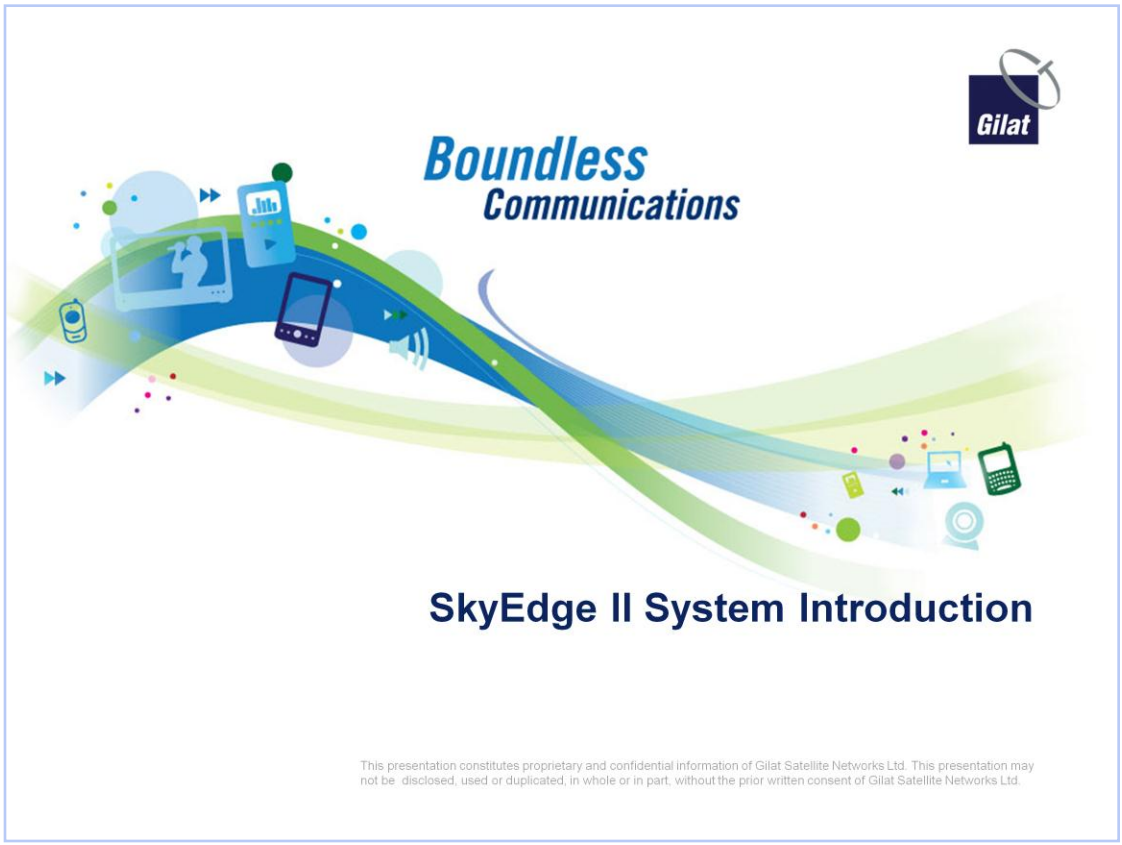
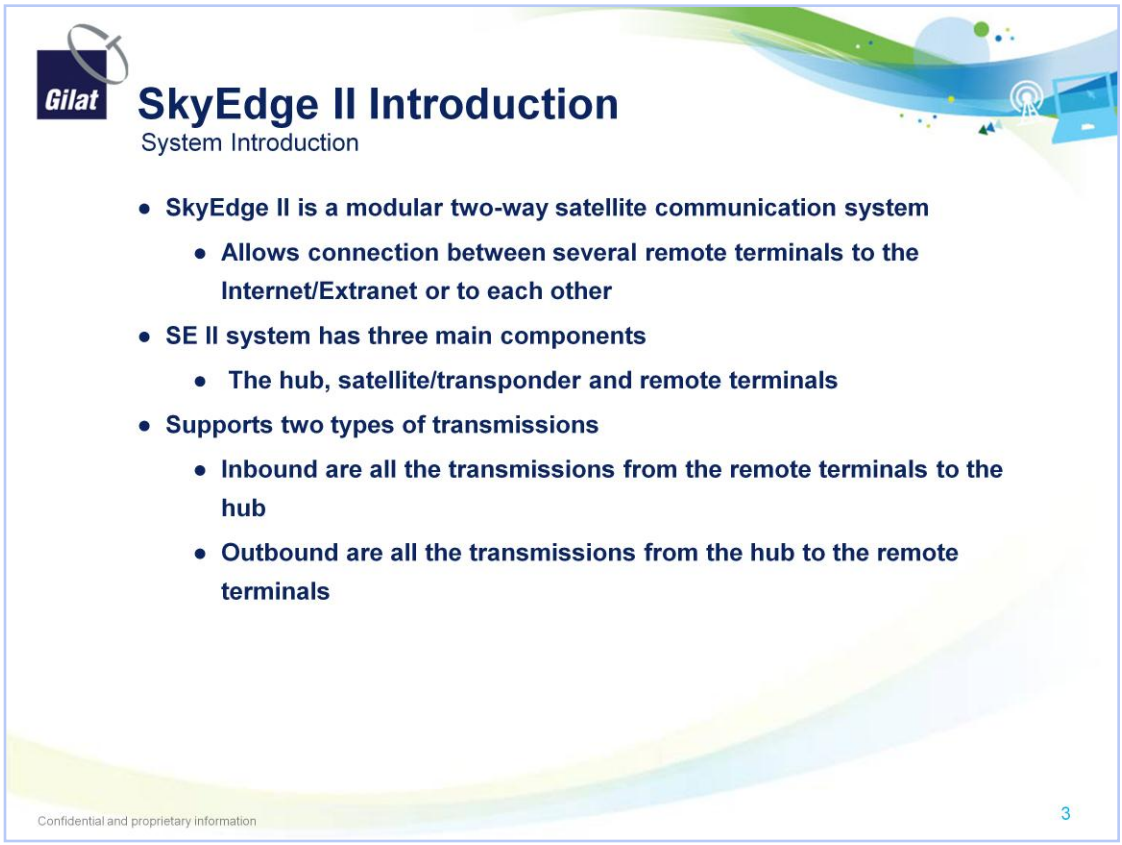
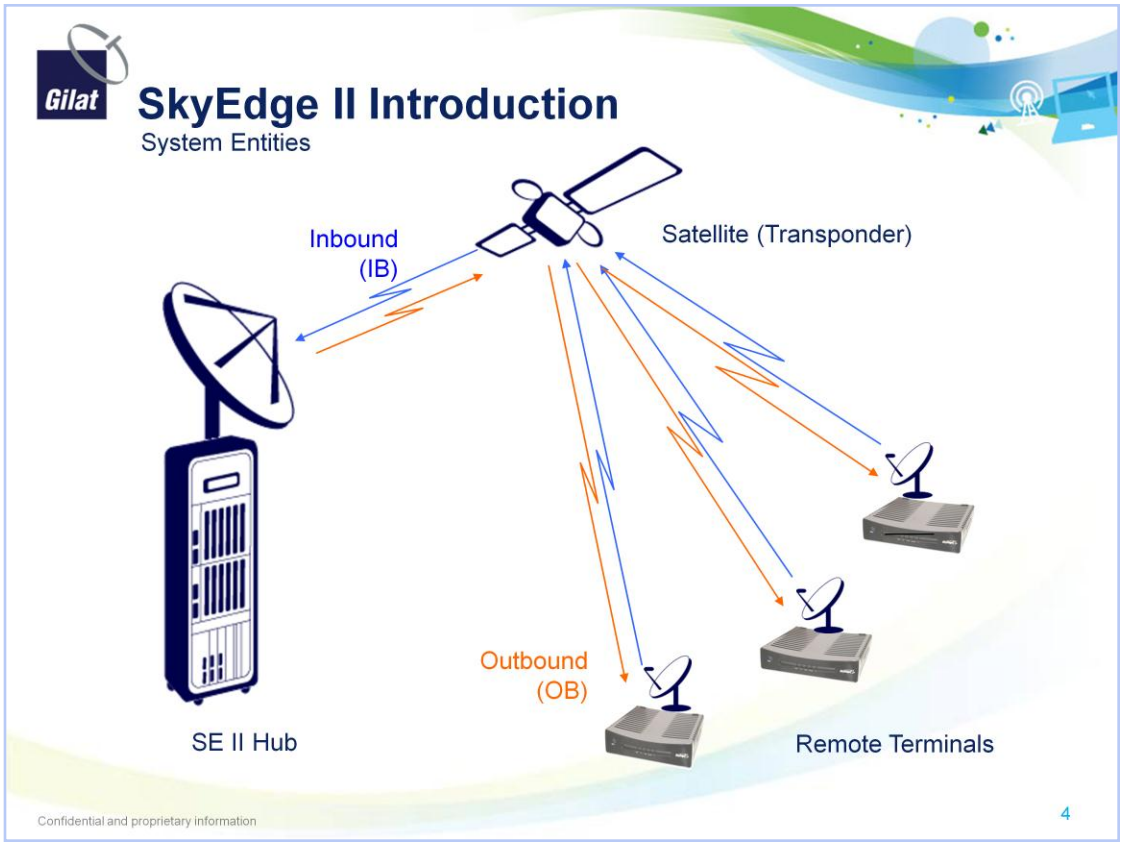


Agenda

- System Introduction
- System Entities
- Network Topology
- Network Architecture
- System Capabilities



Each satellite has several transponders on it. A transponder is an automatic device that receives, amplifies, and retransmits a signal on a different frequency.

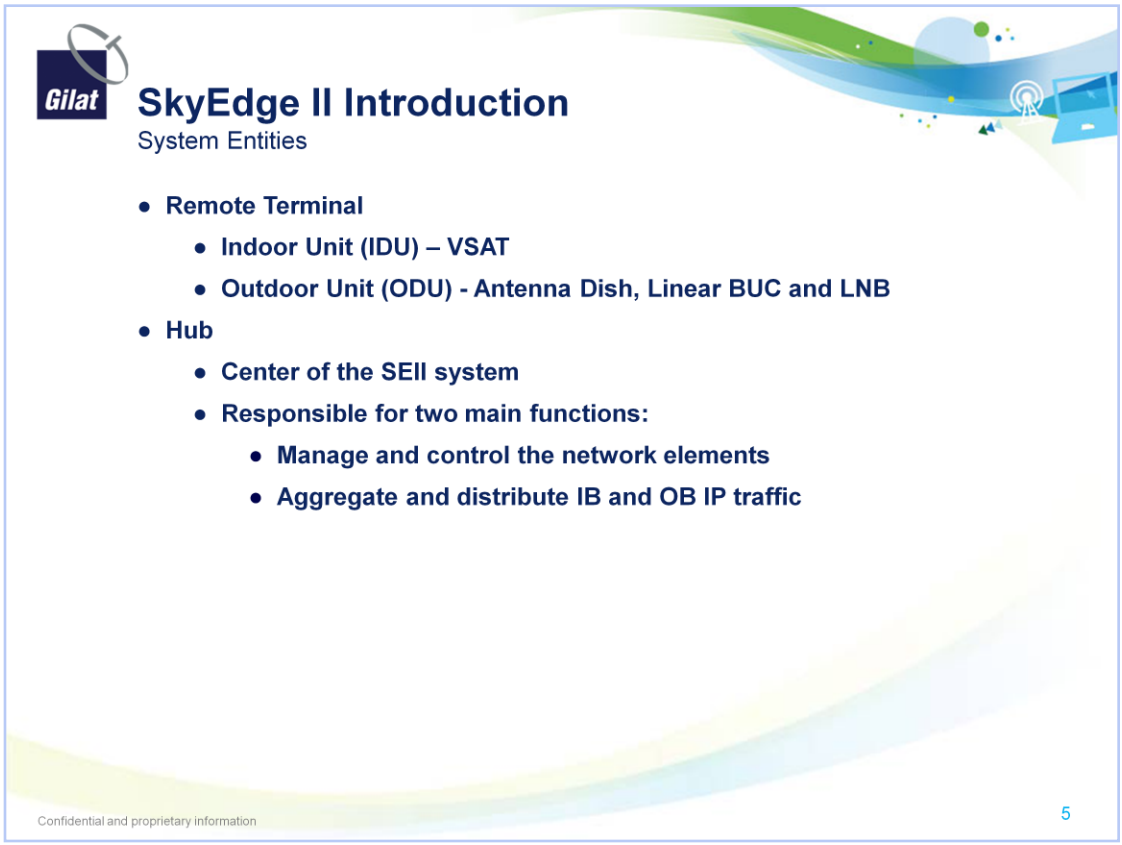


Every transmission from Earth to the Satellite is called Uplink.

Every transmission from the Satellite to Earth is called Downlink.

Every Uplink and Downlink path is called a hop.

Therefore – OB from the hub to a VSAT would be one hop. IB from a VSAT to the hub would be one hop.



VSAT (Very Small Aperture Terminal)
BUC (Block Up Converter) Tx section of the ODU
LNB (Low Noise Blocker) Rx section of the ODU

SkyEdge II Introduction

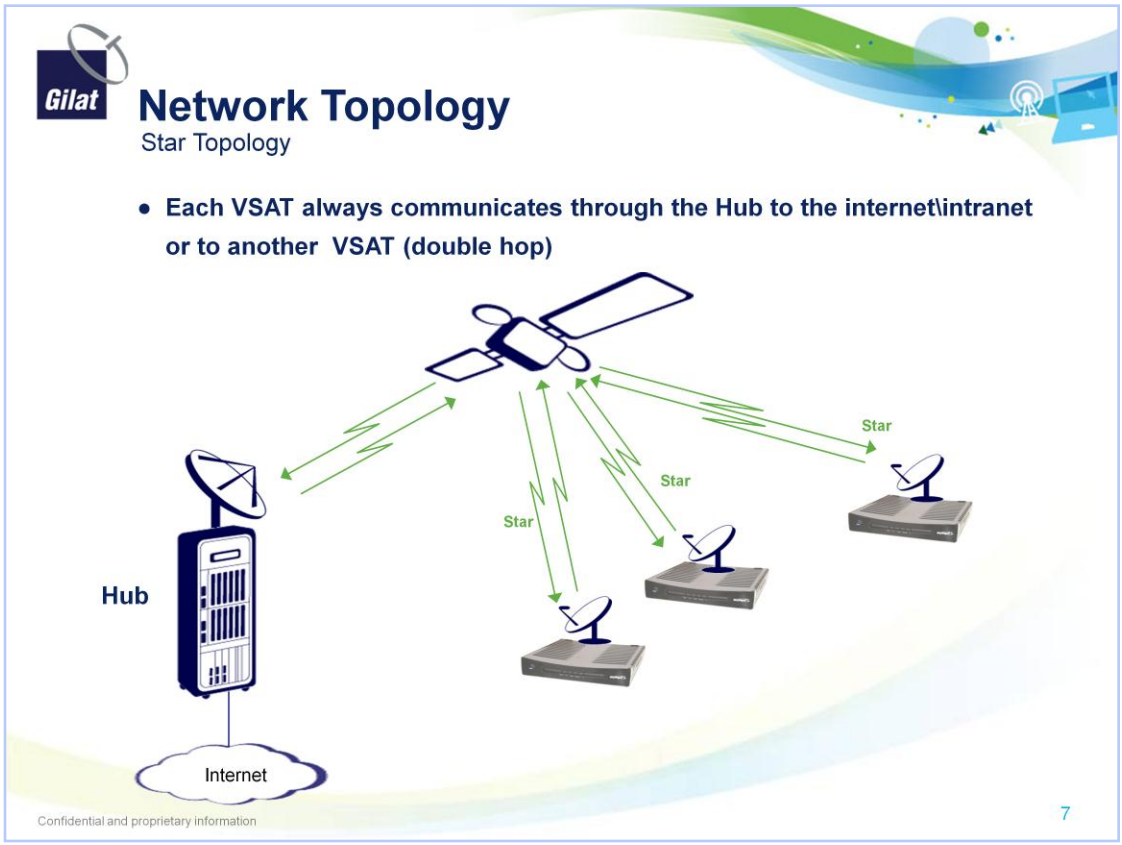
Network Topology

- SkyEdge II hub enables system VSATs to communicate via satellite links:
  - Internet/Intranet networking (VSAT-to-Hub)
  - Each other (VSAT-to-VSAT)
- System supports three basic topologies:
  - Star
  - Mesh
  - Multi-star

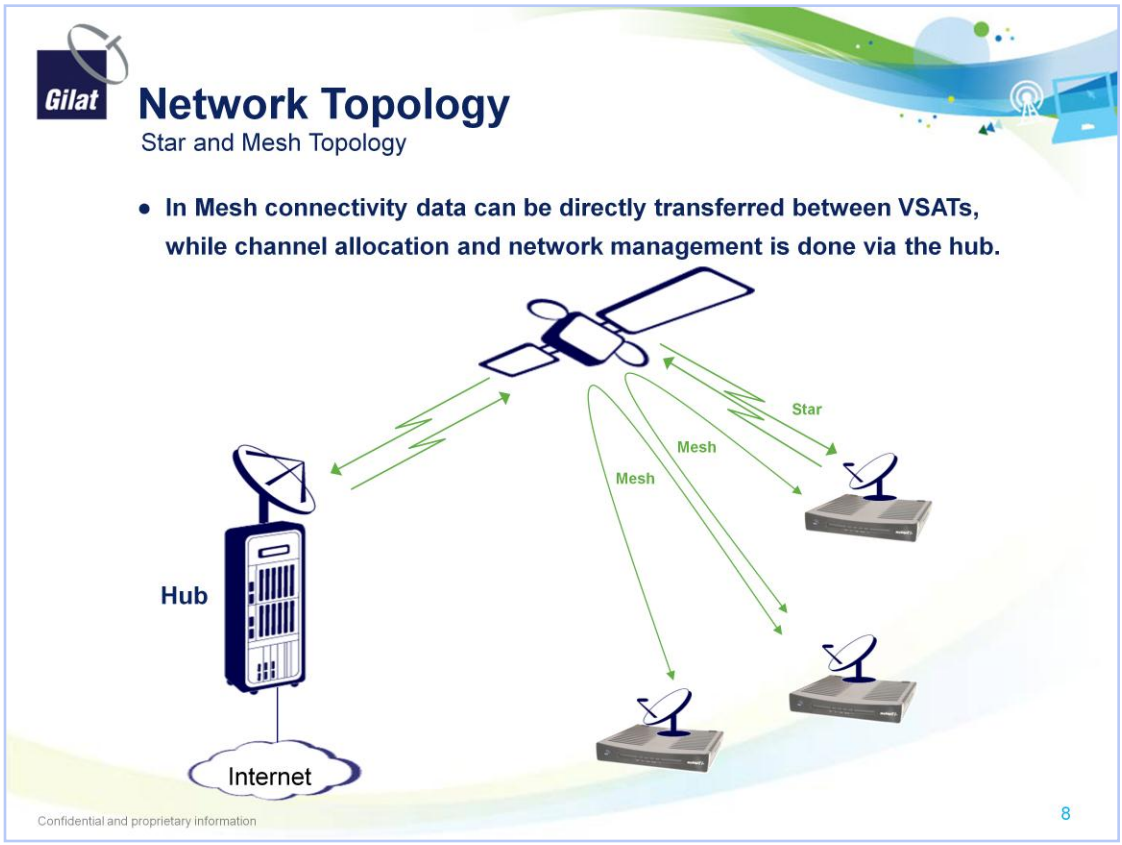
Star Topology – all user traffic is going through the Hub. VSAT to VSAT traffic is double hop.

Mesh Topology – Traffic generated by the user, can be transmitted between VSATs in one hop. Hub is needed only for session initiation, signaling and closure. User traffic is not going through the Hub. Mesh and Star topologies can be implemented on the same Hub.

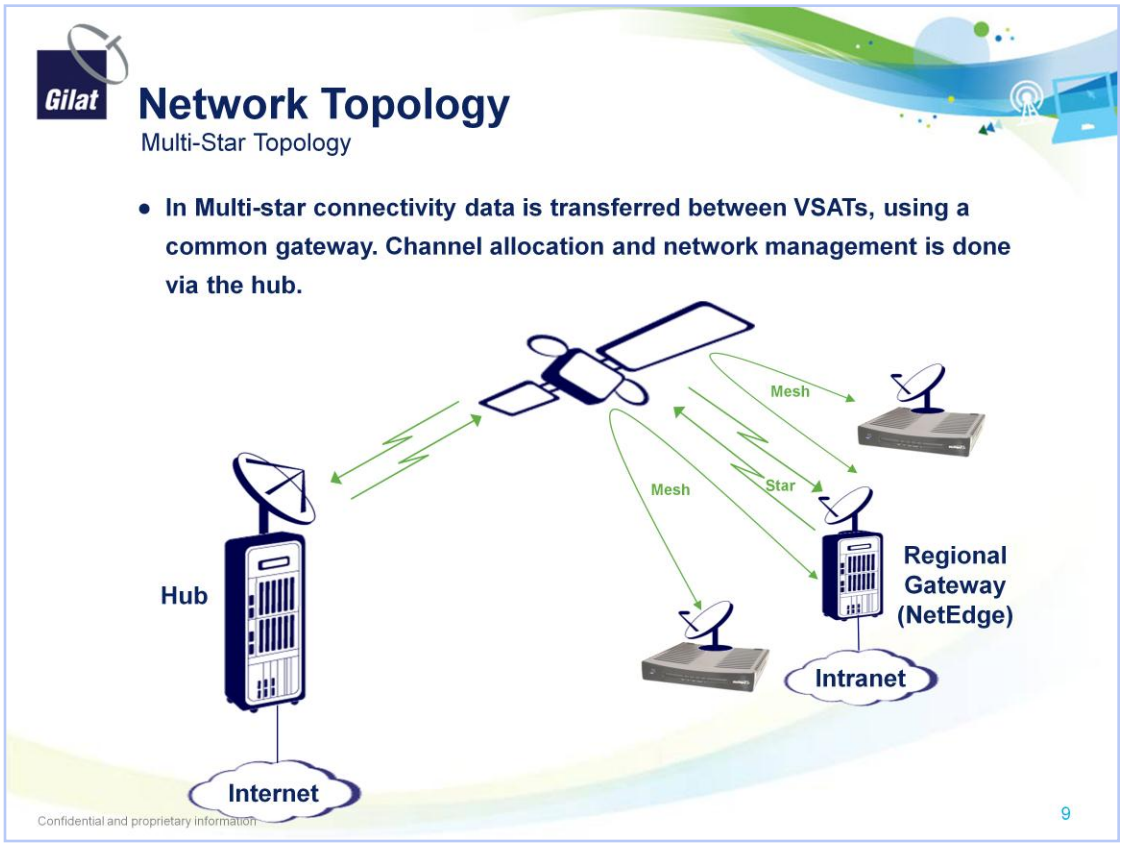
Multi-Star Topology – several star topology networks implemented in one hub, each one has a different gateway. All managed by the same NMS.



Star VSAT to VSAT communication – 2 hops



Mesh VSAT to VSAT communication – 1 hop

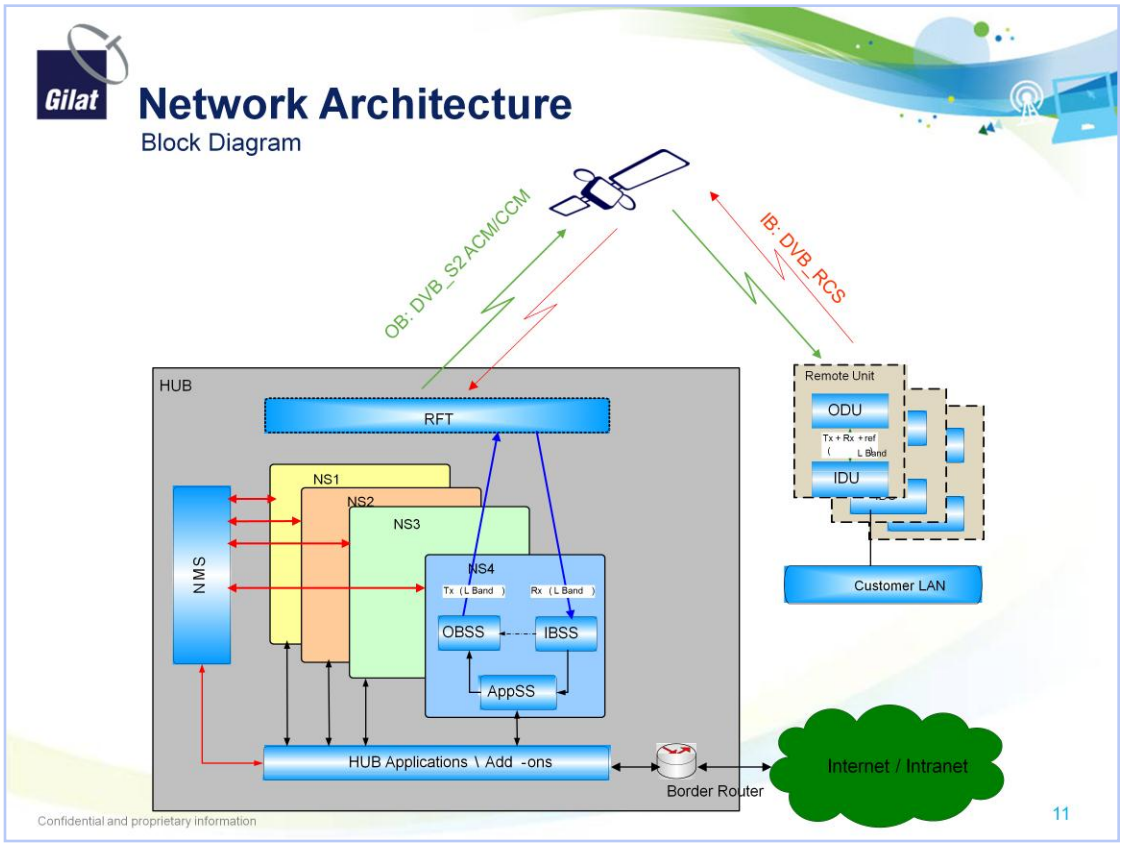


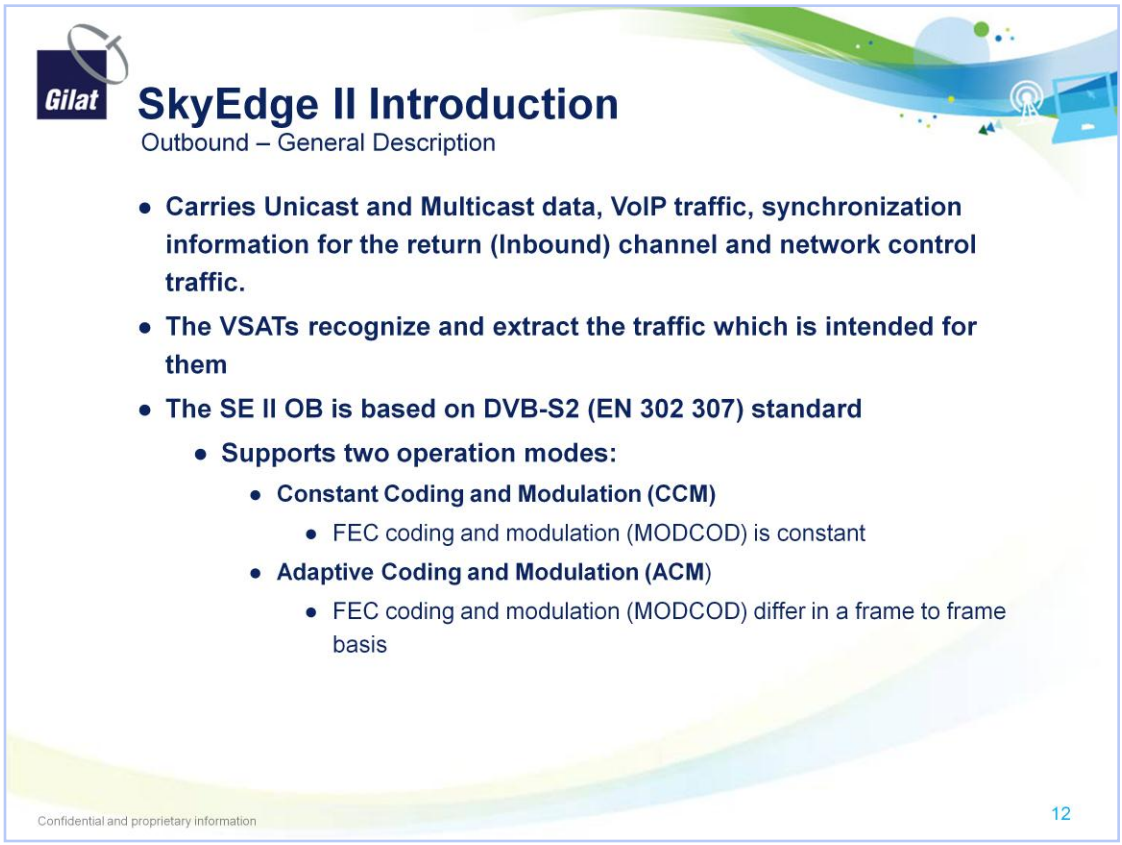
A Multi Star hub will have one central hub, and several regional gateways.

SkyEdge II Introduction

Network Architecture

- **The SE II hub consists of one to four Network Segments (NS)**
- **A NS is a subnetwork that manages three physical subsystems**
  - **Inbound Subsystem (IBSS)**
    - Demodulates and Decodes the traffic coming from the VSATs (Inbound)
  - **Outbound Subsystem (OBSS)**
    - Multiplexes and Modulates the traffic towards the VSATs (Outbound)
  - **Application Subsystem (AppSS)**
    - Provides means to distribute traffic to or from the Internet/Intranet and gives optional QoS services


Network Architecture
Block Diagram
OB: DVB_S2 ACM/CCM
IB: DVB_RCS
HUB
RFT
NS1
NS2
NS3
NS4
Tx (L Band)
Rx (L Band)
OBSS
IBSS
AppSS
NMS
HUB Applications \ Add -ons
Border Router
Internet / Intranet
Remote Unit
ODU
Tx + Rx + ref
L Band
IDU
Customer LAN
Confidential and proprietary information
11



DVB-S2 is the second generation of DVB system for broadband satellite services.
MODCOD combination of Modulation and FEC

SkyEdge II Introduction

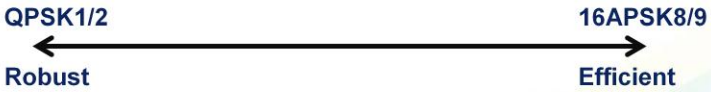
Outbound – MODCOD

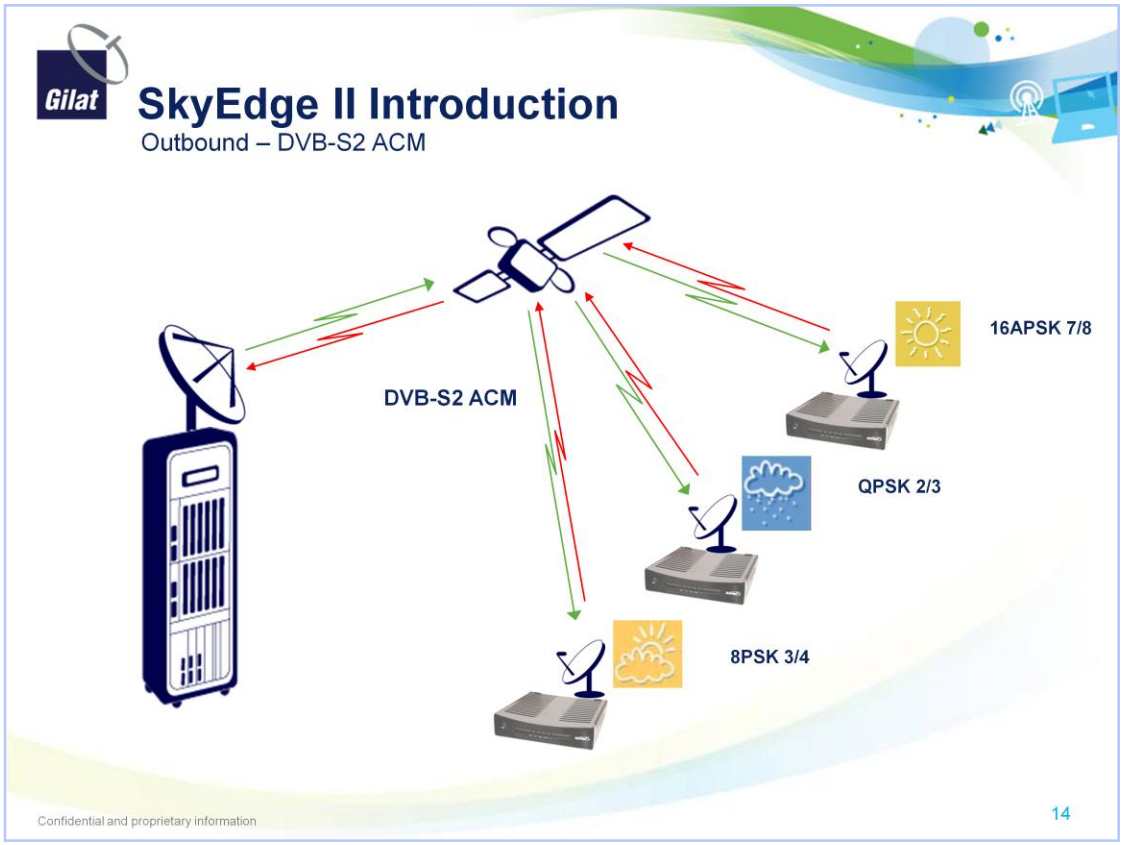
Modulation Schemes

- QPSK ---------- 2 bits per symbol
- 8PSK ---------- 3 bits per symbol
- 16APSK -------- 4 bits per symbol
- 32APSK -------- 5 bits per symbol

Coding (FEC)

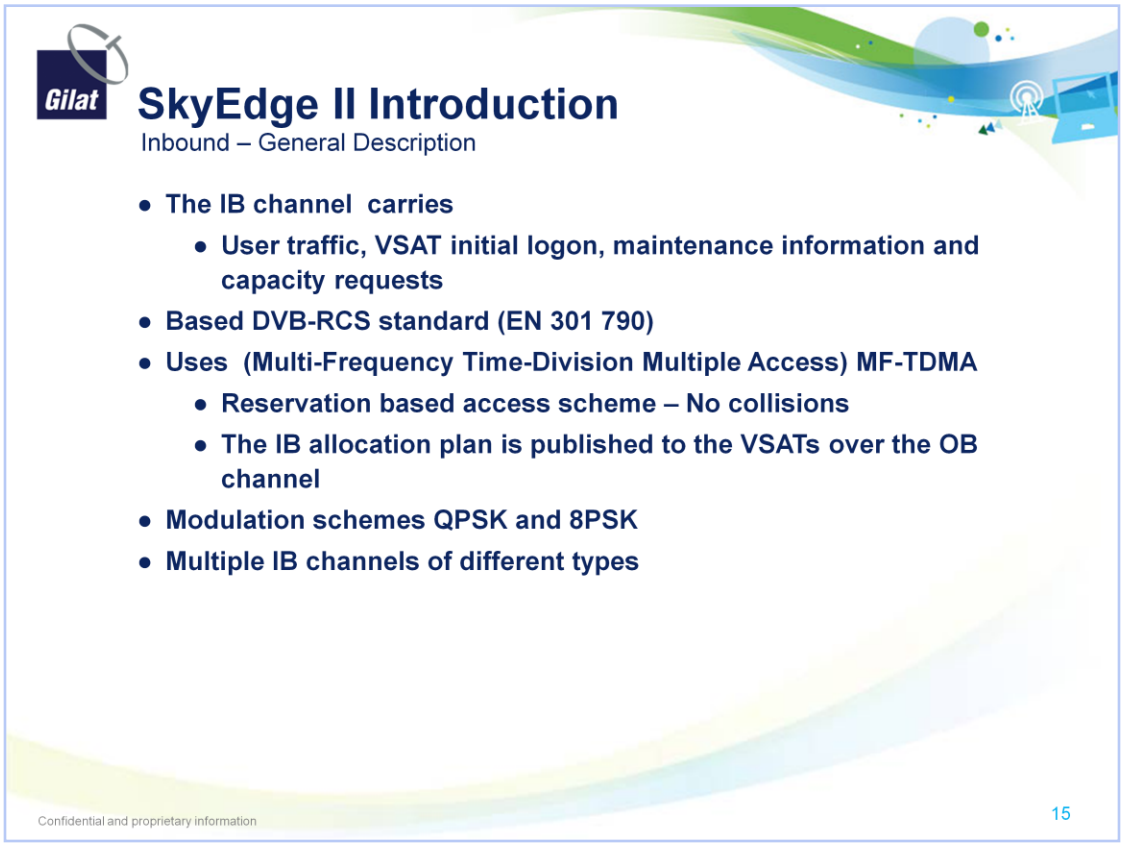
- LDPC / BCH Forward Error Correction Codes
- 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9 and 9/10



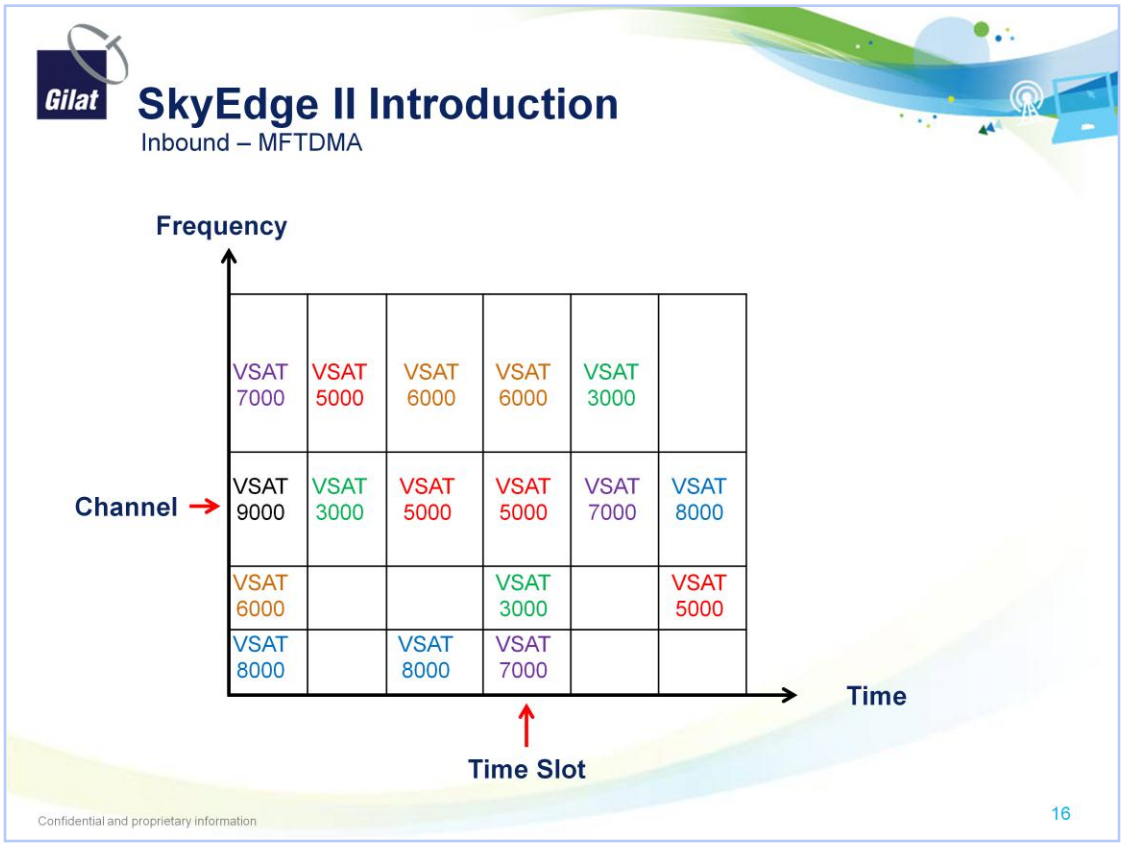


In ACM mode different MODCODs (combination of Modulation and forward error correction coding) are used to transmit to each VSAT according to the measured Es/No. The total OB bit rate changes dynamically according to the MODCOD used.

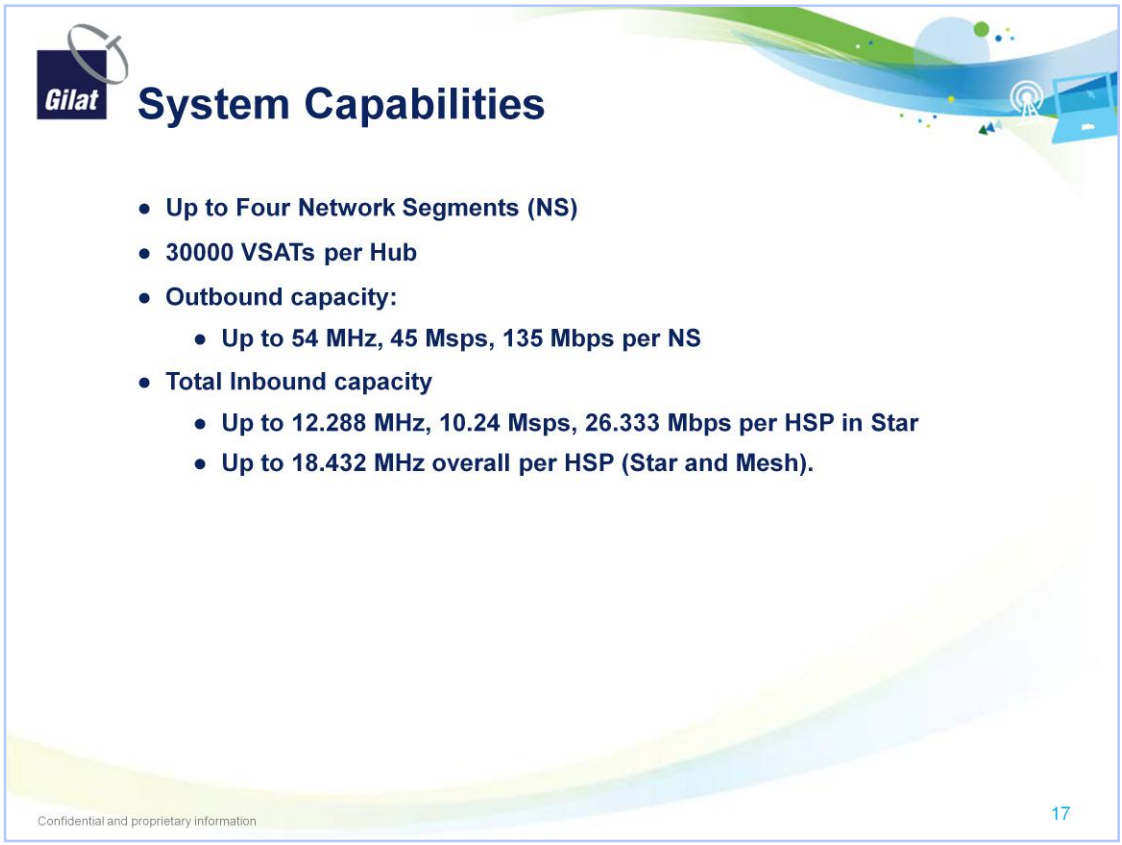
In this example we have one Hub and three VSATs. Each VSAT has a very different weather condition. According to their Es/No measurements the Hub will transmit to each one using different MODCODs. If the weather condition worsens, a more robust MODCOD will be selected from the MODCODs configured in the system.



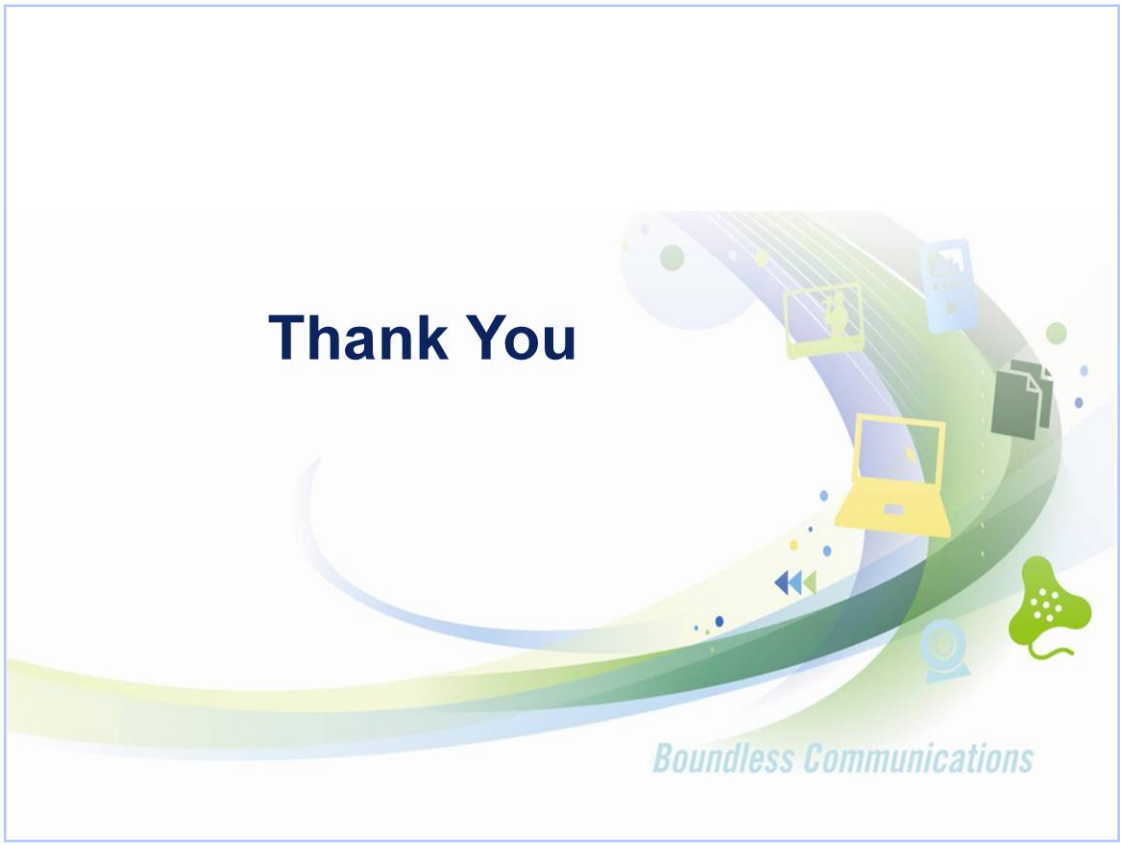
Capacity Request is the request for allocation of to send traffic. The types of requests are based on the type of traffic that each VSAT has to transmit.



A VSAT transmits at a specific channel (frequency) at a specific time (Time Slot)



Minimum CCM OB symbol rate is 300 ksps (short frames).
Minimum ACM OB symbol rate is 1.5 Msps (short frames


Thank You
Boundless Communications