

X-ARCHITECTURE

Taking You into the Future



DELIVERING COMMUNICATION TO THE POWER OF X

Wavestream's X-Architecture for SkyEdge II-c is the ultimate VSAT ground segment architecture for satellite communication. X-Architecture is Software Defined Networking (SDN)-based, addressing current and future needs with a single platform that supports both fixed and mobility SATCOM applications. It supports VSAT network deployments that require operating with several traditional wide beam satellites and/or High Throughput Satellites (HTS), while enabling multiple Virtual Network Operator (VNO) business models.

HTS is no less than a revolution, requiring a cloud-based distributed architecture that is flexible and future-proof. As multi-spot beams reshape the value chain and more capacity becomes available to service new markets, you must ensure that your network is set up to reap the benefits of the growth opportunities ahead.

X-ARCHITECTURE ENABLES MORE OPPORTUNITIES

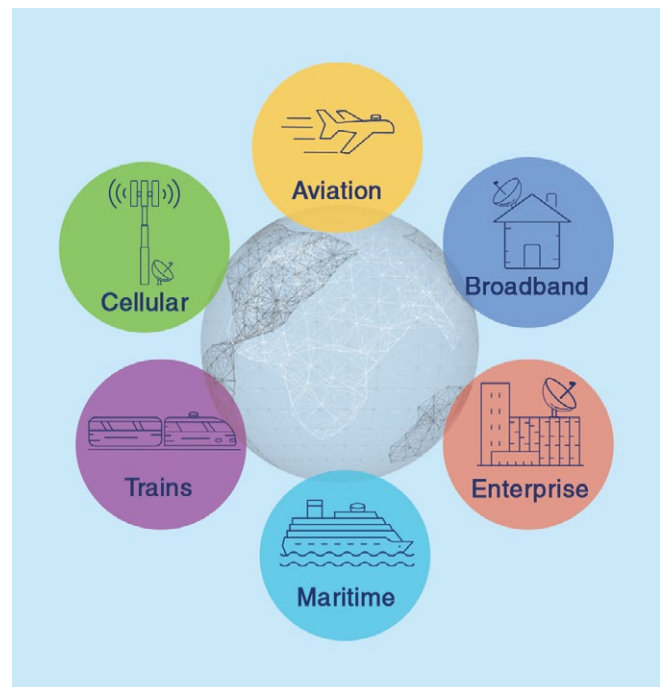
MORE OPPORTUNITIES WITH X MARKETS

Consumer broadband is by far the most widely used application on HTS today, and will most likely continue to be so. However, the surge of capacity lends itself to a much broader set of applications. Markets such as Enterprise, Mobility and Cellular are maturing and are expected to grow significantly over the next few years, leveraging the abundant HTS capacity. Cellular backhauling, and in particular 3G/LTE backhauling, is showing high growth, as cellular networks expand to rural and remote regions worldwide. Another high-growth market is mobility, due to the increasing demand for passenger in-flight connectivity and communication for vessels at sea.

By using a single platform, X-Architecture uniquely helps you expand your services to any fixed or mobility market. Dynamic resource allocation among applications such as broadband, enterprise, 3G/LTE cellular backhauling and mobility reduces satellite capacity OPEX by offering efficient bandwidth management.

For example, by exploiting differences in peak-hour usage patterns between home and enterprise users, bandwidth resources can be allocated as required. Mobility applications also benefit from data sharing while transitioning between coverage regions.

X-Architecture for SkyEdge II-c also provides an enhanced user experience via features such as robust bi-directional QoS, TCP and HTTP acceleration and compression, and DNS caching. Full security is provided, including X.509 terminal authentication, over-the-air link encryption and secure HTTPS-based network management with user authentication.



Many Markets – One Platform

A full portfolio of VSATs are available and optimized to support varying market needs, from high-speed VSATs servicing Broadband applications to ultra-high-performance VSATs servicing Cellular Backhauling and Mobility applications.



Libra



Gemini



Capricorn-4



Capricorn Pro

The SkyEdge II-c VSAT Family

MORE OPPORTUNITIES WITH X VNO MODELS

X-Architecture supports a wide portfolio of managed-service business models for VNOs. The service is easily scalable with minimal equipment. Up to ten VNOs can be supported from a single chassis, which means up to thirty VNOs per rack.

Using the SkyEdge II-c TotalNMS management system, VNOs have full control of their modulators and demodulator cards, data protocol servers and terminals and have full flexibility to define and manage their own services. VNOs also have access to detailed VSAT monitoring information such as VSAT status, bandwidth usage and RF levels.

Following are highlights of the VNO business models enabled by X-Architecture:

Hardware VNO - VNO service utilizing dedicated Tx/Rx hardware components with inbound and outbound MHz capacity.

Software VNO - VNO service utilizing shared hub resources with inbound and outbound Mbps capacity.

Cloud VNO - VNO service over multiple spot beams and satellites, leveraging a shared pool of network functions, data processing and space segment spectrum.

MORE OPPORTUNITIES WITH X SATELLITES AND X BEAMS

In a fast-changing world, scalability and flexibility will best ensure meeting growing business opportunities. With Wavestream's X-Architecture, as your business grows, you can provide broader coverage and increase your satellite bandwidth capacity.

With X-Architecture you have the flexibility to support both traditional wide-beam satellites and multi-spot-beam HTS from a single platform. As the need arises, you can choose capacity from any satellite in any frequency band: C, Ku and Ka. Additional geographic coverage or additional capacity can easily be added later to support a growing subscriber base or expand your business to additional markets.

For example, with X-Architecture you can optimize your network using an initial wide geographical satellite coverage. As your network grows, X-Architecture enables allocating specific spot beam capacity on the regions of high demand.

Increasing Mbps capacity can easily be achieved by inserting transmit and receive cards into the chassis as required.

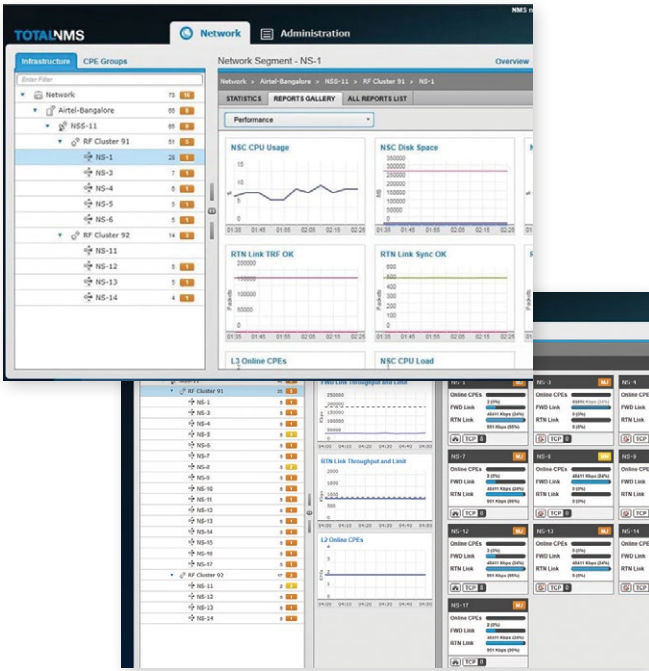
X-Architecture has been designed with utmost flexibility and unprecedented density, supporting up to five satellites from a single chassis and up to 6Gbps per rack, thus saving rack space and power.

X-Architecture enables processing of satellite capacity with its high-efficiency hub baseband, achieving exceptional density with 1:n inter-beam redundancy. A single transmitter and receiver card provides redundancy to all active transmitter and receiver cards, within and across beams.

In addition, X-Architecture's innovative Software-Defined RF Matrix simplifies network operation and allows for business growth. OPEX can be significantly reduced by minimizing technical personnel at the gateway location. Carriers for increased capacity can be easily added remotely via the SkyEdge II-c TotalNMS configuration tool.



High Density X-Chassis



TotalNMS: Centralized Network Management System

X-ARCHITECTURE: DESIGNED FOR SUCCESS

X-Architecture has been designed to support new business opportunities while keeping in mind evolving market needs.

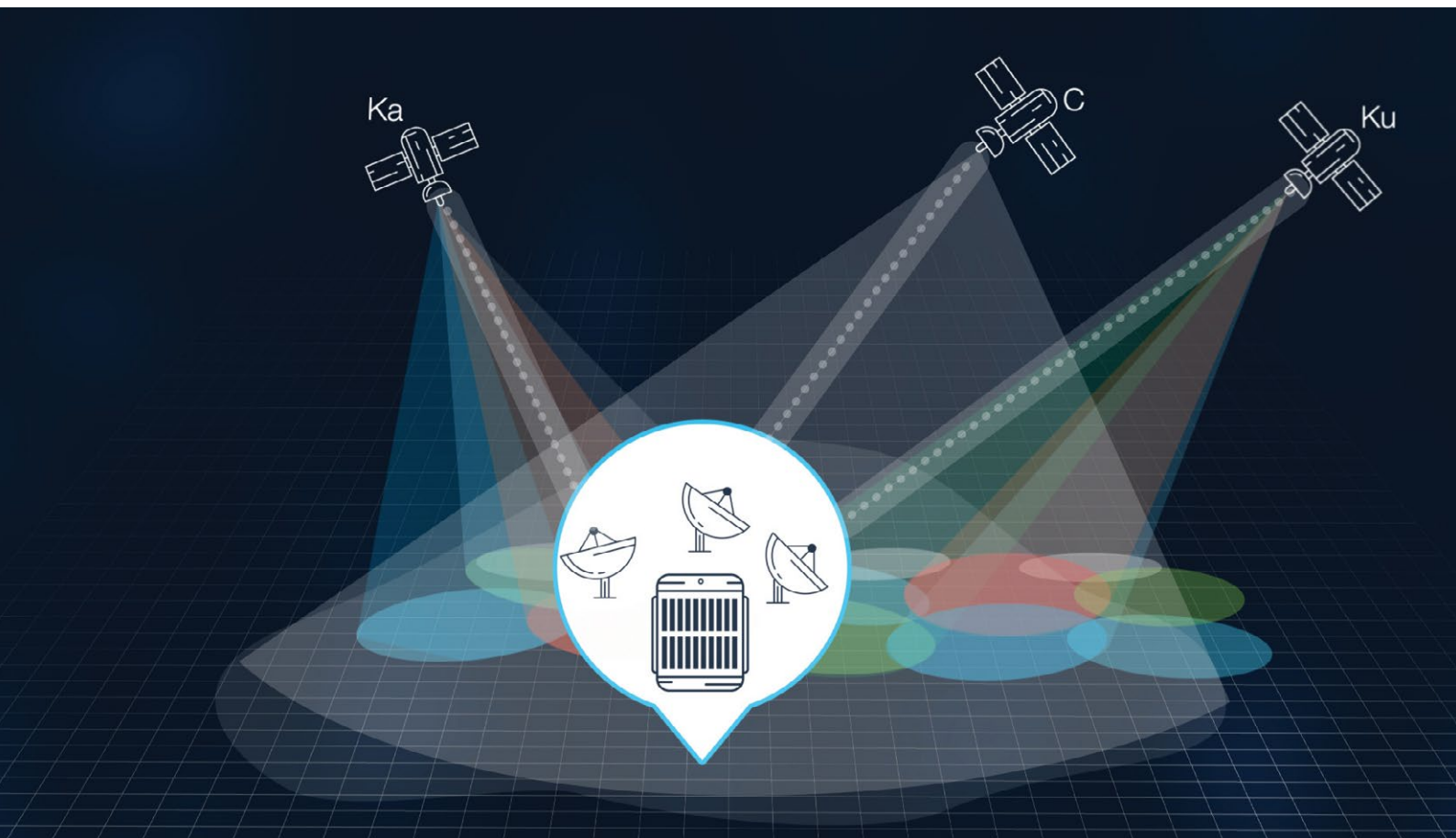
The distributed architecture is optimized for high throughput satellites and maximizes flexibility to work in conjunction, when necessary, with traditional wide beam satellites.

X-Architecture is a scalable, cloud-based design with a migration path to Software Defined Networking (SDN) and Network Functions Virtualization (NFV).

The ground infrastructure can be located in multiple gateway locations to best fit the network design. The servers can be located at the gateway location or in separate data centers, depending on terrestrial network availability and operational costs.

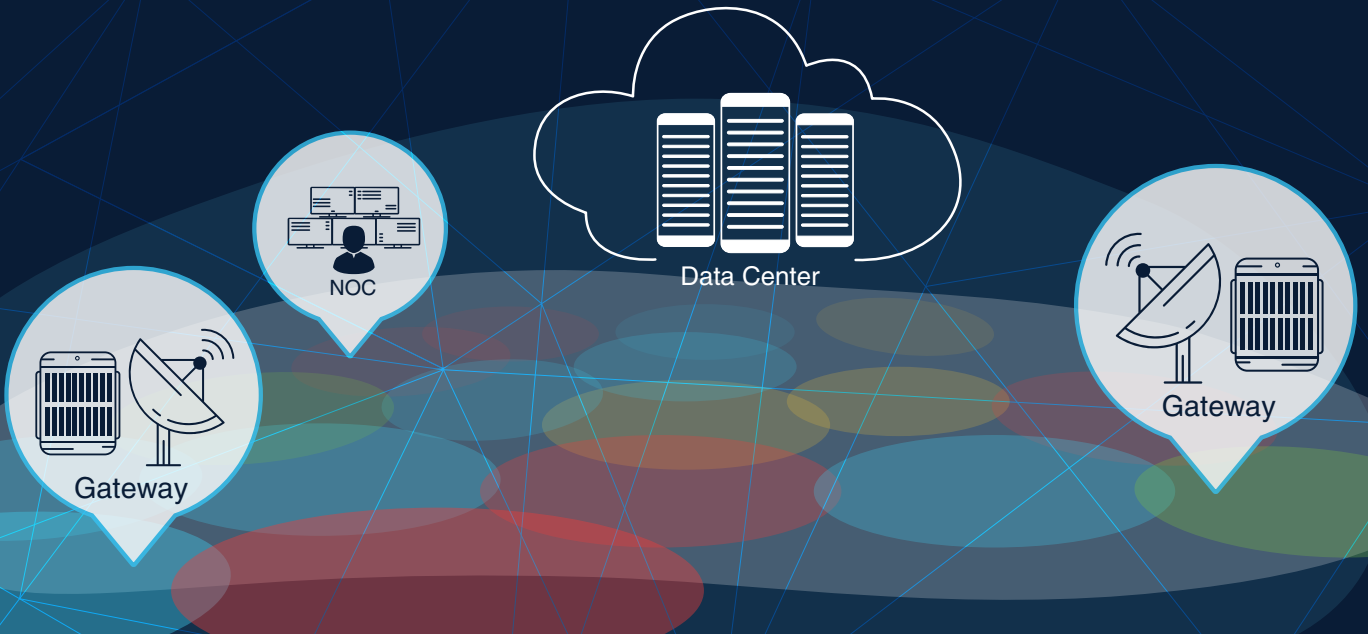
The network is easily controlled by a single global, unified, and centralized network management system. Wavestream's TotalNMS enables full configuration, control and monitoring of all hub elements and remote terminals, regardless of their physical location.

Wavestream's carefully designed X-Architecture for SkyEdge II-c frees you to grow your business with a network specifically designed to address tomorrow's opportunities.



X-Architecture: Any Satellite, Any Band

X-Architecture for SkyEdge II-c



Distributed Architecture for More Flexibility and Scalability

ABOUT WAVESTREAM

Wavestream sets the standard in the design and manufacture of next generation high power solid state amplifiers. Wavestream's Family of Ka, Ku and X-band Solid State Power Amplifiers (SSPAs), Block Upconverters (BUCs) and transceivers provide systems integrators with field-proven, high performance solutions designed for ground mobile and fixed, gateway and airborne satellite communication systems worldwide.

These items are subject to the Export Administration Regulations (EAR), 15 C.F.R. Parts 730-774, and may not be exported or transferred to any non-U.S. person, except as authorized by the U. S. Department of Commerce.

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