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BMS/IMC

1. BMS Background and Goals: BMS Overview

Beach Management Systems (BMS) manages oceanfront properties worldwide, including large condominium rental communities, hotel properties, and resorts.

BMS is oriented to an ad hoc management model. This model tends to lead to project-by-project management, rather than a strongly enforced centralized management culture.

All projects are staffed based on availability and expertise, including network infrastructure upgrades and technology replacements. No dedicated team of network engineer manages the network, and no fixed network management procedures exist.

For project management, BMS uses a process called "the Dive" people gathered from various parts of the company are pulled into the Dive team. The Dive team investigates the problem, considers the options and builds two or three different proposals at different costs and capabilities. These proposals are handed over to a "Cruise" team, which determines the best options, gather the necessary resources, and executes the strategy. Almost always, some members are on both teams.

To meet various regulatory requirements, financial transactions must be protected where data is transferred through networks that are not directly controlled by BMS.

BMS provides support for multiple competing clients that cannot, at any time, have access to each other's data (mean VRF).

Client properties must be multi-homed to the BMS infrastructure for high availability.

Network Infrastructure:

Regional POP Locations

The BMS network is composed of two regional networks, eastern region and western region with one data center in each region. Customer applications and services are hosted in both data centers in active-active mode (dc as over OTV). This setup provides failover from one data center to other in case one of the data centers is down.

Western Region

San Francisco (data center and network operation center)
Los Angeles
Portland
Seattle

Eastern Region

New York (data center and network operations center)
Richmond
Tampa

New Orleans
Houston

BMS provides various TCP-based application and services to client, including these
Booking
Systems Payroll
Calendaring
Web training
tools CRM
Inventory management

BMS has four regional POPs in the western region and five regional POPs in the eastern region. San Francisco and New York are the data center POPs with servers that host services for their clients.

A single EIGRP AS 100 is running on the 20 Mb/s sub rate DS3(HQOS may required-non linear rate) leased-line connections. WRED is enabled on all WAN interfaces to provide fair allocation of resources among the customers that are serviced by BMS. Inbound and outbound policers are also set on all WAN interfaces to rate-limit traffic to 20 Mb/s. All links are assigned the same EIGRP metrics.

Non-overlapping (if overlapping then no summarization) customer routes are carried in EIGRP and are summarized by the backbone router into the WAN backbone on per customer basis.

Introduction:

BMS and IMC are about to merge in order to provide some services Voice, Video and Data IMS is MPLS capable and BMS is running on Native IP capable.

BMS (Beach Management System):

Has multiple POPs across US.

BMS is using EIGRP 100 as IGP.
No Background Information provided about whether BGP is running in BMS, no AS#
Two lines were mentioned at the end of document that BMS uses WRED, police etc. on WAN links. San Francisco is DC (WEST), also New York is DC (EAST)
Applications of BMS are all TCP based (Carefully Note down the business critical application as it's related to QoS related questions)

- Book Systems
- Payroll
- Calendaring
- Web training tools
- CRM
- Inventory Management

In DC, there are several Hub Routers (HR) to support dedicated customer. Server C1 is connected to HR1, and C2 is connected HR2 and so on.
WRED and Rate-Limiting are used on select WAN interfaces as mentioned above in the document. No other QoS features are enabled.
Edge Router(ER) is connected to DC via Internet
BMS also has a Border Router (BR), this used for BMS to BMS connectivity. This will be used to interconnect with IMS later on based on different OPTIONS 1,2,3,4 discussed later in the document.

IMC (Interactive Multi-Media Communication):

Its MPLS provider and servicing VoD multimedia content, VoIP, gaming, internet access and HD interactive video-conferencing.

DCs are in Las Vegas and New York (Kindly Note BMC also have a DC in New York) .

All services are in their respective service-VRF that hosts in (S-PE) IMC use ISIS L2 (As per background it was just mentioned ISIS in the diagram, Later Email came and LDP deployment.

Use CIR from 1M to 100M on Ethernet switches for customer connectivity BGP is implemented in DC, Las Vegas use 65001, NY use 65002, MPLS use 65000 (This was part of initial background).

There was no QoS related information provided.

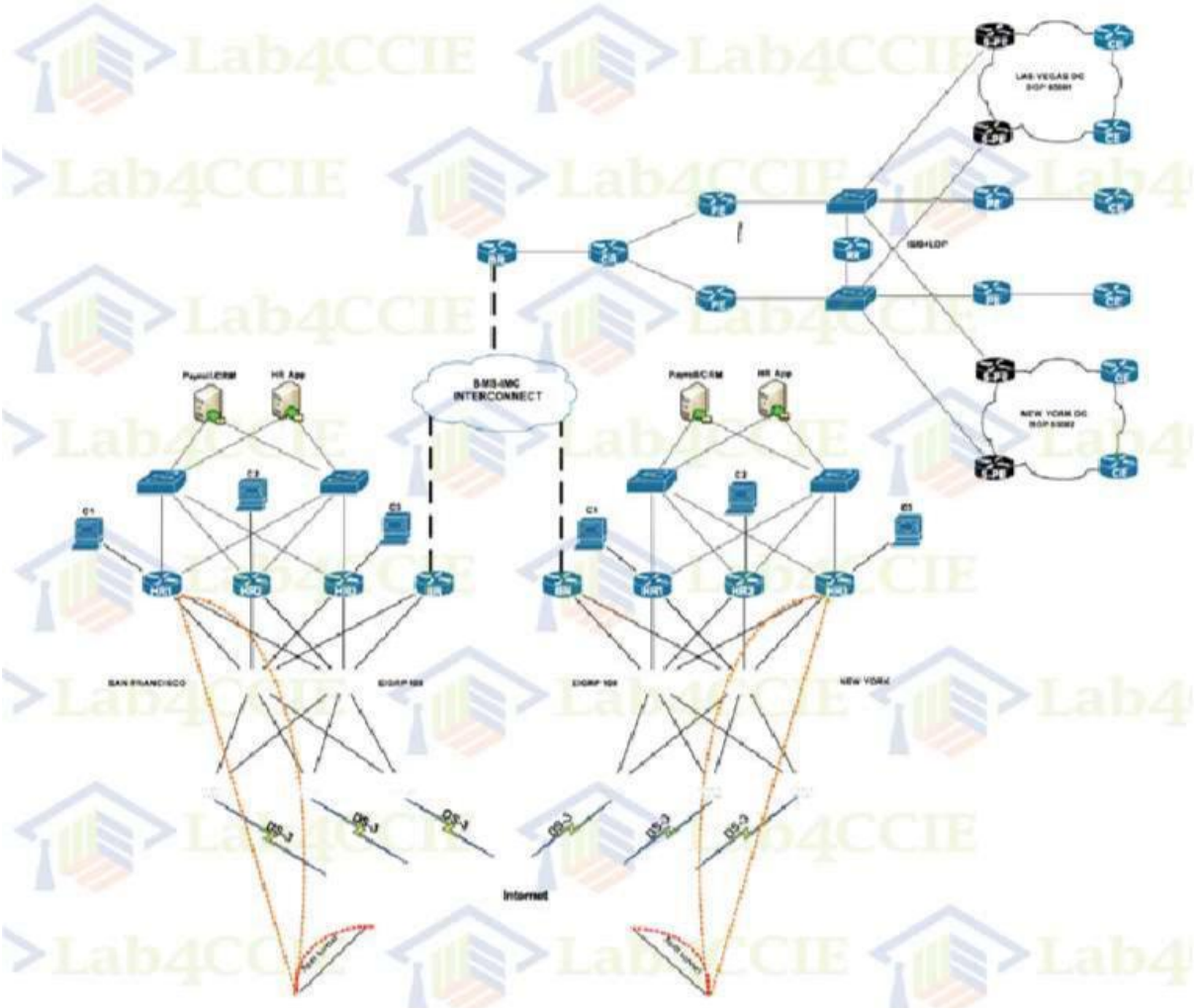
Vision of the Network

Provide additional media-rich service i.e: VoD, gaming, VoIP, and HD video conferencing to BMS resorts and hostel in order to generate additional revenue.

Any to Any connectivity for BMS customer for time sensitive application like VoIP. Minimize any capital expenditure for the merger.

Minimize any impact on exiting services within IMC and BMS.

Have a usage-based billing model per service for BMS client for service that are offered by IMC.



Q1. Which technology can provide direct connectivity optimally (without going through BMS) for communications between the remote BMS properties?

EoMPLS

DMVPN

IP-in-IP

GETVPN

Q2. Which two additional pieces of information do you need to create the optimal design that meets the requirements? (Choose two.)

BGP Topology/Architecture

QOS

IGP Routing

Billing

IP Addressing

Bandwidth

Q3. Which is the most important missing information when designing the BGP based solution to integrate BMS and IMC backbones?

BGP AS number allocation for the core, data center, and customers within IMC Route targets used in IMC

Route distinguishers used in IMC

BGP peering topology deployed in IMC

Q4. Which three questions would you additional information that is necessary for you to make sure that the BMS network can support the new services offered by IMC? (Choose three)

What are routing convergence times in case of a link or node failure with the ISP could?

What is the routing convergence times in case of a failure of a DS3 WAN, backbone router link, or node?

What is the latency and jitter from backbone router to backbone router? Which network management tools and protocols are in use?

What is the latency and jitter for packets from edge router to WAN router?

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Email Arrives: Routing and Qos Info Document

Q5. Why should BMS replace the existing billing system for IMC?

Because IMC uses a billing system that will not integrate with the provisioning system used by BMS Because IMC uses a billing system that is subscription-based

Because IMC uses a billing system that will not scale with the number of BMS subscribers Because IMC uses a billing system built on proprietary protocols

Q6. Which two challenges will you face if you decide to keep the existing IGPs and connect BMS to IMC with IPsec tunnels(VTI) over Internet? (Choose two)

IPsec does not scale to large numbers

IPsec over internet does not provide guaranteed transport BMS runs a different IGP compared to IMC

IPsec encryptions will create a delay that is not suitable for latency and jitter-sensitive applications

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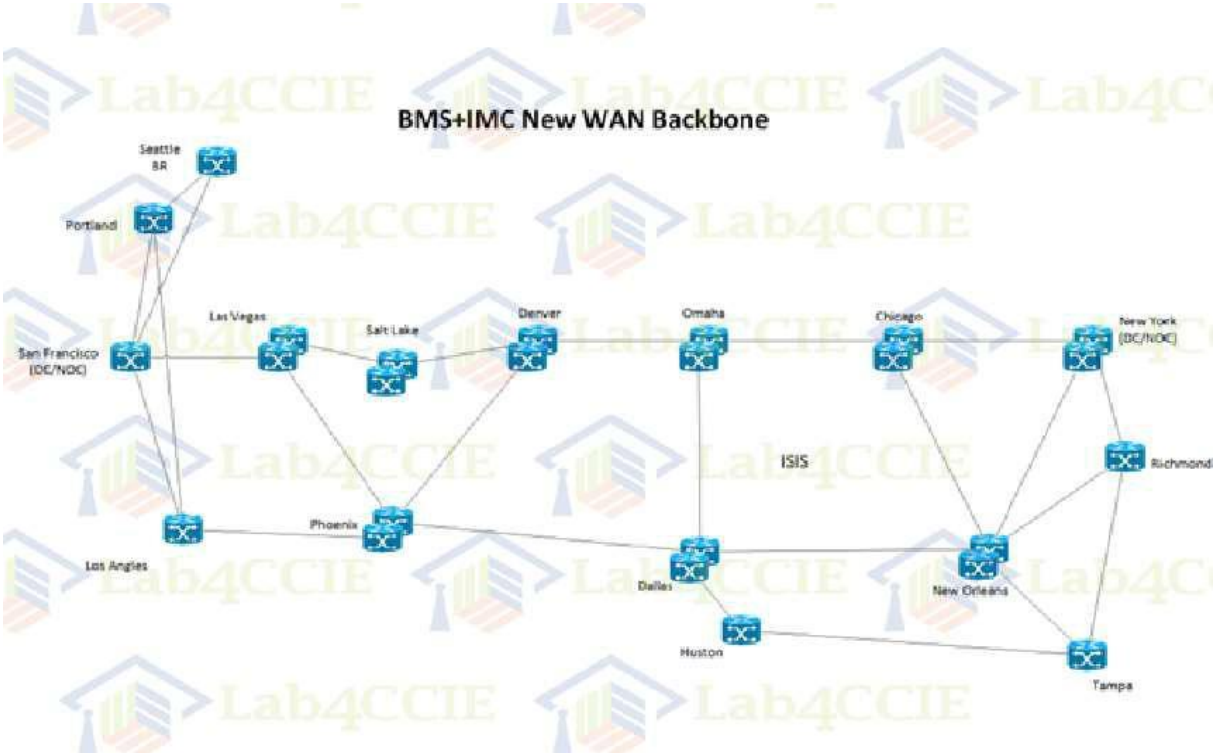
Q7. Drag all the link to be used in the new integrated network.

New document(s) are available for your review
Email Arrives: Merged Backbone Document



Q8. Mark all QoS features with should be applied on the WAN interface to the backbone and core routers to provide optimized performance for each application.

	Booking System	Payroll System	CRM	VoIP	VoD
RED	X	X	X		
WFQ					
licer/Rate Limit	X	X	X	X	X
Q				X	X