Category	Account ID	Event	User	Computer	Description	
1434624		2/24/2010 12:04:33 PM	PmsMonitor	None	2828	1	(N/A)	HILAI-WINOC	Check In - Room: "2828", Full Name: "HONG MR DANIEL YING LONG", Purchase Password, "0000", Service Class: 0, Stay Days: 1, Default Access Plan ID: 2	
1434623		2/24/2010 12:04:33 PM	PmsMonitor	None	3721	1	(N/A)	HILAI-WINOC	Check-Out room: 3721	
1434622		2/24/2010 12:03:31 PM	PmsMonitor	None	3921	1	(N/A)	HILAI-WINOC	Check-Out room: 3921	
1434621		2/24/2010 12:03:18 PM	lasExAuth	AccessAccept	3627	1	N/A	hilai-winoc	User "3627 (00-1C-7E-1C-46-B9)" logged on; SessionTimeout (sec): 86400, MaxUpBandwidth (KBps): 2048, MaxDownBandwidth (KBps): 2048, MaxUpBytes (KB): unlimited, MaxDownBytes (KB): unlimited, CalledStationID: 00-50-E8-01-79-83, MaxCreditTime: N/A	

- **Current Online Users**

Current Online Users										
	S/N	User ID	Login Time	Logout Time	Online Time	User MAC Addr.	User IP Addr.	AP MAC Addr.	NAS ID	NAS IAS Client Name
Terminate	121324	2801	2/24/2010 10:24:13 AM			00-C0-9F-CB-C3-5A	10.2.0.73			WNOC_RC00003
Terminate	121323	3228	2/24/2010 9:05:00 AM			00-0B-97-BB-CB-A6	10.2.1.249			WNOC_RC00003

NAS IP Addr.	NAS MAC Addr.	Class	Accounting Session ID	Organization	Location	Region	Download Bytes	Upload Bytes	Idle Timeout
122.146.192.195	00-50-E8-01-79-83	311 1 10.2.0.3 12/28/2009 18:35:20 3683	43000288	TopRoot	25F Machine Room	25F			86400
122.146.192.195	00-50-E8-01-79-83	311 1 10.2.0.3 12/28/2009 18:35:20 3682	43000287	TopRoot	25F Machine Room	25F			86400

- **Hotel Check-In Record**

Hotel Guest Check In Records							
S/N	Room No.	Full Name	Purchase Password	Check In Time	Check Out Time	Last Modify Time	Service Class
245215	3418	KIKKAWA MR KATSUHIRO	1015	2/24/2010 11:44:58 AM		2/24/2010 11:44:58 AM	1
245214	3627	NISHIO MR YOSHIZUMI	1007	2/24/2010 11:44:58 AM		2/24/2010 11:44:58 AM	1
245213	3729	HO MS IVY PUI WA	0816	2/24/2010 11:42:54 AM		2/24/2010 11:42:54 AM	1

- **Hotel Check-In Record**

Hotel Guest Check In Records

Query By Ccheck In Time

Last 1 day 1 week 1 month

/ / (yyyy/mm/dd)

/ (yyyy/mm)

/ / (yyyy/mm/dd) ~ / / (yyyy/mm/dd)

S/N	Room No.	Full Name	Purchase Password	Check In Time	Check Out Time	Last Modify Time	Service Class
245215	3418	KIKKAWA MR KATSUHIRO	1015	2/24/2010 11:44:58 AM		2/24/2010 11:44:58 AM	1
245214	3627	NISHIO MR YOSHIZUMI	1007	2/24/2010 11:44:58 AM		2/24/2010 11:44:58 AM	1

● **Purchase Record**

Hotel Purchase Records

Query By Purchase Time

Last 1 day 1 week 1 month

/ / (yyyy/mm/dd)

/ (yyyy/mm)

/ / (yyyy/mm/dd) ~ / / (yyyy/mm/dd)

S/N	User ID	Password	Room No.	Full Name	Purchase Time	Usable Minutes	Charge	Notified PMS?	VLAN ID
58420	2801	0000		LIN MR CHIN HUNG	2/24/2010 10:24:12 AM	1440	NTD \$100	Yes	0
58419	3228	0328		MATSUOKA MR SHIROU	2/24/2010 9:04:59 AM	1440	NTD \$100	Yes	0

● **Network Devices Monitoring Status**

All	Name	Device ID	IP Address	Firmware Version	System Up Time	Net ID	Device Type	Ping	HTTP	TCP	SNMP	Trap
<input type="checkbox"/>	<input checked="" type="checkbox"/> Netscreen 5GT	ND001	10.2.0.2				Firewall	OK	OK	OK	Skipped	<input type="button" value="View..."/>
<input type="checkbox"/>	<input checked="" type="checkbox"/> Dlink 3828	SW001	10.1.1.1				Unknown	OK	OK	OK	OK	<input type="button" value="View..."/>
<input type="checkbox"/>	<input checked="" type="checkbox"/> Nomadix AG5000	AG5000	172.16.100.105		70 days, 14:43:39.21		AG	OK	OK	OK	OK	<input type="button" value="View..."/>
Total: 3												

G. Various Statistics Reports

WiNOC’s “Report Wizard” provides various types of reports on how the system performs during a specified period of time. These reports can be used as a basis for correcting operational strategy of the Internet access service. The Report Wizard can generate the following reports:

- **By-Interval HSIA purchase log report** for the number of the purchased plans, plan ID, and total amount

Report Wizard Step 4/4

Organization Report (Organization: [TopRoot])

Query duration:	This Month
Scope:	<input checked="" type="checkbox"/> Include suborganizations
Report type:	HSIA Service Purchase Statistics

Access Plan ID	Usable Minutes	Max Download Bandwidth	Max Upload Bandwidth	Charge	Currency	# of Purchases	Total Amount
12	1440	2048	2048	100	NTD	402	40200
22	1440	2048	2048	0	NTD	360	0
2	1440	2048	2048	300	NTD	211	63300

- **By-Interval HSIA account usage log report**

Network Access Log Query

Last 1 day 1 week 1 month

/ / (yyyy/mm/dd)
 / (yyyy/mm)
 / / (yyyy/mm/dd) ~ / / (yyyy/mm/dd)

Found 4 record(s)

Login Time	Logout Time	Used Time (sec)	In Data (KB)	Out Data (KB)	Location	Region	MAC Address	User IP Address	NAS Name	NAS IP Address
2/24/2010 1:24:53 AM					25F Machine Room	25F	00-1E-8C-61-5D-CA	10.2.0.106	Nomadix	122.146.192.195
2/22/2010 12:22:48 AM	2/22/2010 1:38:07 PM	47719	8086	45871	25F Machine Room	25F	00-17-42-62-3B-76	10.2.2.1	Nomadix	122.146.192.195
2/13/2010 8:13:18 PM	2/14/2010 6:31:13 AM	37075	4800	51581	25F Machine Room	25F	00-19-B9-77-87-0D	10.2.1.191	Nomadix	122.146.192.195
2/2/2010 3:16:42 PM	2/3/2010 6:40:18 AM	55416	9435	69622	25F Machine Room	25F	00-23-8B-75-5F-10	10.2.1.121	Nomadix	122.146.192.195

- **Per guest, by-Interval distribution graph** for the number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-location top n billboard graph** for the number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-hour top n billboard graph** for the number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-week top n billboard graph** for the number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-month top n billboard graph** for the number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-year top n billboard** for the number of user online sessions, used time, uploaded bytes, or downloaded bytes

- **By-location text report** for the total/average number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-hour text report** for the total/average number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-week text report** for the total/average number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-date text report** for the total/average number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-month text report** for the total/average number of user online sessions, used time, uploaded bytes, or downloaded bytes
- **By-year text report** for the total/average number of user online sessions, used time, uploaded bytes, or downloaded bytes

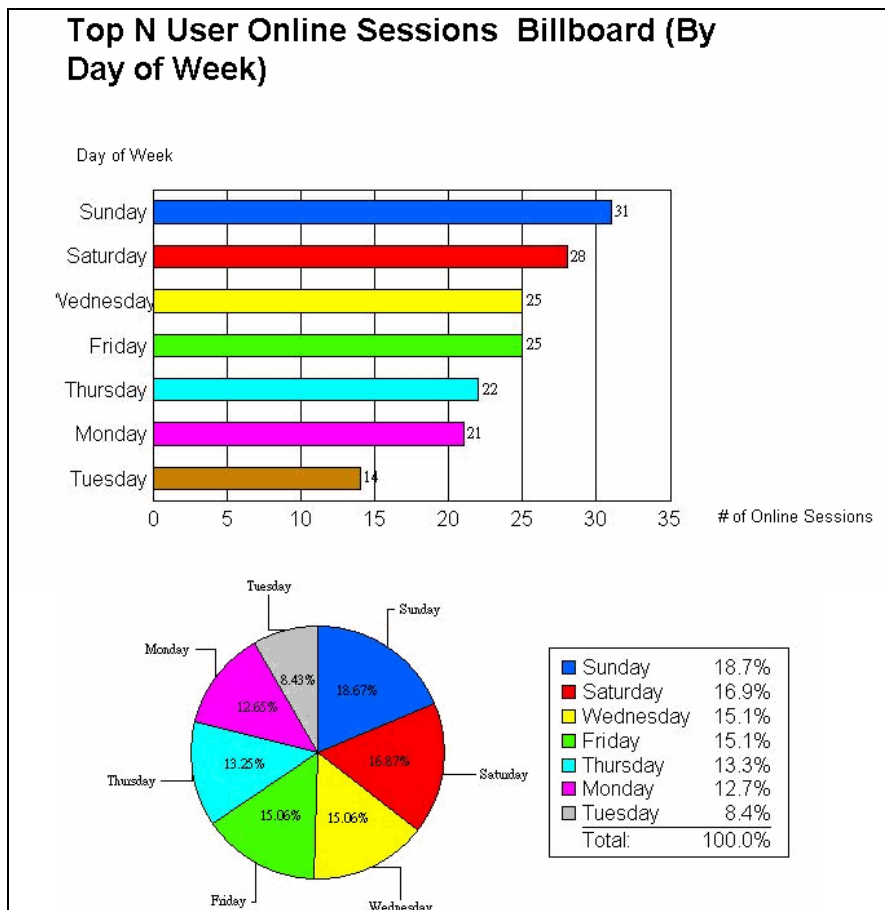


Fig. 17. Graphical statistics report

H. Support for high availability

By using Nomadix Gateway's HA (High Availability) functionality and WiNOC's Server Clustering functionality, two Nomadix Gateways and multiple WiNOC servers can be used to provide nonstop service.

I. Firewall for public Internet protection (Optional)

The Fortinet FortiGate™ firewall series of security appliances deliver high performance, multi-threat protection at a compelling cost that is ideal for securing your network. Complete Unified Threat Management (UTM) features including firewall, VPN, intrusion prevention (need subscription), Web filtering (need subscription), anti-spam (need subscription), antivirus (need subscription), antispysware (need subscription), traffic shaping and IM/P2P controls prevent blended attacks or unauthorized use from interrupting hotel HSIA network.

4. How the Solution Works

4.1. Check In Stage

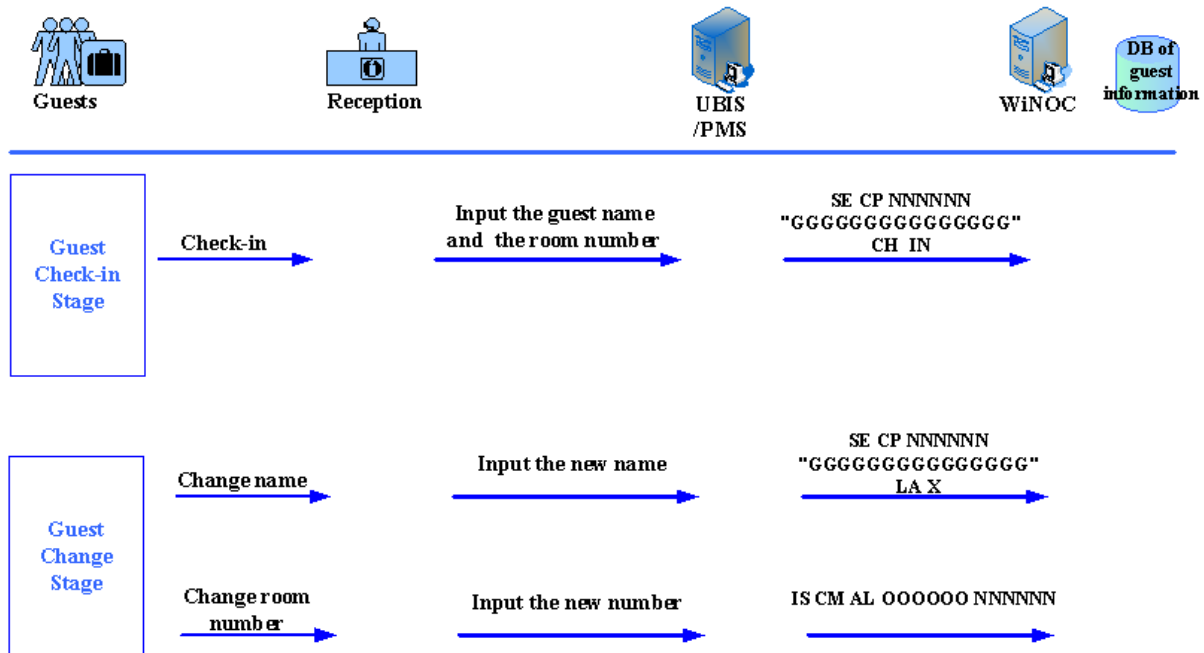


Fig. 18. Check-in stage

1. The reception clerk enters the room number and name of the guest, who is checking in the hotel, into UBIS/PMS.
2. UBIS/PMS notifies WiNOC of the guest's room number and name, and then WiNOC stores the information in its database.
3. In case the reception clerk changes name information of this guest due to typos or some other reasons, UBIS/PMS will notify WiNOC of the name change.
4. In case the reception clerk changes room information of the guest because the guest changes rooms or some other reasons, UBIS/PMS will notify WiNOC of the new room number.

4.2. Service Purchase Stage

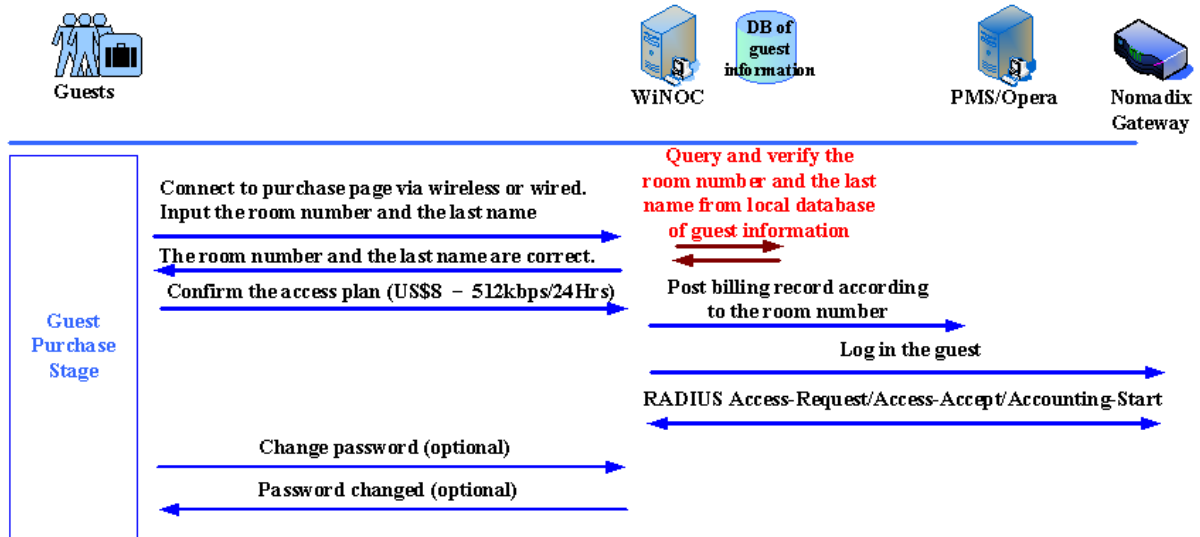


Fig. 19. Service purchase stage

1. When the guest tries to connect to the Internet by using a Web browser, he/she will be directed to a login page (the *Welcome* page, see Fig. 20) to enter his/her login account and password. Because the guest has not purchased the Internet access service yet, he/she enters his/her *room number* as the account and *last name* as the password. After the information has been entered, the guest clicks **OK** to proceed.

Note: The Welcome Portal Page will switch the language automatically according to the language setting of the guest's browser. The default language is English if the language of the browser is not supported. The guest could manually switch the language by clicking the language buttons on the bar.



Fig. 20. Internet access login page

2. WiNOC searches the guest information database to make sure the guest has finished the check-in procedure and has not checked out. Then, the guest is directed to a *service purchase page*. On this page, the guest chooses the purchase plan he/she wants according to bandwidth (optional) and duration. Then, the guest clicks **Purchase** to proceed.

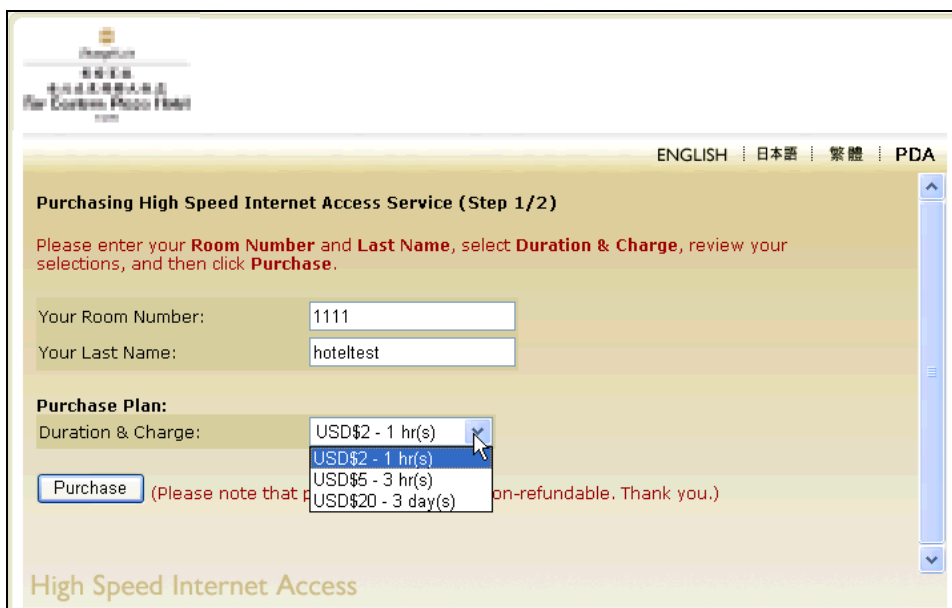


Fig. 21. Internet access service purchase page, Step 1

3. If the purchase operation is successful, WiNOC posts the information about the purchased duration and service fee to UBIS/PMS. And WiNOC shows the account and password for logging in to the Internet access service on this page. The guest can click **Log In** to instantly log in to the Internet access service.

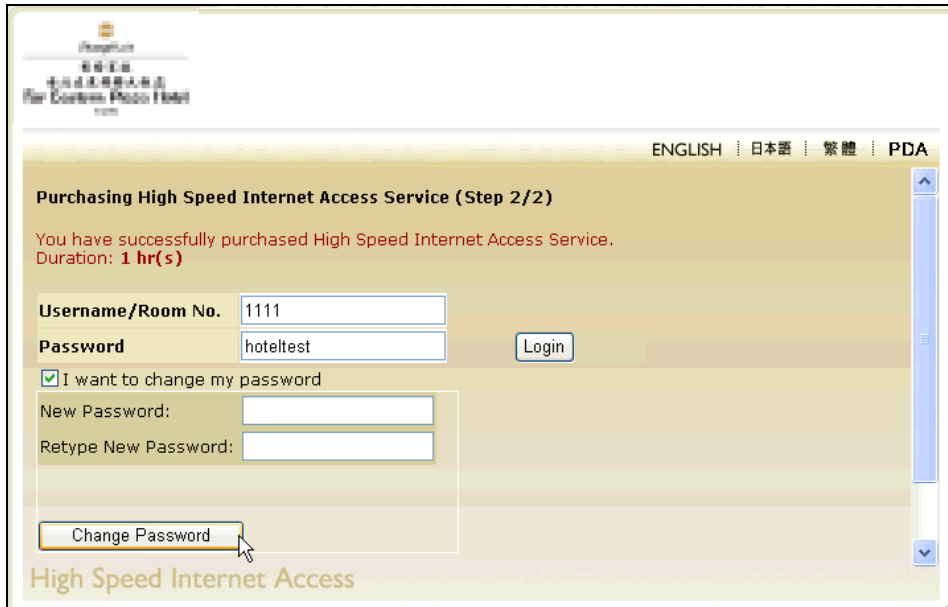


Fig. 22. Internet service purchase page, Step 2

4. If the guest wants to change password, he/she can click **Change Password** to change password after entering the new password.
5. WiNOC reports the result of password change on the service purchase page.

NOTE: For those guests who just attend conferences held in the hotel but do not check in to occupy rooms, they can buy pre-generated temporary accounts and passwords at the hotel front desk/business center.

4.3. Using Internet Access Service Stage

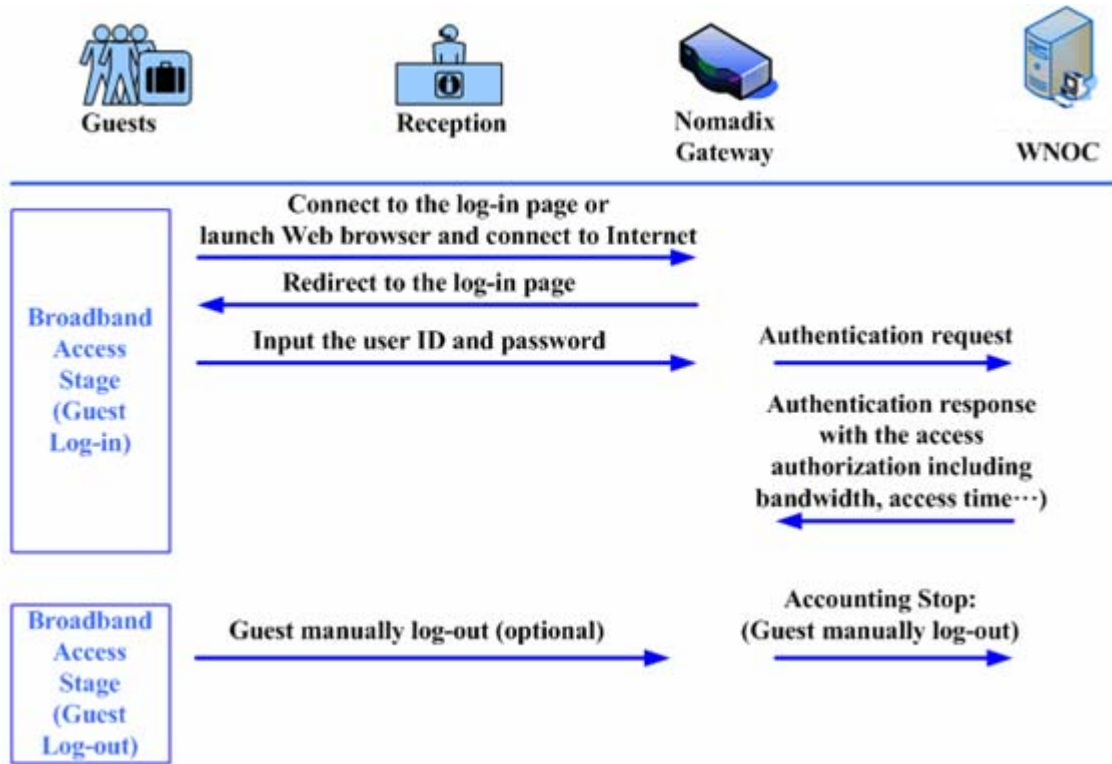


Fig. 23. Using Internet access service stage

After successfully purchasing the service, he/she can enter the login account (*room number*) and password (default to his/her *last name*, but is changeable) on the *Welcome* page (see Fig. 20) to log in the Internet access service. Nomadix Gateway and WiNOC base on the RADIUS (Remote Authentication Dial-In User Service) protocol to perform authentication for Internet access control.

The Internet authentication service provided by WiNOC allows “checked-in guests”, “customers who just eat or shop in the hotel” and “employees” to log in the network. All these types of Internet users use the same *Welcome* page as the first portal page to log on to the Internet or purchase the service; WiNOC automatically decides what to do according to the user type and status.

NOTE: Only one Internet session is allowed for each account. In other words, the maximum number of concurrent session is 1. This means a purchased account cannot be shared by multiple guests concurrently, but can be shared if the guests use the account to log in at different time duration.

4.4. Check Out Stage

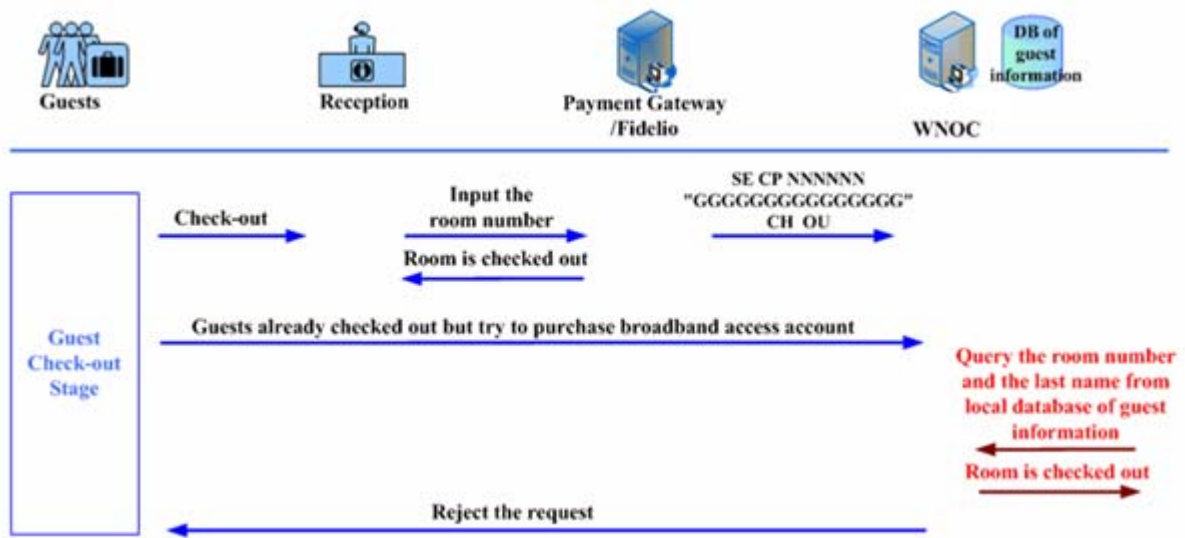


Fig. 24. Check out stage

When the guest checks out, WiNOC will be notified by UBIS/PMS of this event. Therefore, if the checked-out guest tries to purchase the Internet access service, WiNOC will reject the request.

NOTE: A checked-out guest cannot continue using the Internet even if his/her subscription has not expired yet. It's because WiNOC commands Nomadix Gateway to log out the guest when he/she checks out.

5. Feature Comparison

WiNOC + Nomadix	Nomadix only
◎ <u>Features and Advantages for Hotel Guests</u>	
The guests could share purchased account to log in different time slot. The online session of the previous logged-in laptop will be terminated once another laptop logs in successfully using the same account. The guests could also purchase the second account for the second laptop accessing Internet concurrently. The maximum number of purchasable accounts of each room is up to three.	MAC-based.
The WiNOC policy-based bandwidth management feature enables bandwidth control on a per guest basis such as for normal guests 512/512 kbps and for VIP guests 1M/1M. The guest VIP level could be integrated with Opera Guest VIP code to assign VIP bandwidth to VIP guests transparently. WiNOC also enables the hotel to assign higher VIP bandwidth to a specific user account or room for guest's special needs via WiNOC user-friendly administration interface.	Need IT to log in Nomadix and change the configuration. Misconfiguration might cause the HSIA system unreliable.
With WiNOC user-friendly administration interface, when the guest HSIA account of WiNOC is configured to support the IP Up-Sell functions of Nomadix Gateway (see Fig. 5), public IP addresses can be allocated to guests who have special VPN needs.	Need IT to log in Nomadix and change the configuration. Misconfiguration might cause the HSIA system unreliable.
◎ <u>Features and Advantages for Hotel Operation and Customer Service</u>	
WiNOC provides welcome portal log-in and purchase pages customization service for the hotel guests' pleasant experience and the hotel maximal branding benefits. The welcome portal could be design to follow the hotel's standard of artwork and procedures. The service purchase page allows guests to choose from different service plans, and it is multilingual support according to hotel's requirement	N/A
Integrate guest Internet portal into the overall guest relationship. Extract and centrally consolidate information from PMS, loyalty, sales and catering and distribute that information across one or many property locations for guest experience benefit	N/A
Flexible billing policies. WiNOC allows the hotel to differentiate fees for various levels of Internet access service. Support flexible and definable billing policy such as different usable time different rate, different location (room) different rate, different guest VIP level different rate, different account type different rate and different bandwidth different rate. The guest VIP level could be integrated with Opera Guest VIP code to assign VIP bandwidth to VIP guests transparently.	N/A

<p>Hybrid control of free public Internet and charged Internet with quality-guaranteed. WiNOC enables the hotel to provide free Internet to anonymous public guests for promotion purpose and also provide quality-guaranteed Internet access to the hotel guests who have paid for hotel services. The paid guests could obtain bigger bandwidth and longer session time without interrupt than the anonymous guests.</p>	N/A
<p>Change room transparently. Automatically move the purchased accounts to new room once the guest is changed room by any reason. The remaining time and the password of the purchased account will be kept and moved.</p>	N/A
<p>User-friendly and File-Explorer-Like Web-based administration interface for hotel IT, front desk and business center staffs easy to be trained and learned (Multilingual support). Web-based management interface could be accessed by any computer on the Internet or the intranet.</p>	N/A
<p>Flexible and definable role-based authorization control. Such as IT has full permissions, front desk has limited permissions and auditor has read-only permission.</p>	Only two roles
<p>Definable temporary accounts for non-checked-in-room guests. Hotel BC or FO admin could enable and print a temporary account via the Web-based Interface to sell or give away to allow non-checked-in-room guests to access public area wired or wireless Internet without charge to their room using the credentials on the print-out sheet.</p>	N/A
<p>For conference event, support batch account properties editing (account enable/disable state, password and access plan) and batch account information printing (account ID, password, usable minutes and expiration time etc) via web-based administration user interface.</p>	N/A
<p>Detailed event logs of guest's account status for troubleshooting. WiNOC provides several event logs for tracking "guest purchasing Internet access service", "guest changing password", "business center administrator purchasing Internet access service on guest's behalf", "business center administrator changing guest password", etc. Information recorded in these logs is extremely useful when troubleshooting.</p>	N/A
<p>Bar Internet service without deposit. If the guest is checked in without deposit, the hotel operator could manually bar the HSIA service of the room. After the service is barred, the guest could not purchase a plan and access Internet. This feature could be also integrated to bar or unbar the HSIA service of specific room by the parameter sending from FOS/PMS.</p>	N/A
<p>© <u>Features and Advantages for Hotel IT Support</u></p>	
<p>WiNOC build-in RADIUS server also keeps guest's log-in/log-out time, MAC address, IP address, port number, transmitted bytes and usage time in database for tracking, statistics and analysis.</p>	N/A

<p>WiNOC build-in Syslog server enables the hotel to store and manage the Nomadix lawful intercept tracking logs in the database server. These tracking logs enable you to trace-back to a particular MAC address and Username based on port and IP information available to an external site that has been attacked, hacked or used in an illegal fashion.</p>	N/A
<p>Manage multiple Nomadix boxes. According to the hotels' business strategy and billing policy, WiNOC enables the hotel to manage multiple Nomadix boxes which might be located within the same hotel or in different hotels. The hotel guest HSIA account roaming between the Nomadix boxes could be supported. The hotel guest could access Internet with the same username within these hotels or locations of a hotel.</p>	N/A
<p>Background network devices (such as Nomadix, Ethernet switch and AP) and PMS communication link health monitoring and anomaly alerting by Email.</p>	N/A
<p>SNMP-based device status and performance statistics reporting and analysis.</p>	N/A
<p>Uploading location (or floor) maps and device-specific images for managing devices graphically.</p>	N/A
<p>Integrate with hotel wireless APs to provide secure wireless Intranet access control for internal operation needs.</p> <p>The VLAN ID could be assigned to individual user account (staff account, manager account, vendor account) according to the account group or the authentication method (IEEE 802.1x/PEAP, Web-redirection). The user would be authorized the privilege of hotel network access by the assigned VLAN ID. For example, the vendor account could only be allowed to access Internet and the staff account could only be allowed to access Intranet with highly data-encrypted security.</p>	N/A
<p>WiNOC's "Report Wizard" provides various types of reports on how the system performs during a specified period of time. These reports can be used as a basis for correcting operational strategy of the Internet access service.</p>	N/A
<p>Software customization service according to special requirement to match hotel current standard procedure.</p>	N/A