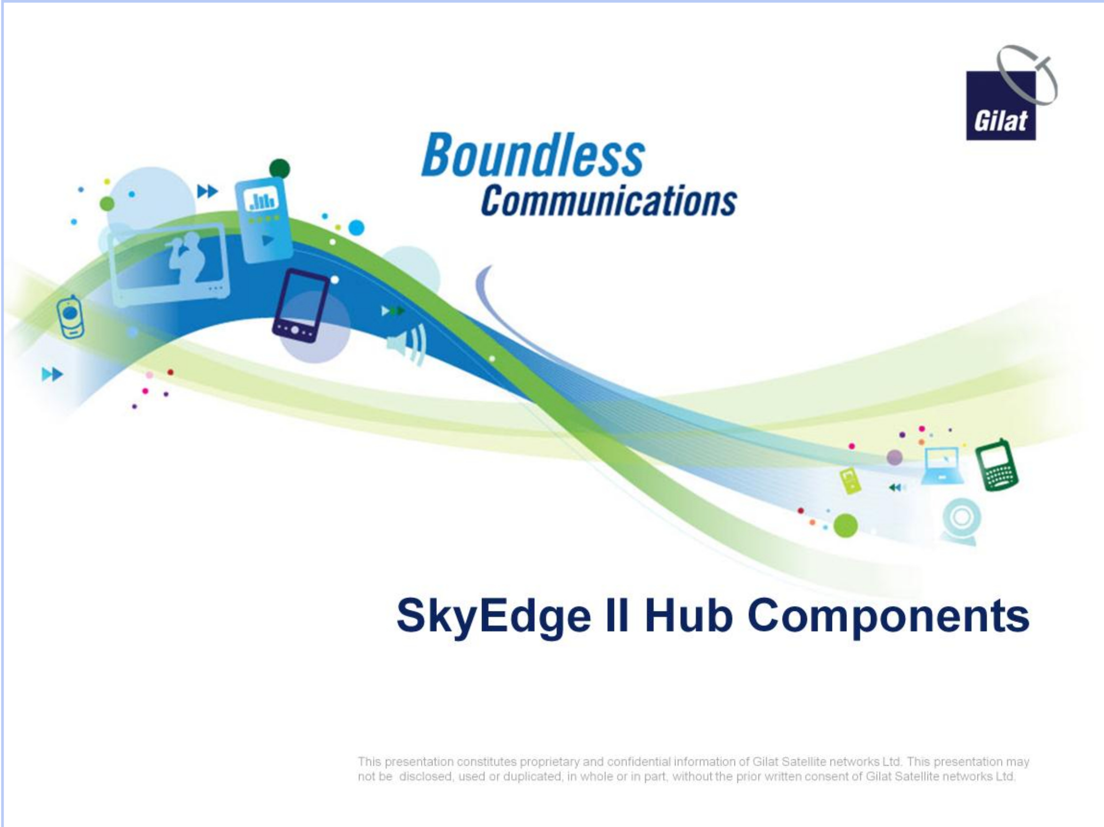
Gilat
Boundless
Communications
SkyEdge II Hub Components
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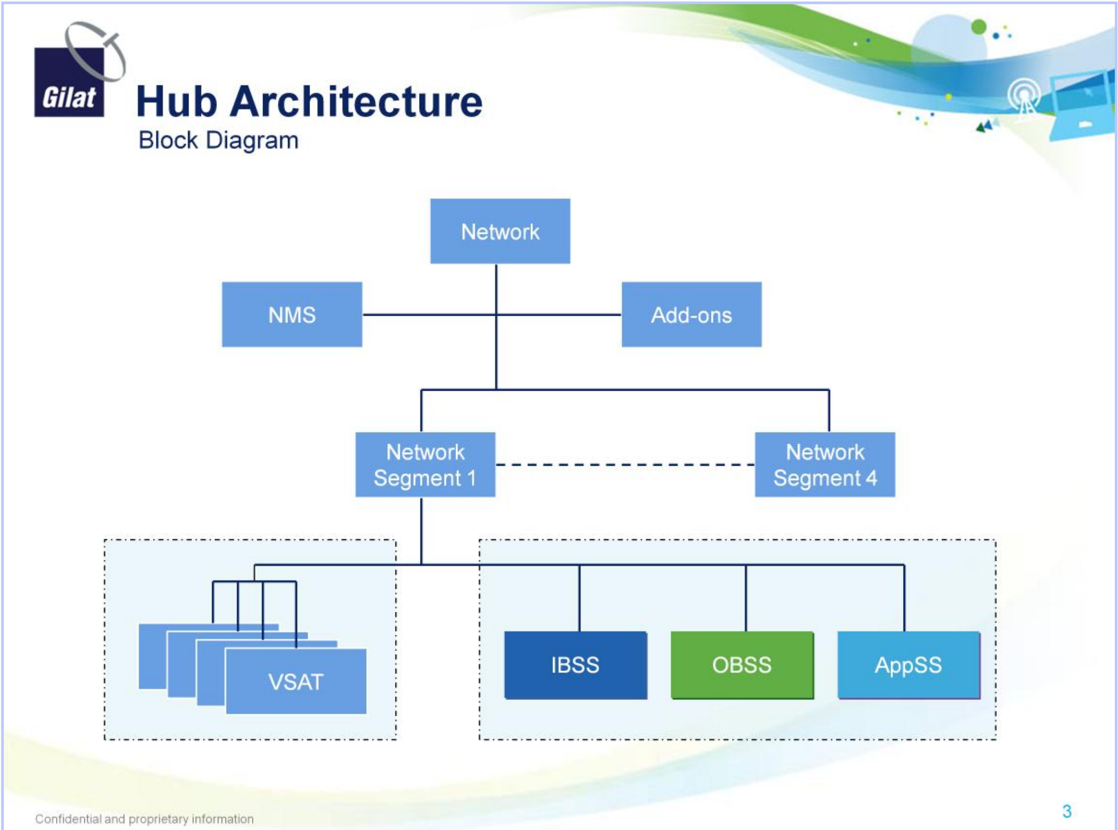
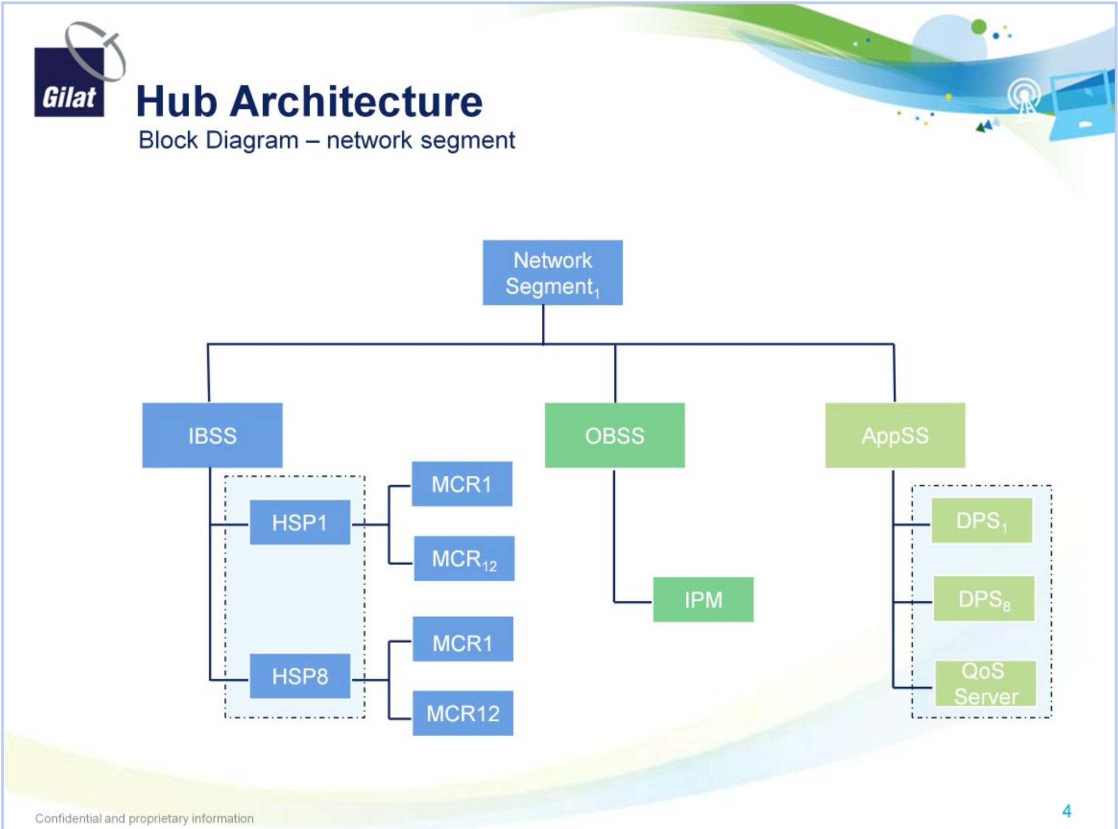
Agenda

- Hub Architecture
- Inbound subsystem
- Outbound subsystem
- Application subsystem
- NMS



The SkyEdge II system consists of up to four network segments. A network segment is a subnetwork that manages a set of physical subsystems:

Outbound (OBSS), Inbound (IBSS), Application (AppSS), and the VSATs belonging to this network segment.



IBSS – Inbound subsystem

HSP – Hub Satellite Processor

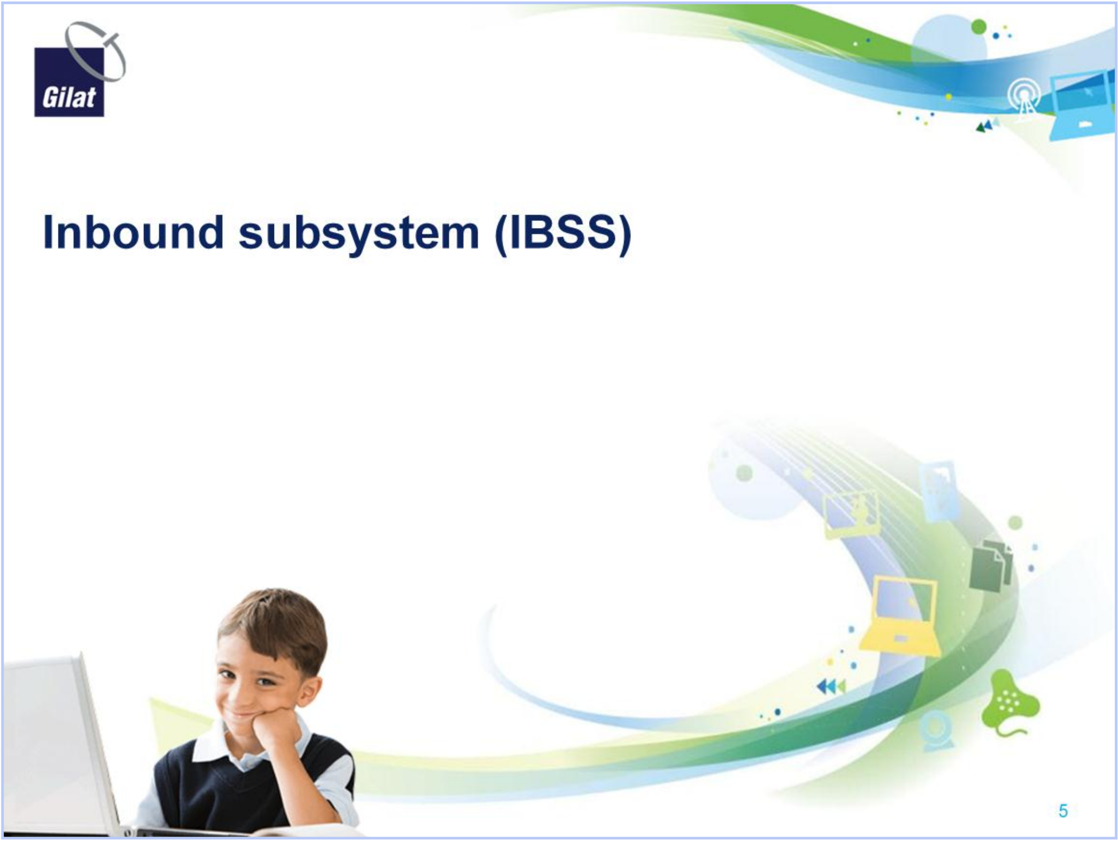
MCR – Multi Channel Receiver

OBSS – Outbound subsystem

IPM – IPE (IP Encapsulator) + Modulator

AppSS – Application subsystem

DPS – Data Protocol Server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Inbound subsystem (IBSS)
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Multi-Channel Receiver (MCR)

General Description

- The MCR is part of the Inbound subsystem (IBSS)
  - One stand alone receiver unit
- The MCR functions
  - Receives the Inbound RF signal (L-Band) coming from the RFT
  - Demodulates the RF signal
  - Transfers TRF bursts to the HSP

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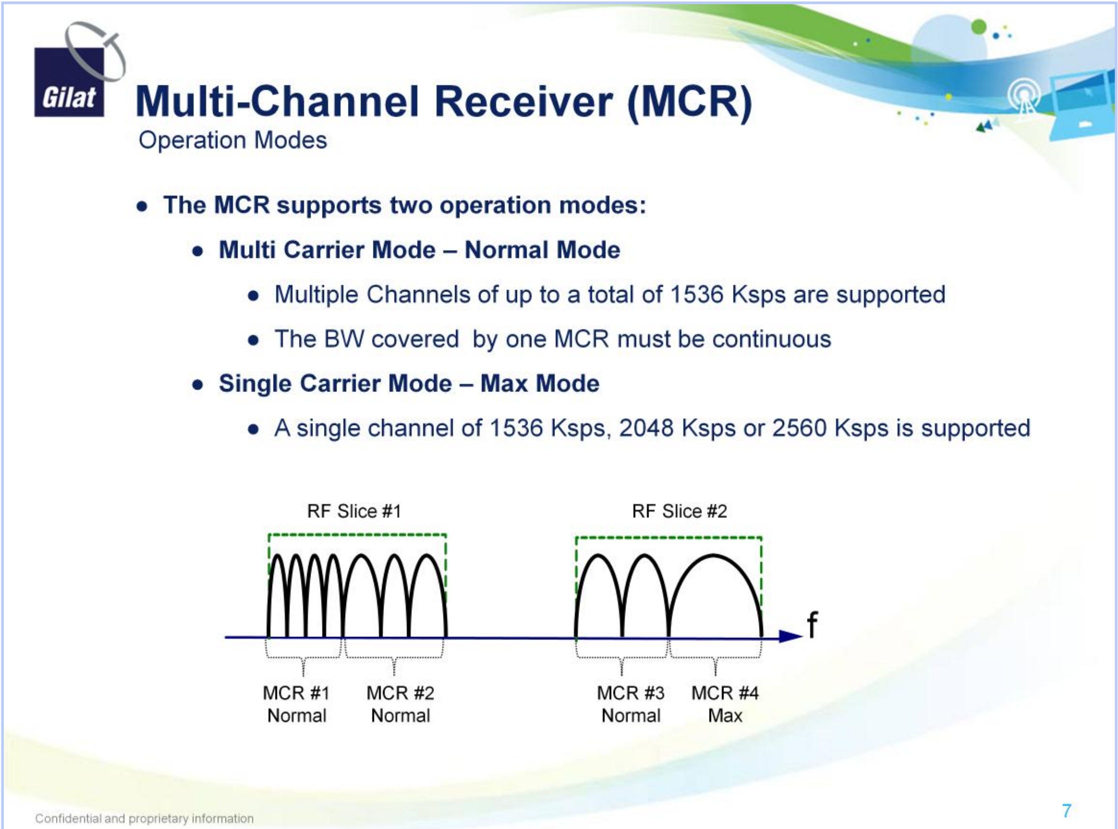
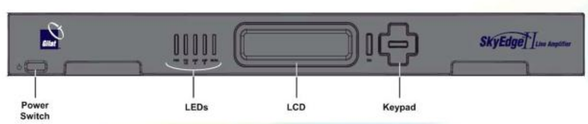


The mode operation and channel allocation is automatically selected by the HSP.

The HSP selects the most efficient MCR configuration in the available IB BW; depending on the Carrier Type and number of channels configured in the system.

Gilat Line Amplifier (GLA)

- RF signal from the RFT is split to all MCRs of the hub
- To compensate for splitter attenuation, the RF signal is amplified beforehand by the GLA
- The GLA contains two fully independent amplification chains and internal switches for supporting auto-redundancy
- NMS Configurable Gain, front panel(LCD) telemetry, and manual switch over capability



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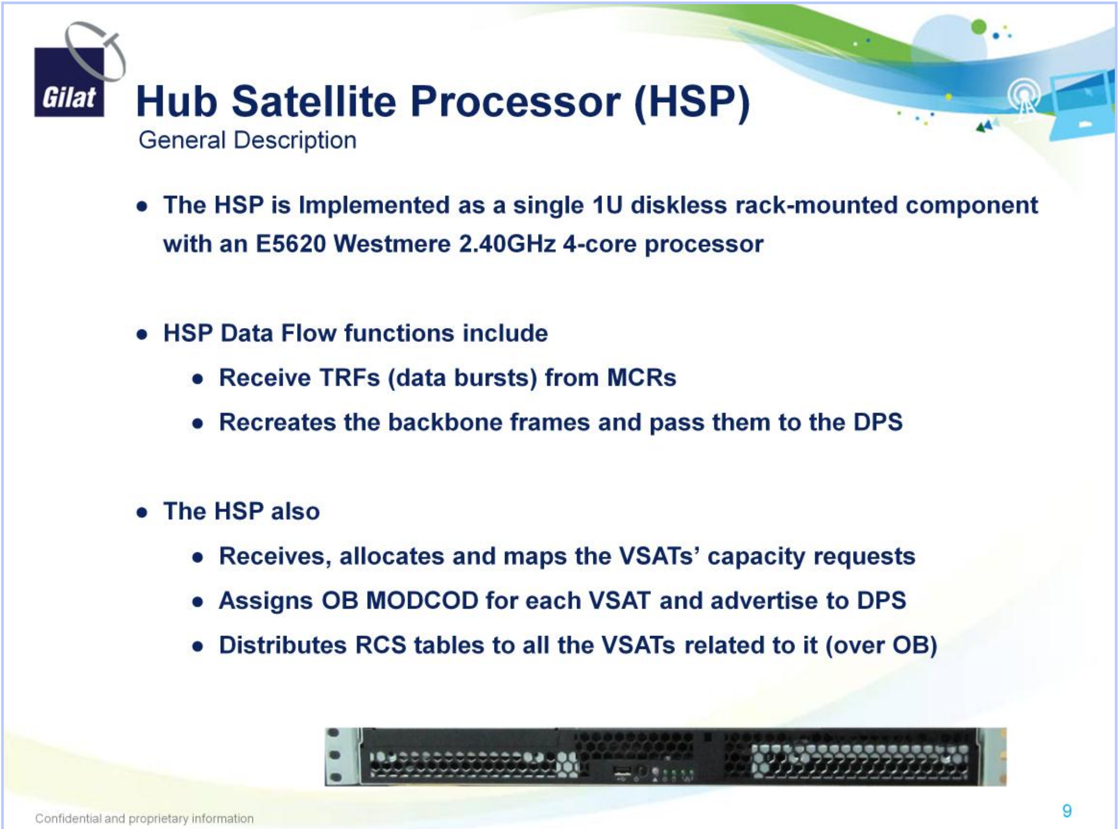
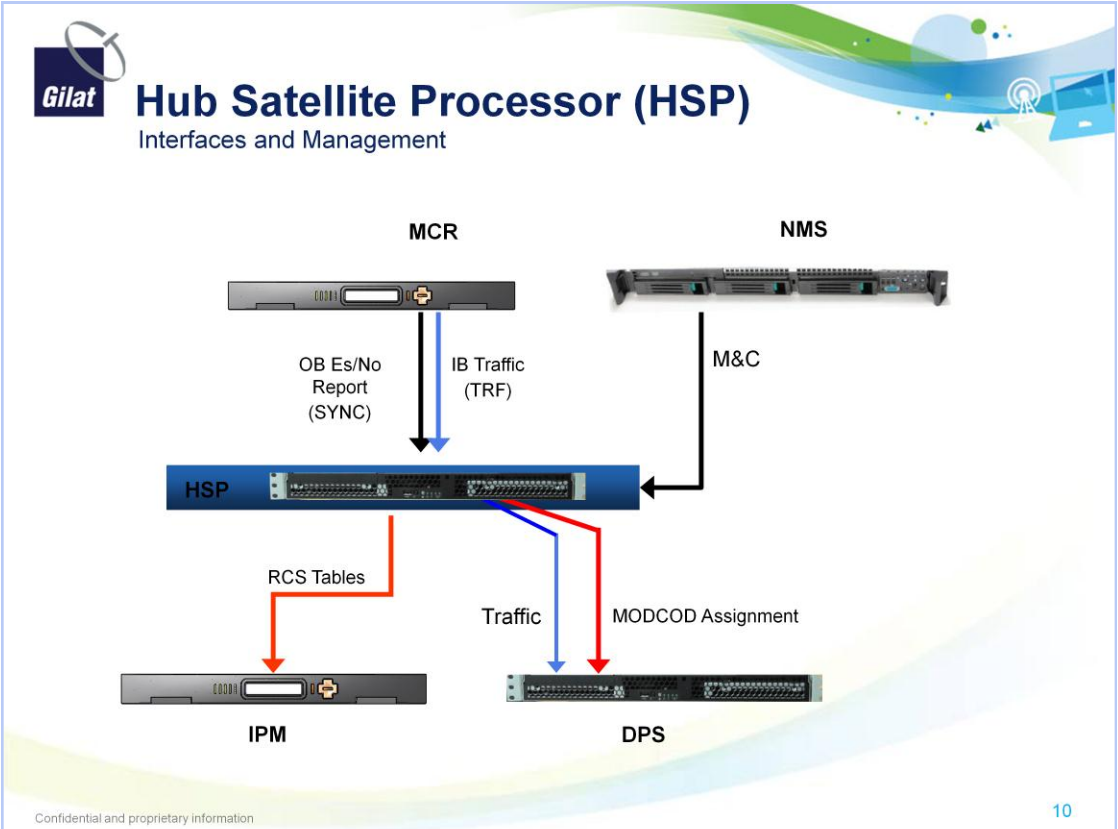


HSP functionality can be separated to:

- The functions related to data flow
- The functions related to the time Frequency Plan
  - Time Slot allocation
  - ModCod assignment and advertising
  - RCS tables distribution
- Other functions of the HSP
  - MCR management
  - Redundancy control
  - Channel allocation



Each VSAT sends its OB Es/No Reports to the HSP. The HSP matches this information to the appropriate MODCOD and advertises the MODCOD assignment to the DPS.

Meanwhile, the HSP receives the IB traffic from the MCR, reorders the TRFs and de-encapsulate the ATM cells; the reconstructed backbone packets are sent to the DPS.

The HSP generates several RCS Tables which are sent to the VSAT over the OB (The HSP sends them to IPM)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Outbound subsystem (OBSS)
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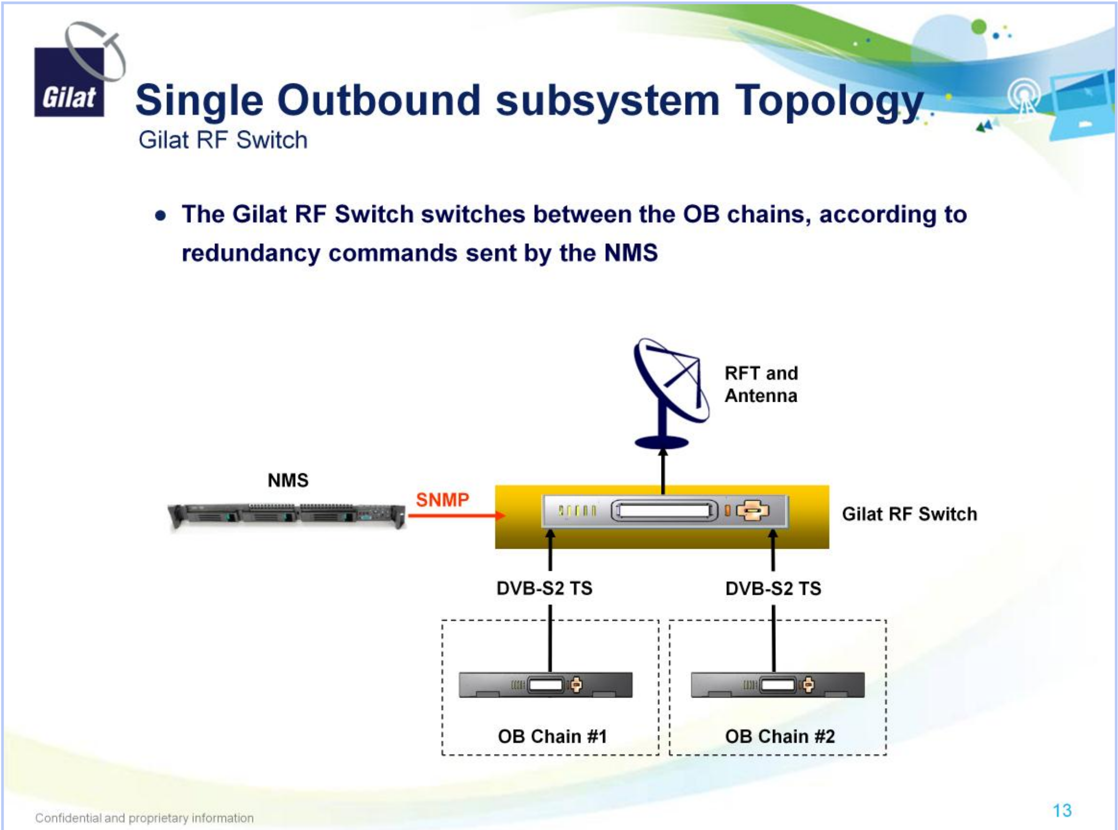
Outbound subsystem

Single network segment - Components

- **For each network segment**
  - **Two IPMs**
    - One active and one redundant
  - **Gilat RF switch (L-Band)**



The main features of Gilat RF Switch are as follows:

1. Switching from port A to B (and vise versa) invoked by an NMS command or via the front panel keypad.

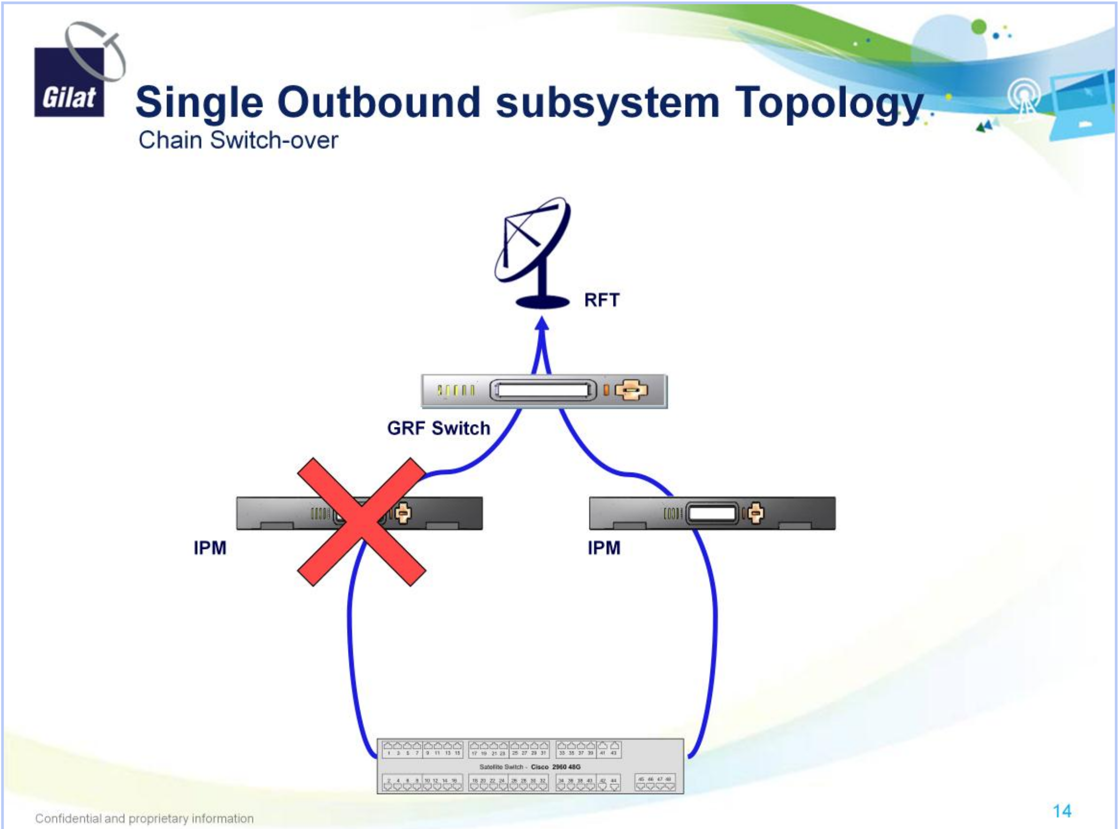
2. Dual power supply with automatic switchover from Main to Secondary power supply unit for high availability.

3. Owing to latch mode, the Gilat RF Switch keeps the selected input port (A or B) connected to the output under power outage.

4. Conformity to the SkyEdge II Outbound redundancy mechanism.

5. Software download from the NMS via FTP.

6. Configuration – from the NMS via XML.

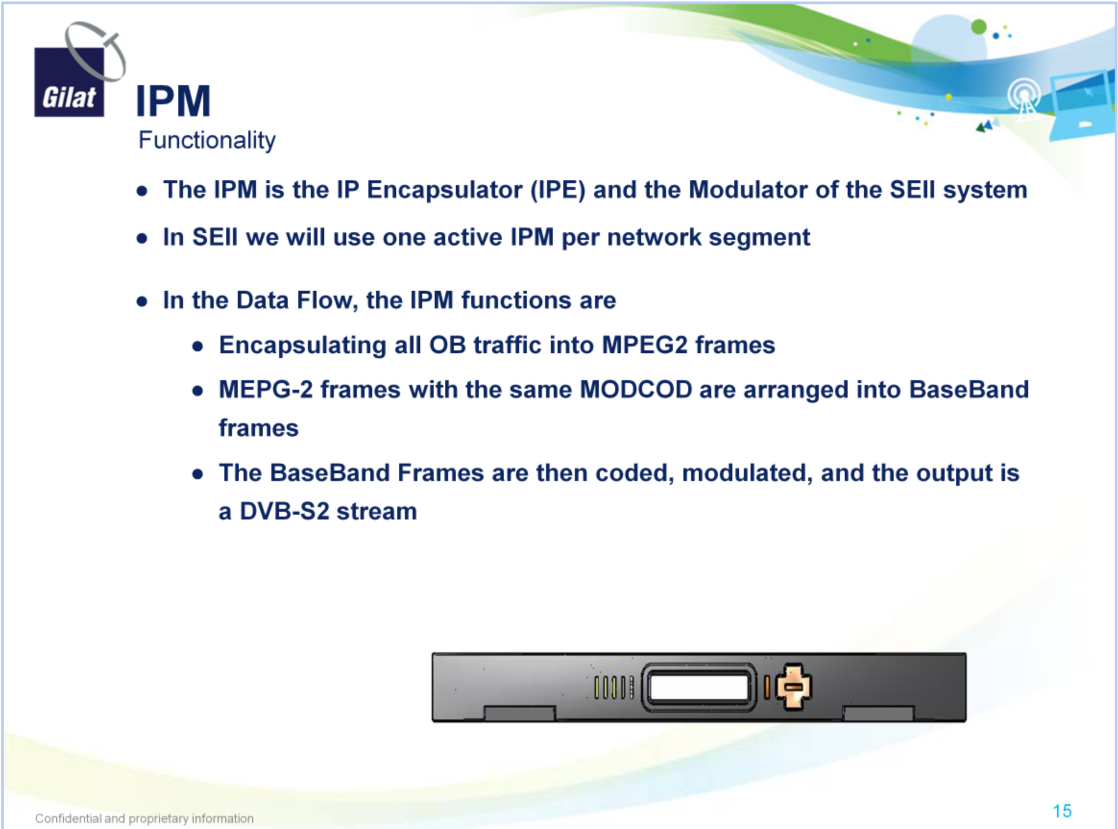


The NMS controls the redundancy switching in the Outbound Redundancy system either manually or based on triggers (health checks and SNMP traps)

The NMS performs periodic health checks of the Outbound components (IPM) and checks traps from these devices for failures.

When a failure is detected, the NMS initiates a chain switchover and copies the configuration of the faulty active IPM to the redundant one.

The complete chain (including ports in the switches) is switched over.



The DPS will send the OB data rate to the Allot QoS server over a Telnet session.

The PCR (Program Clock Reference) extraction interval is 40 msec.

The scheduler of the IPE is Spin Time based, that is, it collects MPEG frames during the spin (typically 20 ms), orders the MPEGs in BB Frames from the Lowest MODCOD to the Highest (most efficient) and sends them to the modulator. Number of BB Frames (MODCODs) per spin is determined by the spin time, symbol rate and the modulation of the frames (QPSK, 8PSK and 16APSK)

The modulator:

Performs BCH outer and LDPC inner coding (FEC)

Aggregates Pilot frames

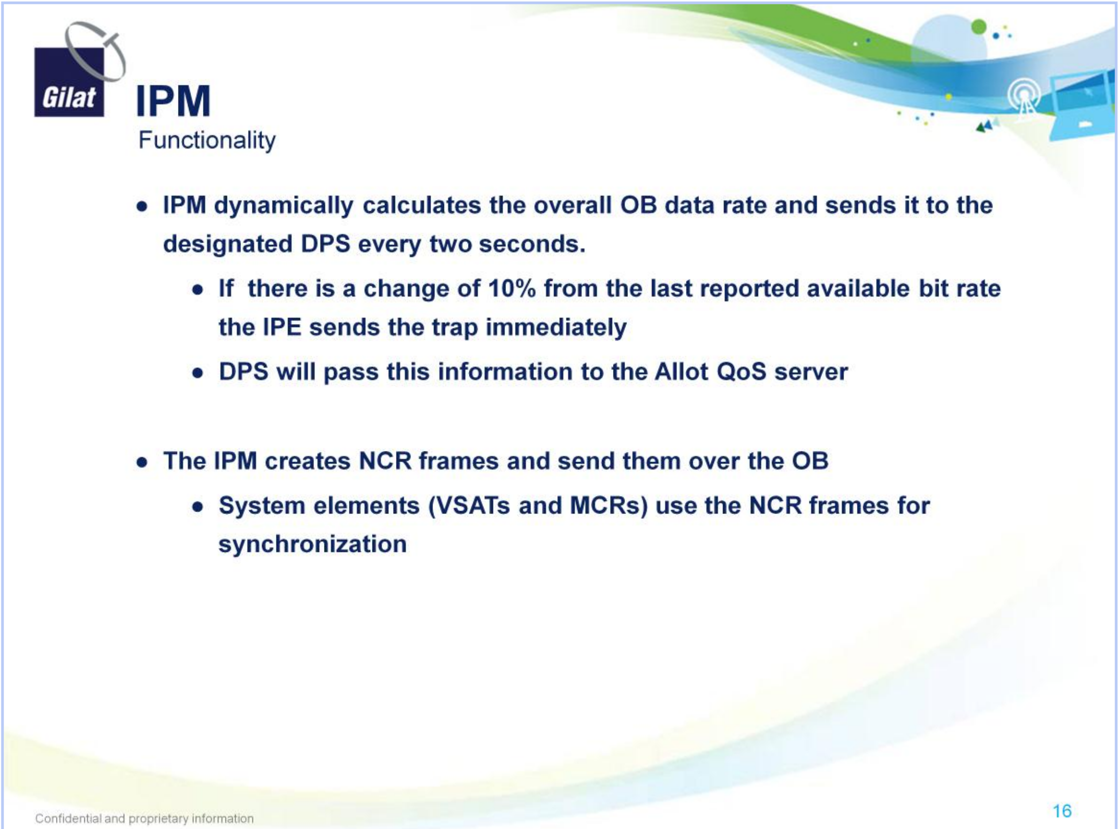
Carrier shaping with 0.2 roll-off factor

Modulates the physical frames

Output is a DVB-S2 stream

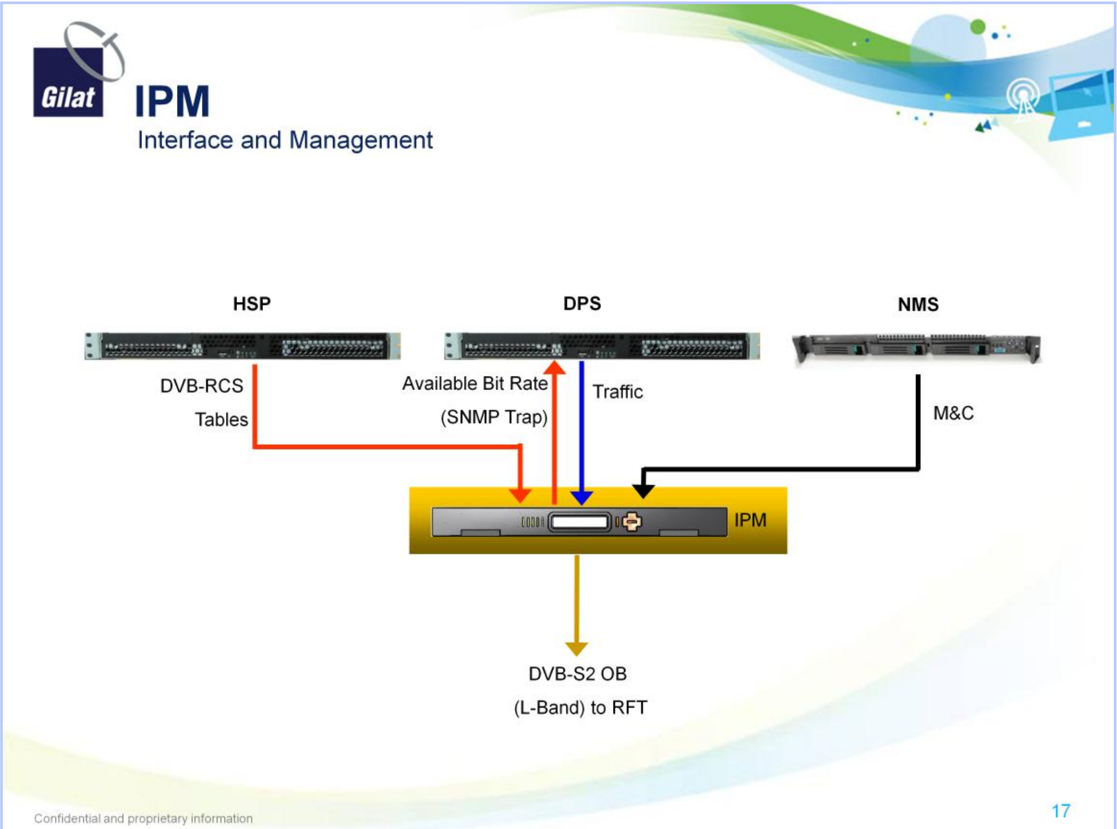
The IPM is capable of supporting 300Ksps to 45Msps

The IPM receives the configuration from the NMS



The DPS will send the OB data rate to the Allot QoS server over a Telnet session.

The scheduler of the IPM is Spin Time based, that is, it collects MPEGs during the spin (10 - 30 ms), orders them in BB Frames from the Lowest MODCOD to the Highest (Robust to efficient) and sends them to the modulator.



The IPM receives the RCS tables from the HSP and sends them over the OB. At the same time receives the rest of the traffic from the DPS.

The Software and configuration parameters are received from the NMS. This includes SW and parameters for the IPM itself, and SW and parameters for the VSATs, which are sent over the OB.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Application subsystem (AppSS)
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Application subsystem

General Overview

- **The AppSS includes**
  - **Data Protocol Server (DPS)**
    - Up to 8 DPSs per NS
    - Up to 32 DPSs per network
  - **QoS server**
    - One active and one redundant per NS

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Data Protocol Server (DPS)

- Implemented as a single 1U diskless rack-mounted component with an E5620 Westmere 2.40GHz 4-core processor
- Acts as system border between satellite and terrestrial networks
- In the data flow, the DPS
  - Encodes IP packets into Backbone on the OB
  - Decodes Backbone to IP on the IB
- Provides acceleration and spoofing for TCP traffic
- Marks OB packets with appropriate MODCODs
- Passes OB bit rate information from IPM to the QoS server

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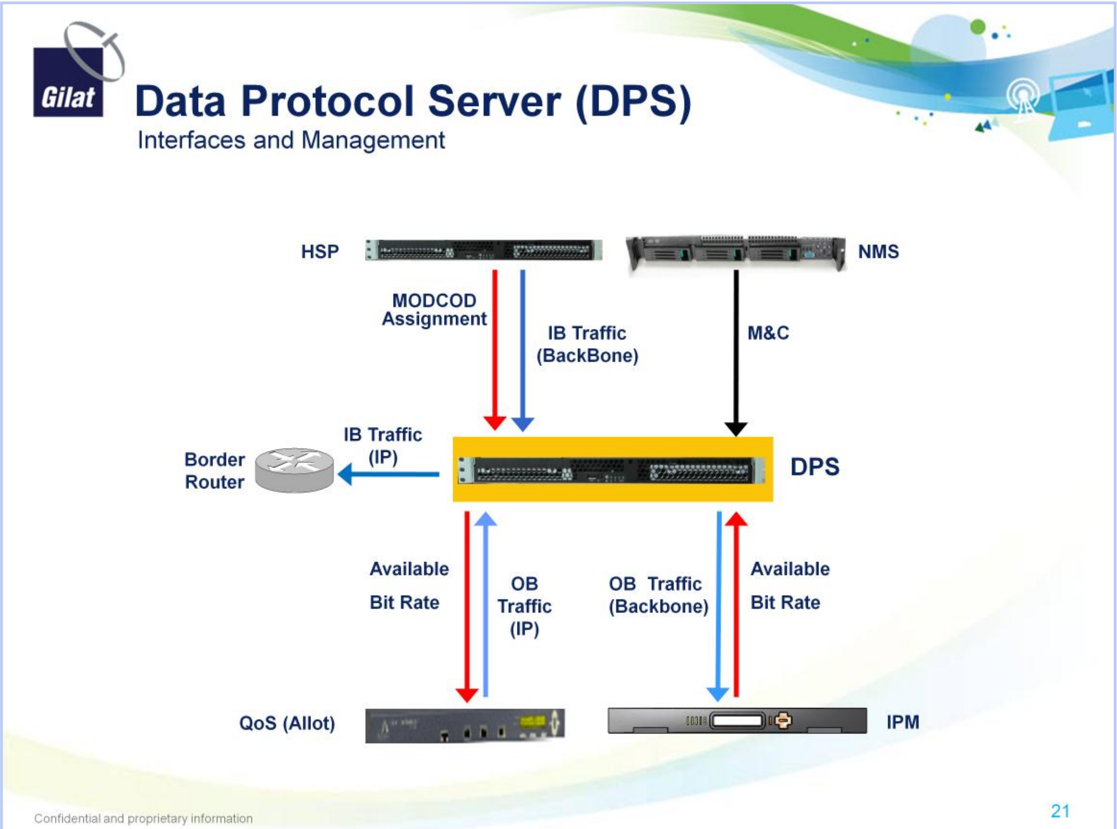
The DPS will receive software and parameters from the NMS

The NMS controls the DPS redundancy automatically



At boot up, the DPS receives the software and parameters from the NMS, and the NMS will health check the DPS and control its redundancy.

The HSP advertises the MODCOD for each VSAT to both the NMS and DPS; the DPS stamps this information in the IP heather of each packet. It performs Backbone encoding and sends the OB traffic to the IPM. The DPS controls the QoS Server data rate to avoid any overflow, this is done by the DPS sending a telnet command.

The DPS and IPM will interact and flow control the TCP data tunnel between them.

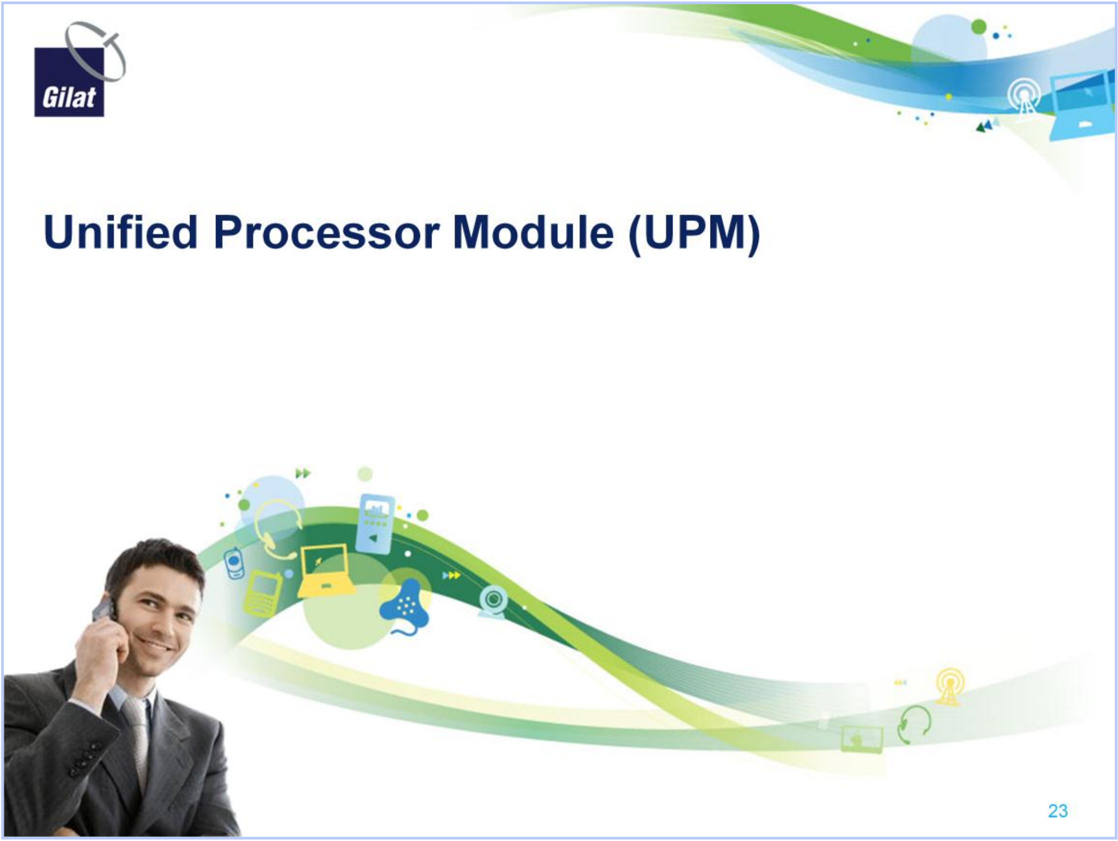
All traffic between Border Router and the SkyEdge II System passes through the QoS Server. There are no QoS Policies for the IB traffic.

QoS Server
General Description

- **Outbound QoS server**
  - **Limits the traffic coming to the hub**
  - **Avoids overflow of the system**
  - **Performs traffic policing and shaping**
  - **Generates enhanced reports and graphs**
  - **Has a 1:1 auto redundancy scheme**

In ACM systems, the total Data rate in the OB varies all the time. To avoid overflow in the DPSs, the IPM will inform the DPS of the momentary OB Data rate and the DPS will inform the QoS server. By this means the QoS server will know the momentary data rate of the OB and limit the incoming traffic to this value.

Besides this important function, the QoS server enforces the OB QoS policy in the SEII hub. Policies can be configured and extensive reports and Graphs can be obtained.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Unified Processor Module (UPM)
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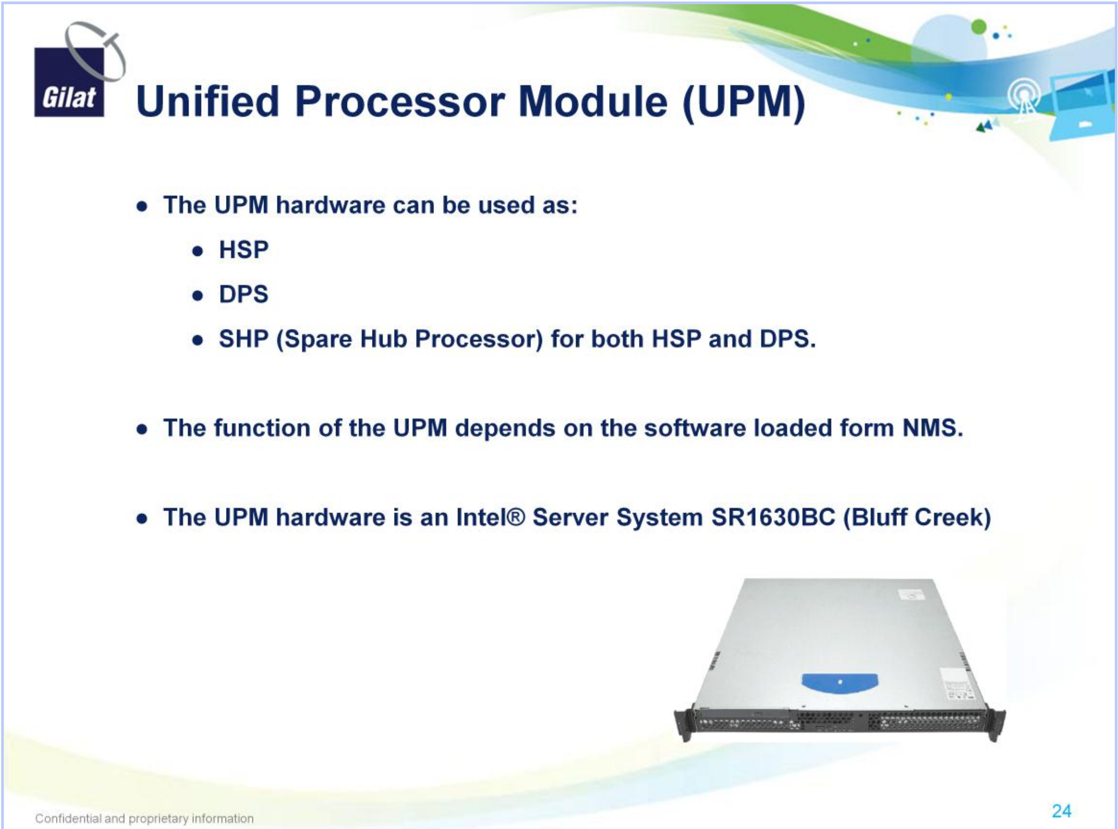


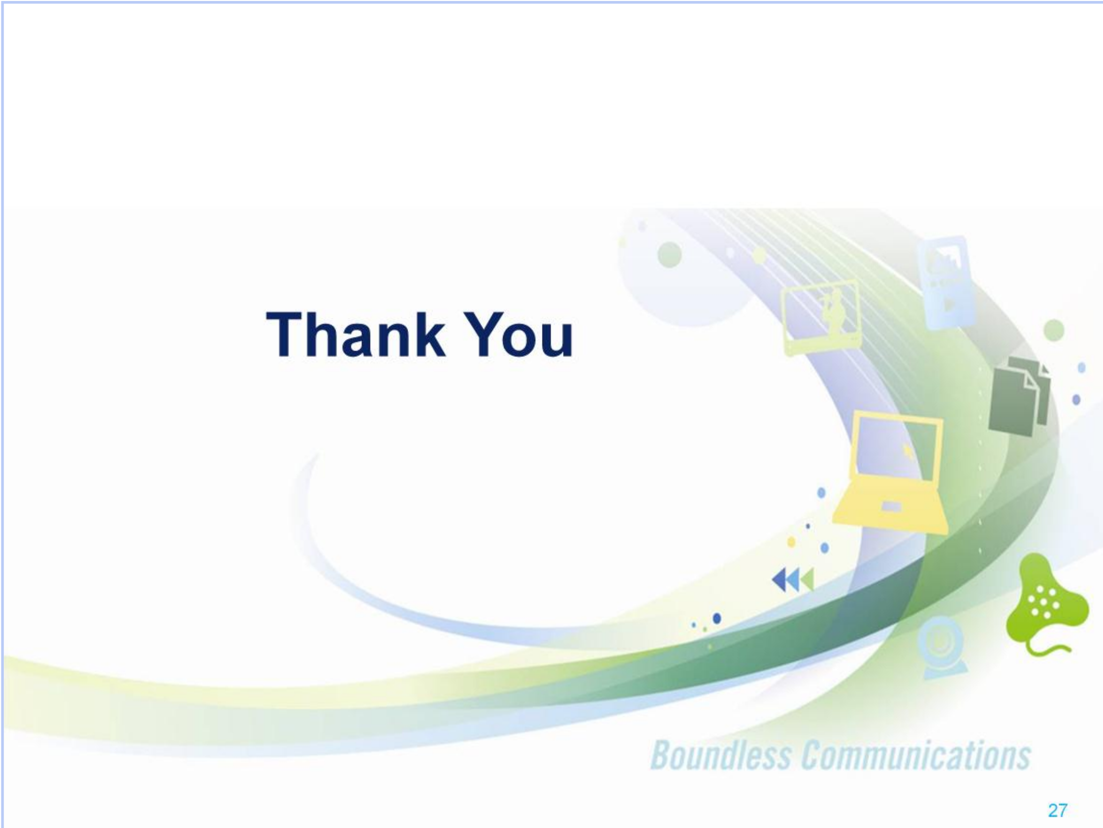
The UPM is also known as UHP (Unified Hub Processor) or SHP (Spare Hub Processor)

Supplementary Components

- **NMS – Used for management, control, configuration and more (will be covered deeply later in the course)**
- **Management PC – used for local management purposes (telnet and serial to hub components, sniffer, local FTP server, Etc.)**
- **Terminal server – serial to Ethernet converter, used to centralize serial console communications to hub components**
- **KVM switch – centralizes keyboard video & mouse from all system computers (NMSs, MPC, NetExplorer, SkyMon, Etc.) to a single operation KVM human-interface**

Supplementary Components

- Remote access router – Connected to the intranet for NMS browsers access, and to internet for Gilat Tech Support access (via VPN)
- SkyMon – A web-based monitoring tool for the SkyEdge II system
- NetExplorer server - Provides a centralized management system for all NetEnforcers of the network
- LowFly - Satellite simulator used for system configuration without satellite. Adds noise and attenuation, but no delay


Thank You
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