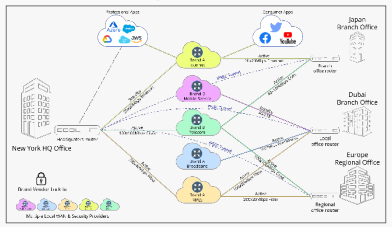
Breakthrough Wide Area Networking

Next-generation networking platform that uses a unique method of data transmission over the public Internet

NEW TECHNOLOGIES ARE NEEDED FOR WAN PROGRESS

Wide area networks must jump over several growing hurdles

Today's Network



Reduce Complexity & Cost

Improve Performance

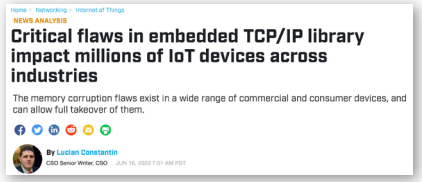
Deliver End-to-End Security

Meet Flexible Edge Needs

Next-Gen Network

?

Failure to jump over the hurdles is resulting in significant security, performance, cost, and complexity challenges for operators and subscribers.


Critical flaws in embedded TCP/IP library impact millions of IoT devices across industries

The memory corruption flaws exist in a wide range of commercial and consumer devices, and can allow full takeover of them.


CISA Warns of Increased DDoS Attacks

Security Experts Say Remote Workforce, Online Learning Create Opportunities


Are Legacy WAN Routers Putting Your Cloud Transformation at Risk?

Cloud transformation requires solutions that simplify cloud on-ramp activities and deliver cloud connectivity that offers performance and protection.


MIT Technology Review

The first DDoS attack was 20 years ago. This is what we've learned since.

However, today's MPLS and SD-WAN solutions fall short due to their use of legacy protocols

Today's Solutions

~2014

SD-WAN

~2000

MPLS

Reduce Complexity & Cost

Improve Performance

Deliver End-to-End Security

Meet Flexible Edge Needs

Next-Gen Solutions

???

SD-WAN

MPLS

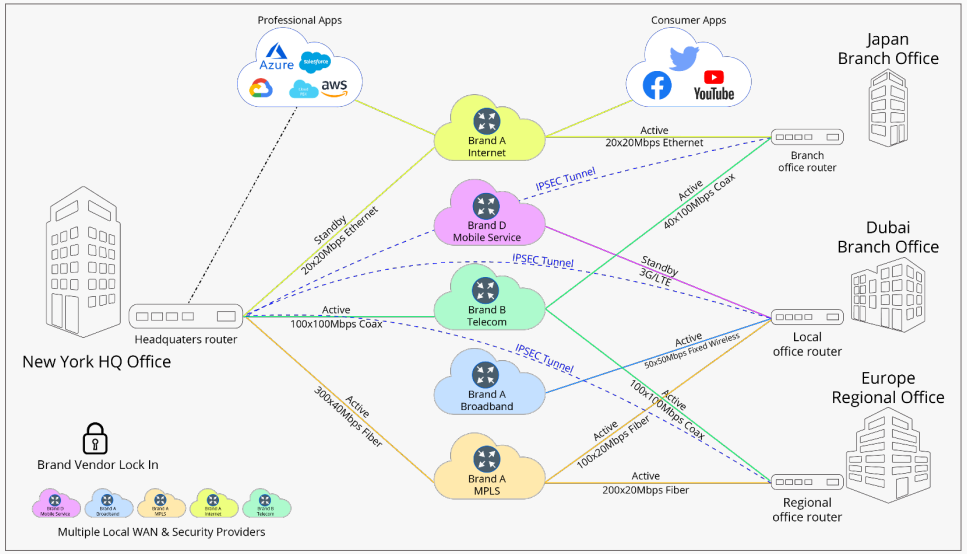
HELIX IS A VALIDATED NEW SOLUTION TO ENABLE WAN TO LEAPFROG HURDLES

Traditional Solutions

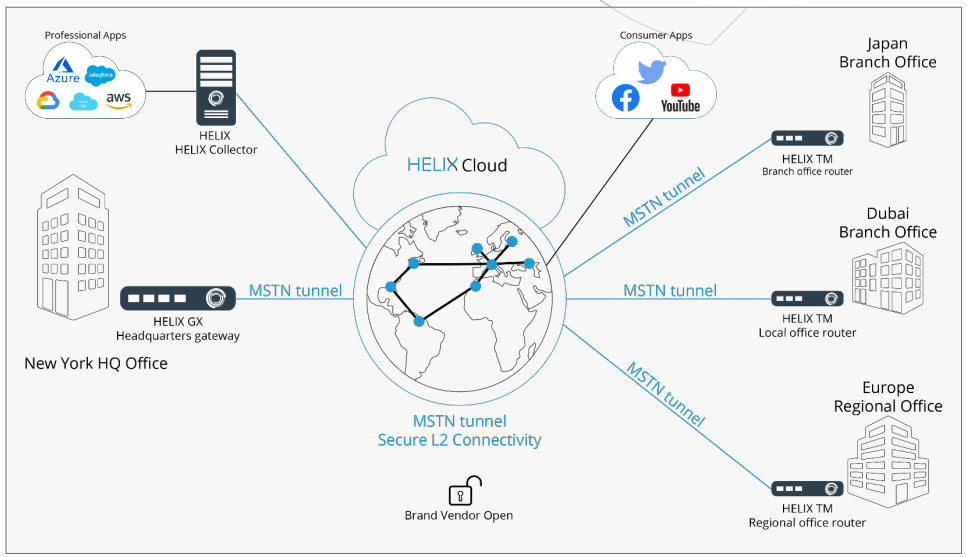
Next-Gen Network

IA | DIA | MPLS | SD-WAN

HELIX MSTN



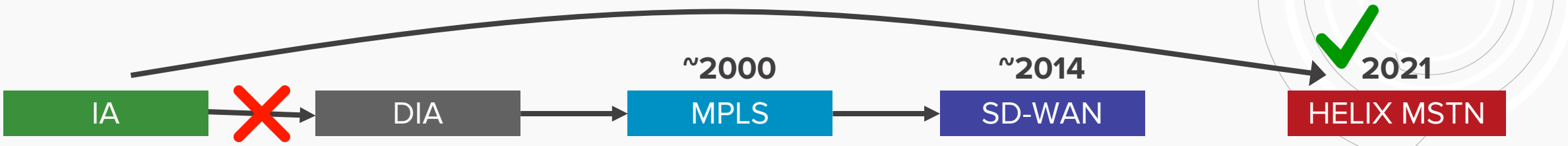
- Reduce Complexity & Cost
- Improve Performance
- Deliver End-to-End Security
- Meet Flexible Edge Needs



- Transform enterprise network into secure Autonomou System
- Harden network by design against DDOS attacks
- Configure network for required performance

INTEGRATED INNOVATION

Leapfrog technology generations limitations



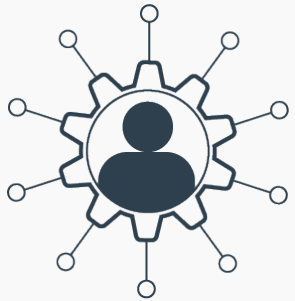
IA	DIA	MPLS	SD-WAN	HELIX MSTN
Internet access	Dedicated internet access	Dedicated private telco circuit	L3 Public Internet	Private L2 network through public Internet
Not expensive ($)	Expensive ($$$$)	Expensive ($$$$)	Cheaper MPLS ($$$)	Cheaper DIA/MPLS/SD-WAN ($$)
Legacy TCP/IP technologies	Legacy TCP/IP technologies	Legacy TCP/IP technologies	Legacy TCP/IP, BGP technologies	Breakthrough MSTNT technologies
No hardware lock-in	Point to Point Connectivity	Point to Point Connectivity	Point to Point Connectivity	Multi-point Connectivity
Average Staffing Burdens	Complex data transmission methods, complex equipment	Hardware lock-in	Deployment less complex than MPLS	Dynamic QoS
	No hardware lock-in	Hi Staffing Burdens	QoS and Security are Add-Ons	Secure monolithic channel between network resources
	Average Staffing Burdens		Hardware lock-in	Reduced network congestion
			Hi Staffing Burdens	Improved bandwidth efficiency
				No hardware lock-in
				Low staff burden

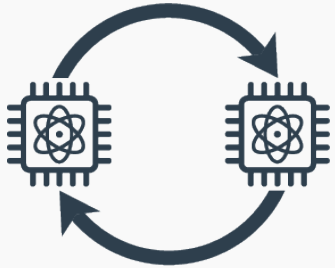
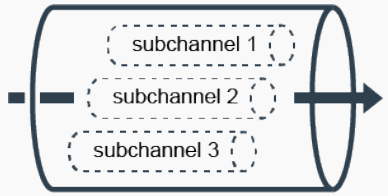
Legend

IA – Direct Internet Access
DIA – Dedicated Internet Access
MPLS – Multiprotocol Label Switching
SD-WAN – Software Defined Wide Area Networking
MSTN – Multi-Service Tunneling Network

HELIX PROPRIETARY ENGINEERING

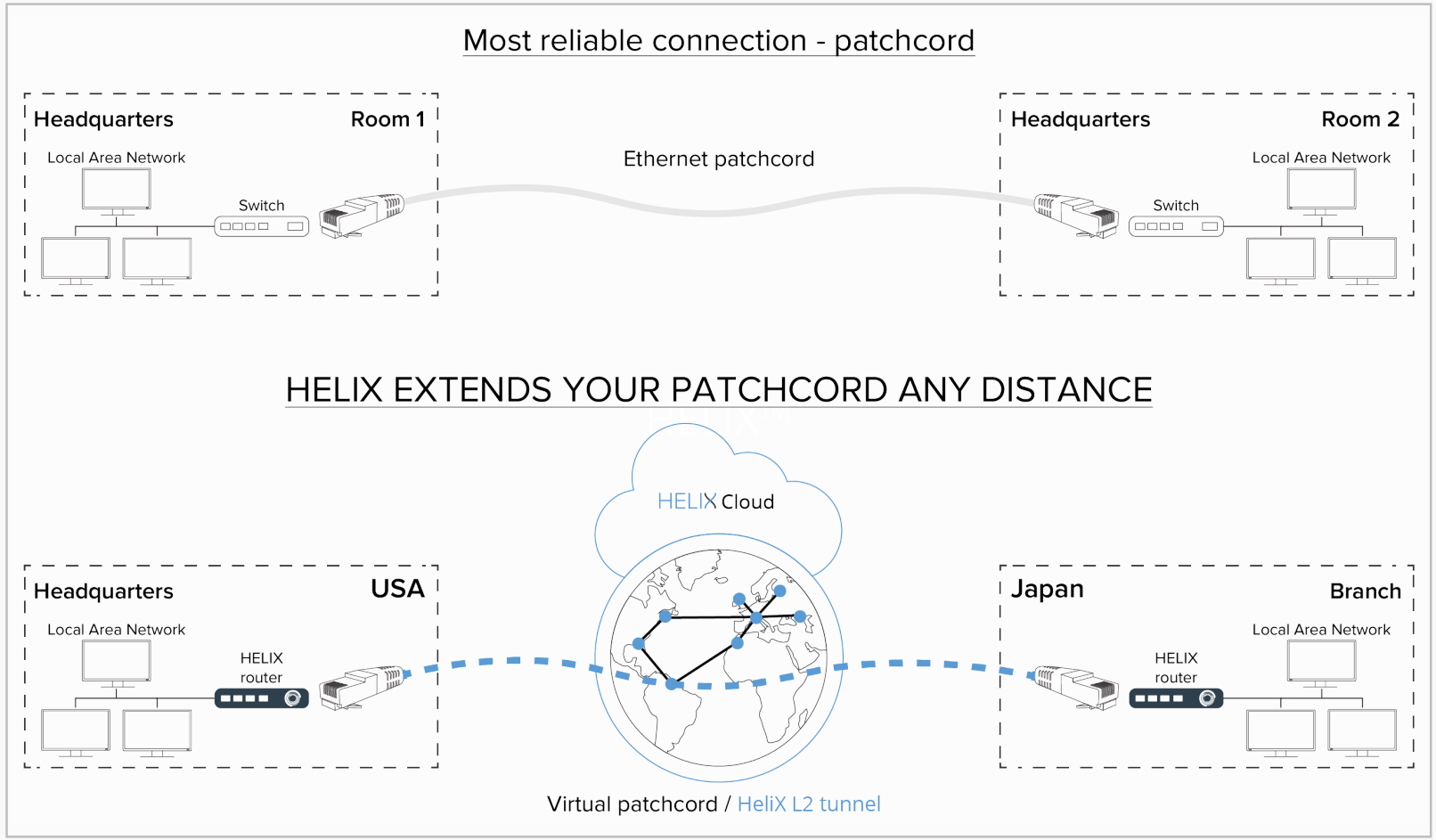
HELIX transforms the network from an expensive, fixed asset infrastructure to a secure corporate service

Centralized Governance	Hardware Freedom	Ready Global Network	Isolated Autonomous System
			

NEW fragmentation algorithm	Private, Non-Trace Routing	Kernel-to-Kernel Transport	Multi-channel Tunneling
			

HELIX NETWORK - SIMPLE AND RELIABLE

HeliX WAN connections are as simple and reliable as conventional patchcord

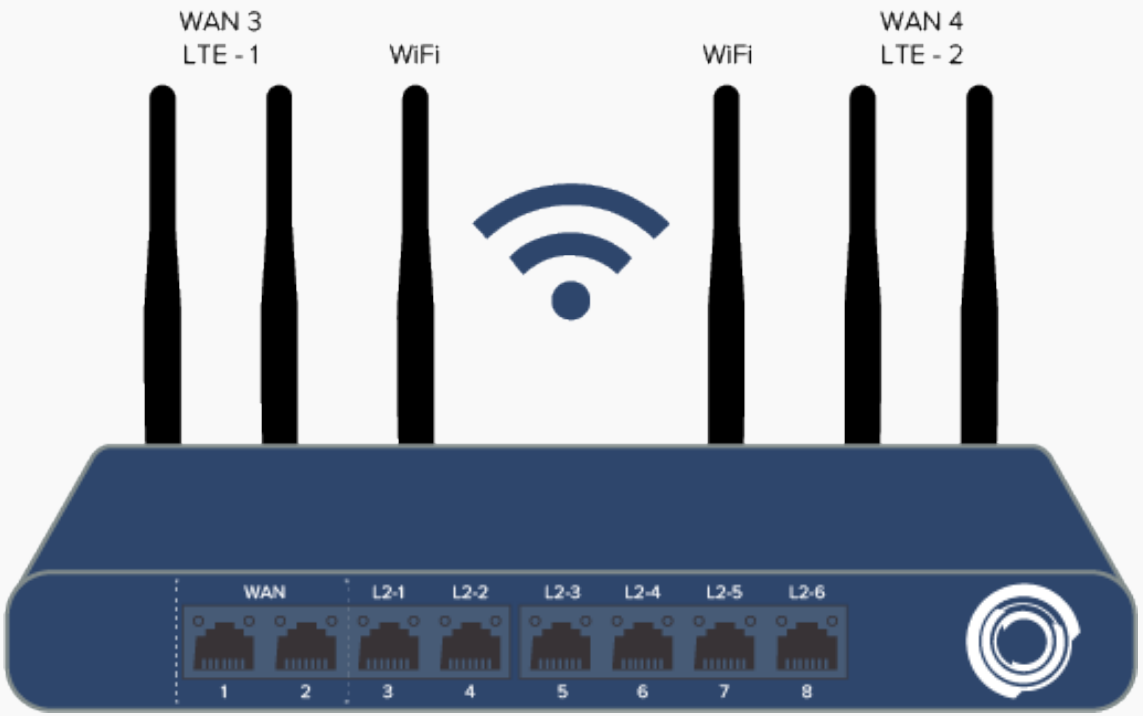


HELIX allows familiar LAN networks to expand to a worldwide scale.

Global connections created on top of the public Internet are comparable to wired patchcord in terms of reliability and ease of use.

EASY AND FAST DEPLOYMENT OF THE HELIX NETWORK

Multi-platform software for subscriber terminals.



- **Four** Uplinks.
- **Six** independent L2 segments.

Unified subscriber terminal operates with several communication channels. In summation mode, redundancy (hot/cold) and is capable of transmitting six independent L2 segments.

Creates six L2 tunnels for different types of traffic:

L2-1 - Corporate data,

L2-2 - VOIP voice traffic,

L2-3 - Video surveillance system,

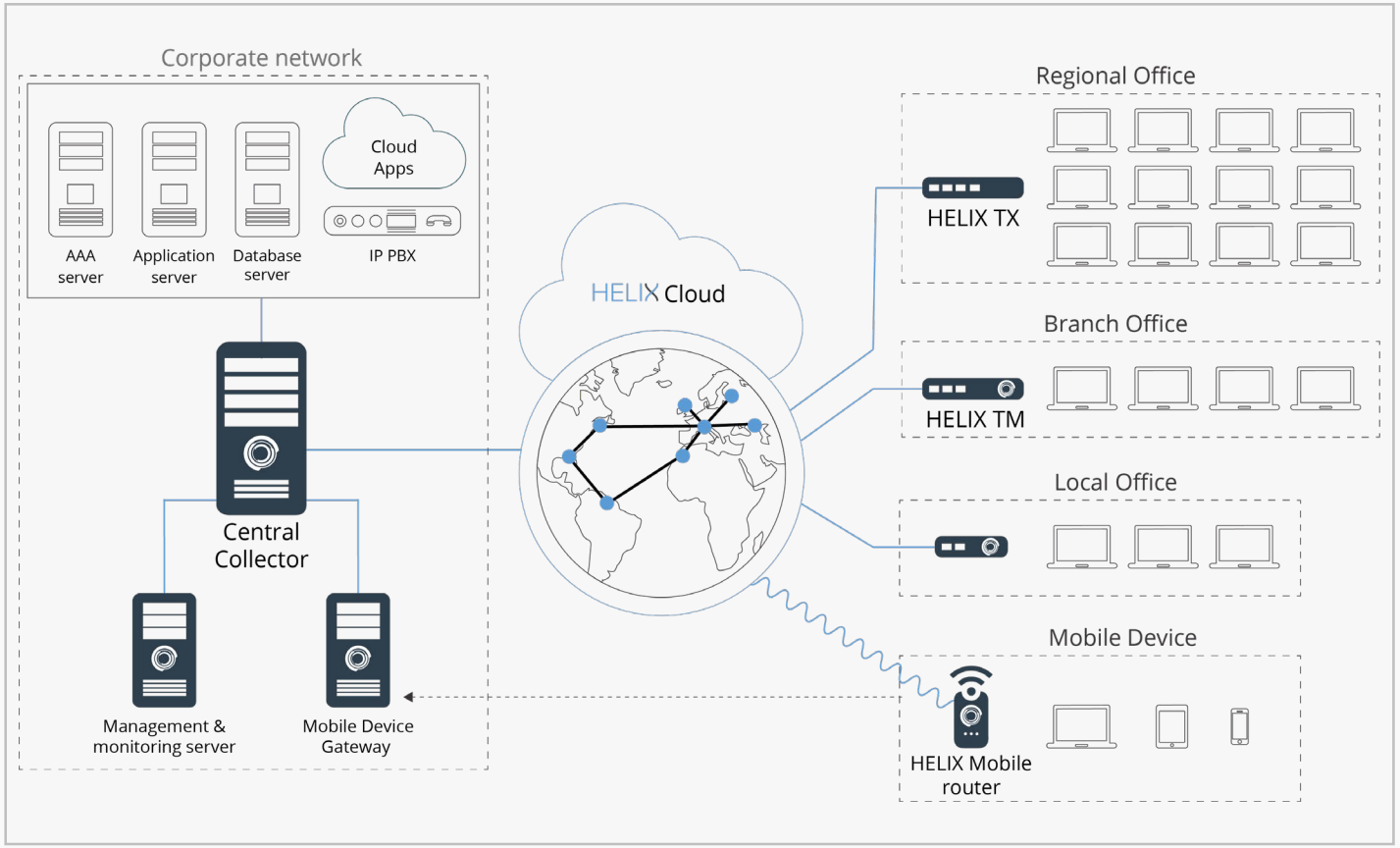
L2-4 - Demilitarized Zone,

L2-5 - Internet,

L2-6 - Reserve L2 channel (radio communication, ATM, payment terminals or an additional set of VLANs)

COMMERCIALIZATION MODELS

HeliX Autonomous System is a unique software-defined networking platform for building secure, distributed corporate networks of any scale.



An example of a global corporate network based on HELIX services.

1) HELIX VSAS — For All

Virtual Subscriber Autonomous System

Modular **single-tenancy** service environment for small and medium-sized enterprises with a distributed network infrastructure on a monthly subscription basis.

2) HELIX NAS — For F50, FinServ, Govt

Named Autonomous System

Dedicated **single-tenancy** service environment for organizations and enterprises operating their own closed, fully-controlled networks.

3) HELIX OSAS — For Operators

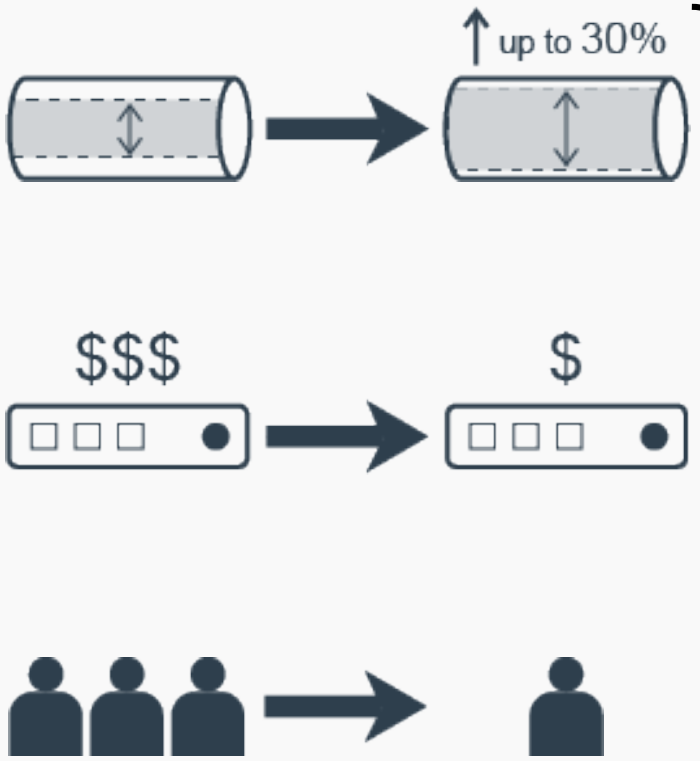
Operator Subscriber Autonomous System

Modular **multi-tenancy** service environment for telecom operators, including modular solutions for network optimization and software for subscriber terminals.

ECONOMIC EFFECT

Significant reduction in network maintenance costs

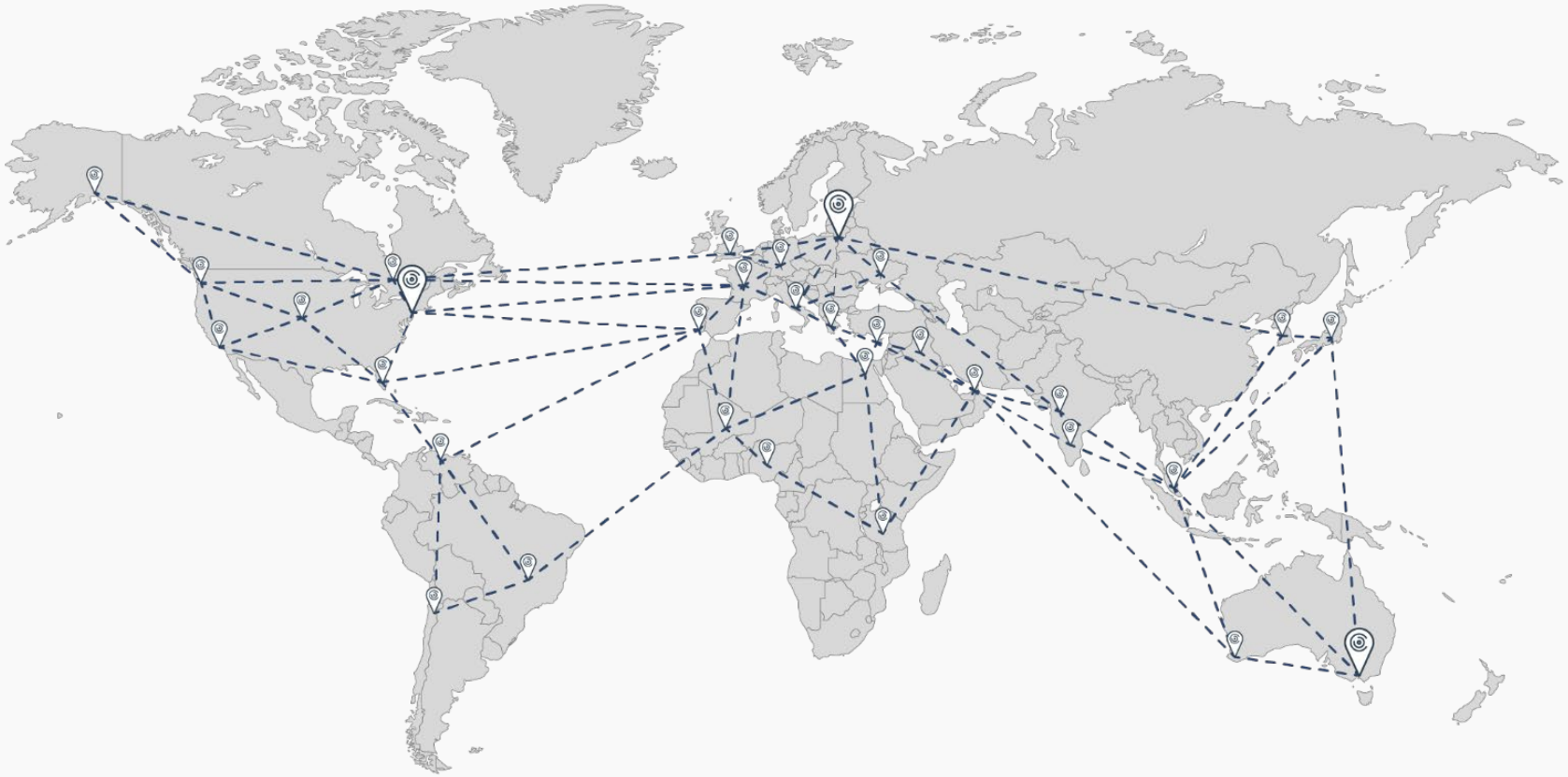
1. Bandwidth utilization.
2. Savings on equipment costs.
3. Reduced staffing levels.



Cost Operation Networks

Up to 30%

HELIX CONNECTION ANYWHERE IN THE WORLD



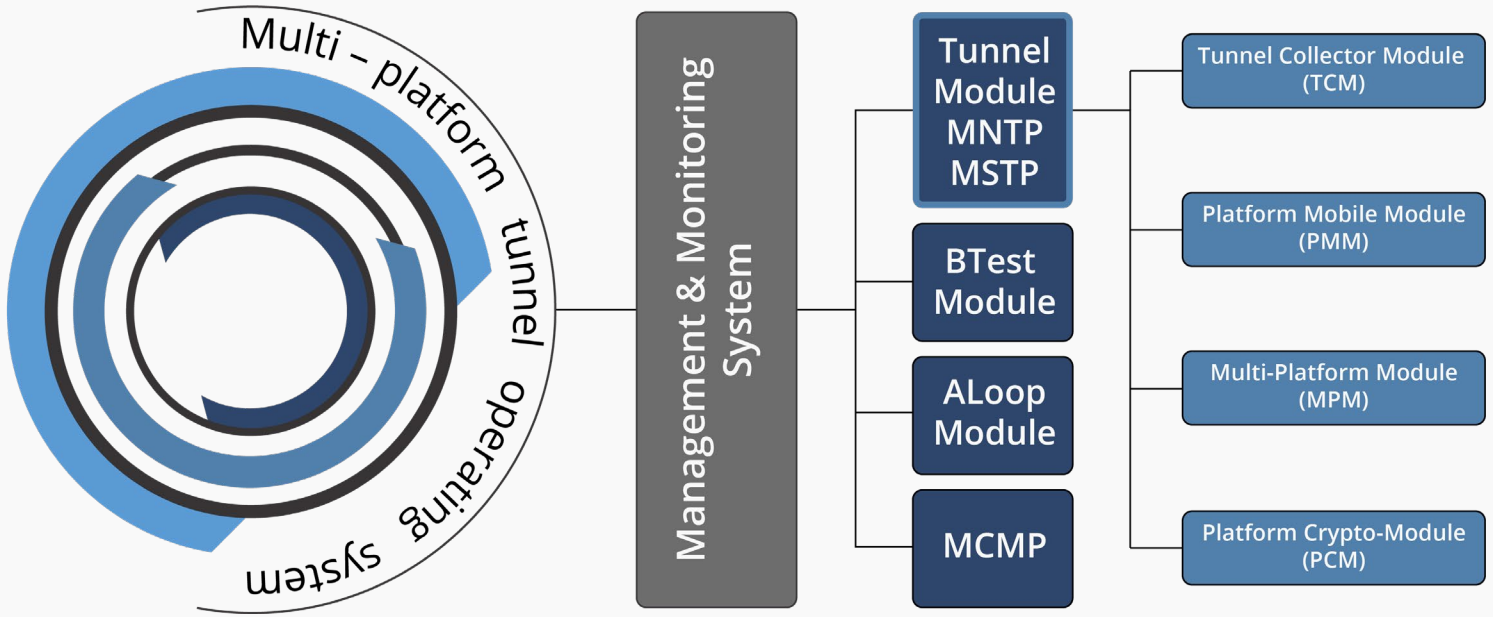
HELIX™ World Coverage Map

HELIX's global networking platform provides access to internal and cloud resources and services for all users at work, at home, and on the go from anywhere in the world.

HELIX Reference Appendix

Illustrative Schematics/Application Use Cases

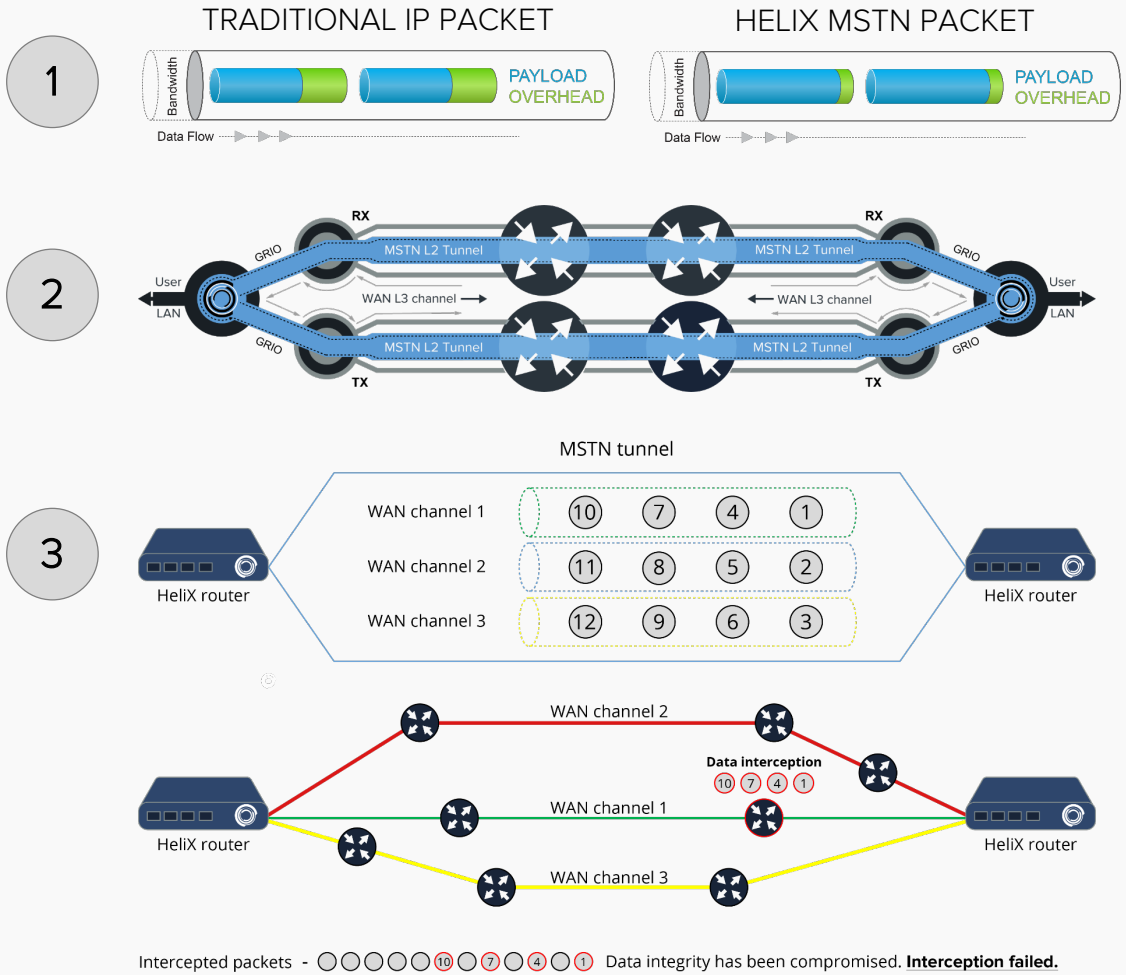
HELIX is a powerful proprietary multi-platform tunnel operating technology



- Comprehensive network tunnel operating system
- Multiple tunnel configuration and dynamic traffic management
- Real-time network management and monitoring
- Cryptographic tools
- Integrated testing
- Natively mobile-enabled
- Range of edge device form factors
- Edge hardware independence/Vendor unlocking
- Patent-pending

Safety on a design level.

HELIX AS eliminates the possibility of DDOS attacks and provides a new level of security quality.



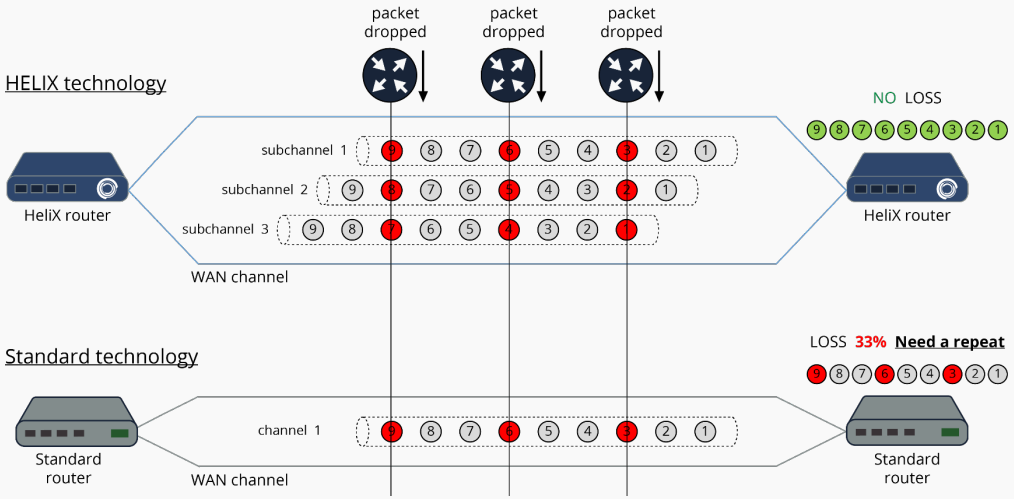
1. HELIX has a proprietary packet fragmentation algorithm for maximum data transfer efficiency and additional security.

2. By creating a monolithic channel between network resources and using its own network indexes, HELIX provides protection against IP-based network attacks.

3. By using round robin packets and mixed sequencing across multiple sub-channels, HELIX makes it quite impossible to intercept data packet traffic.

Unique transport design.

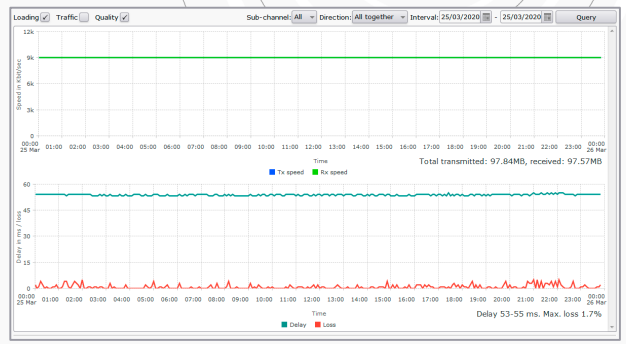
HELIX can use logical sub-channels to reduce packet loss



Without HELIX™

Delay 53-54 ms | Max Loss 14.0%

With HELIX™



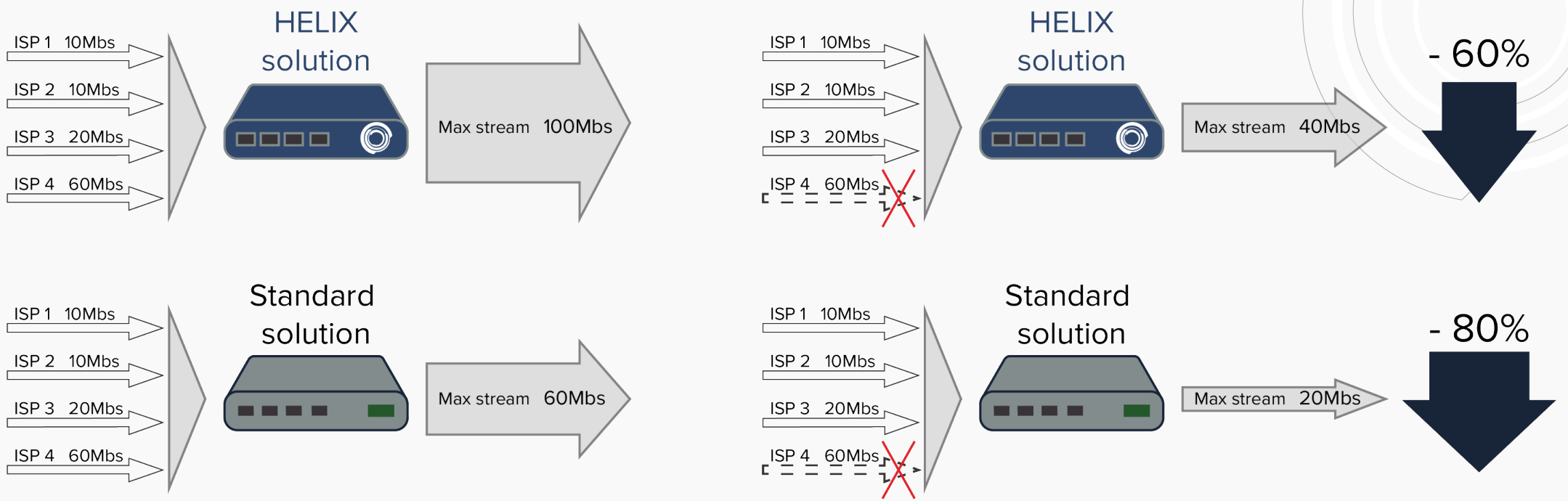
Delay 53-54 ms | Max Loss 1.7%

Any subchannel (separately for tx and rx) can be defined as a Hot Backup slave. A data packet transmitted through such subchannel will be cloned and simultaneously transmitted through Hot Backup slave subchannel. The receiving side will process the first received packet. The other copies will be ignored.

Even when using a loss communication channel, MSTNT technology can significantly improve communication quality: remove losses and minimize jitter.

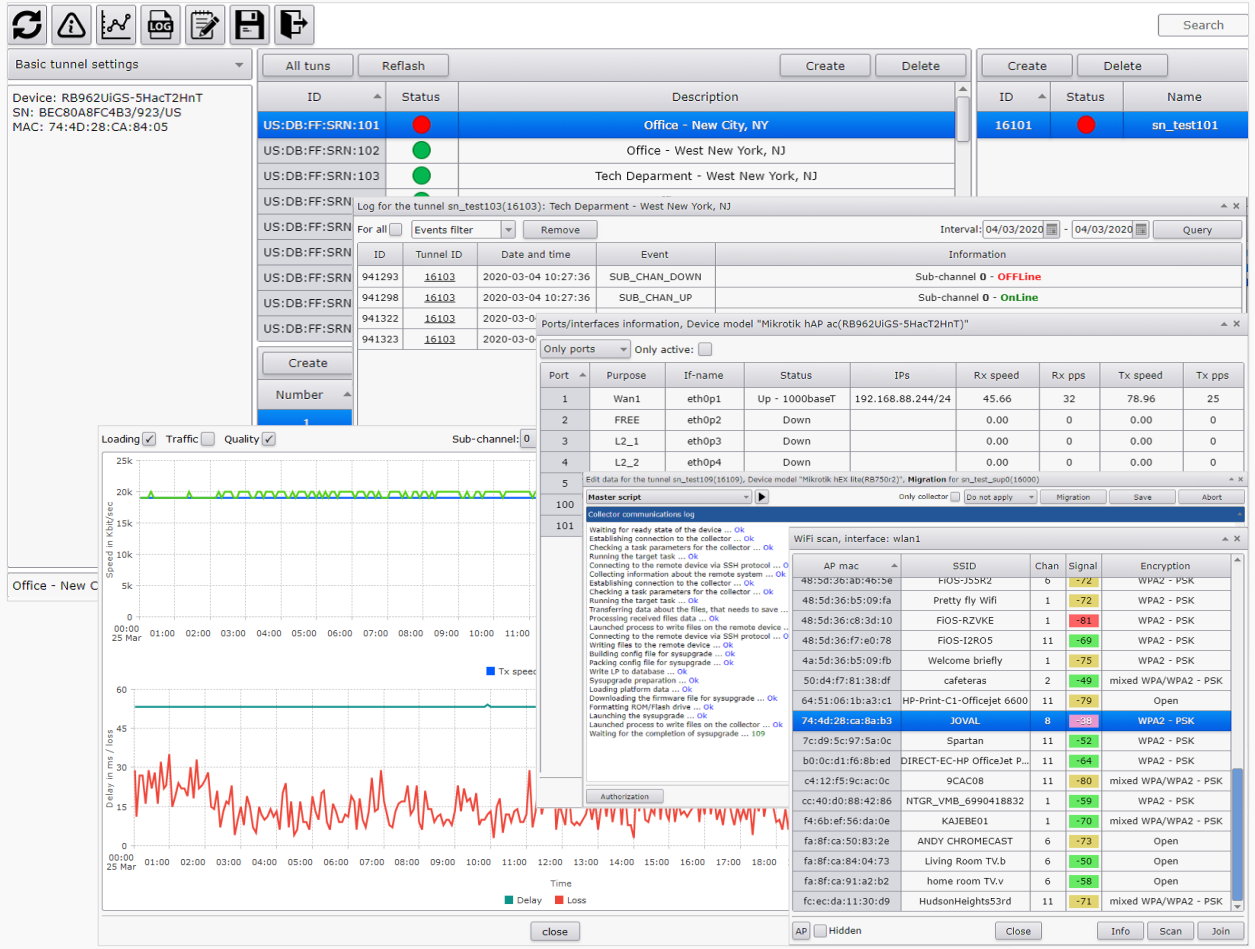
Combining multiple channels: HELIX provides bandwidth summation.

HELIX combines several communication channels in "summation" mode.



- Complete summation by adding the bandwidth of different channels (fiber, broadband, LTE, etc.) into a monolithic data channel.
- Built-in packet sequence recovery and jitter equalization mechanisms.
- Increased efficiency of bandwidth utilization by creating monolithic streams.

Monitor and Manager: HELIX provides a powerful interface to administer the network



- Monitor the status and loading of communication channels.
- Network engineer can evaluate the quality of tunnels and their subchannels in real-time, as well as their loading with useful data payload.
- Capabilities include uploading, saving, editing, and automatically creating configuration files for both the servers (HELIX Collectors) and subscriber devices (HELIX CPE).

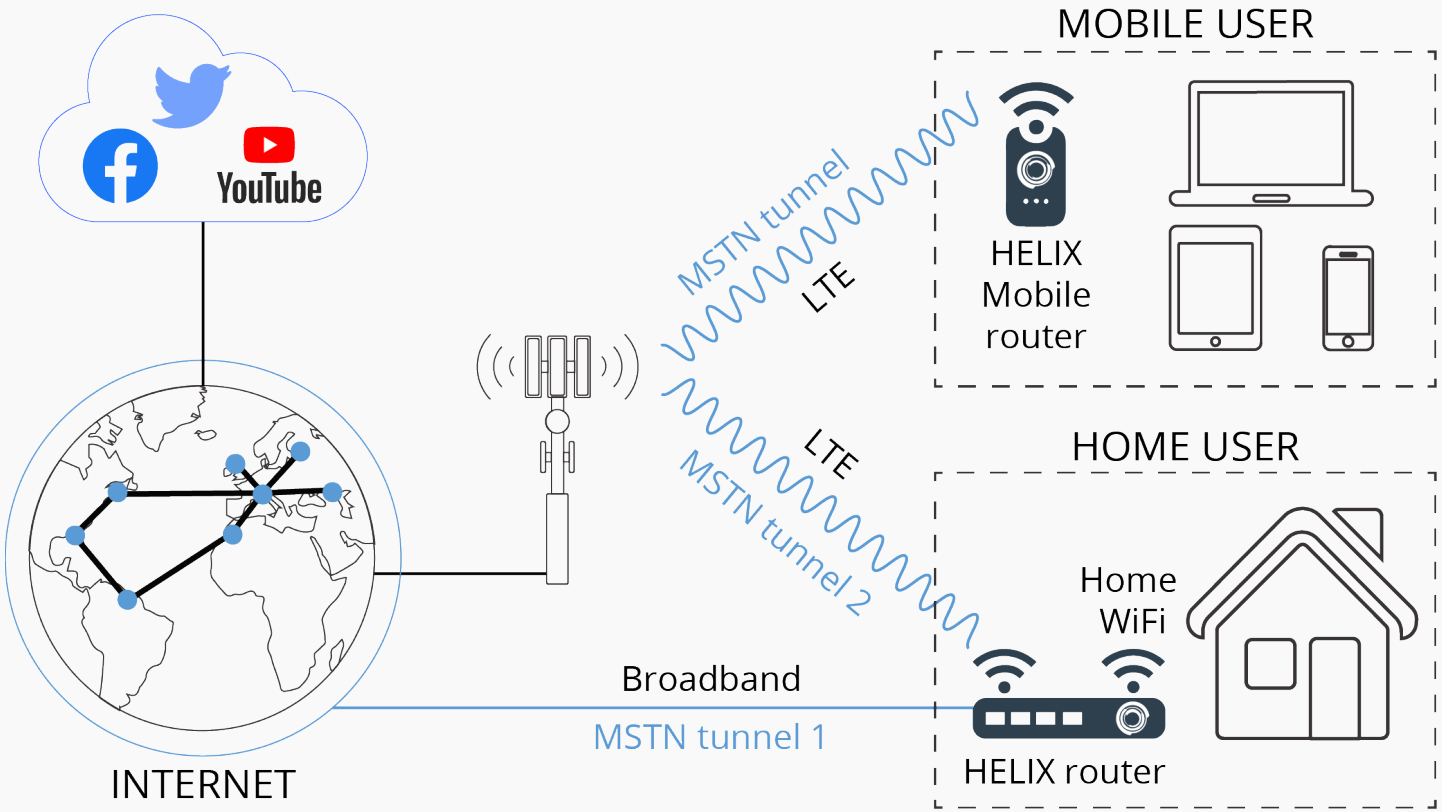
Built-In Loop Protection: HELIX provides built-in modules to protect against loops

For all | Events filter | Remove | Interval: 22/03/2020 - 30/03/2020 | Query

ID	Tunnel ID	Date and time	Event	Information
77786	19100	2020-03-29 05:01:54	SUB_CHAN_DOWN	Sub-channel **0** - OFFLine
77787	19100	2020-03-29 05:01:55	SUB_CHAN_DOWN	Sub-channel **1** - OFFLine
77788	19100	2020-03-29 05:01:55	SUB_CHAN_UP	Sub-channel **1** - OnLine
77789	19100	2020-03-29 05:01:55	SUB_CHAN_UP	Sub-channel **0** - OnLine
77798	19100	2020-03-29 19:23:16	LOOP_BEGIN	**Appeared** a loop on the interface **eth0p5**. pps = 4
77837	19100	2020-03-29 20:41:28	LOOP_END	**Disappeared** a loop on the interface **eth0p5**. pps = 0
77838	19100	2020-03-29 20:44:13	LOOP_BEGIN	**Appeared** a loop on the interface **eth0p5**. pps = 3
77854	19100	2020-03-30 00:42:18	LOOP_END	**Disappeared** a loop on the interface **eth0p5**. pps = 0
77878	19100	2020-03-30 00:45:41	LOOP_BEGIN	**Appeared** a loop on the interface **eth0p5**. pps = 3
77881	19100	2020-03-30 02:29:18	SUB_CHAN_DOWN	Sub-channel **1** - OFFLine
77882	19100	2020-03-30 02:29:18	SUB_CHAN_DOWN	Sub-channel **0** - OFFLine
77883	19100	2020-03-30 02:29:18	SUB_CHAN_UP	Sub-channel **1** - OnLine
77884	19100	2020-03-30 02:29:19	SUB_CHAN_UP	Sub-channel **0** - OnLine
77951	19100	2020-03-30 10:06:36	LOOP_END	**Disappeared** a loop on the interface **eth0p5**. pps = 0
77954	19100	2020-03-30 10:20:03	LOOP_BEGIN	**Appeared** a loop on the interface **eth0p5**. pps = 10
77957	19100	2020-03-30 10:33:11	LOOP_END	**Disappeared** a loop on the interface **eth0p5**. pps = 0
78030	19100	2020-03-30 17:59:40	SUB_CHAN_DOWN	Sub-channel **0** - OFFLine
78031	19100	2020-03-30 17:59:40	SUB_CHAN_UP	Sub-channel **0** - OnLine

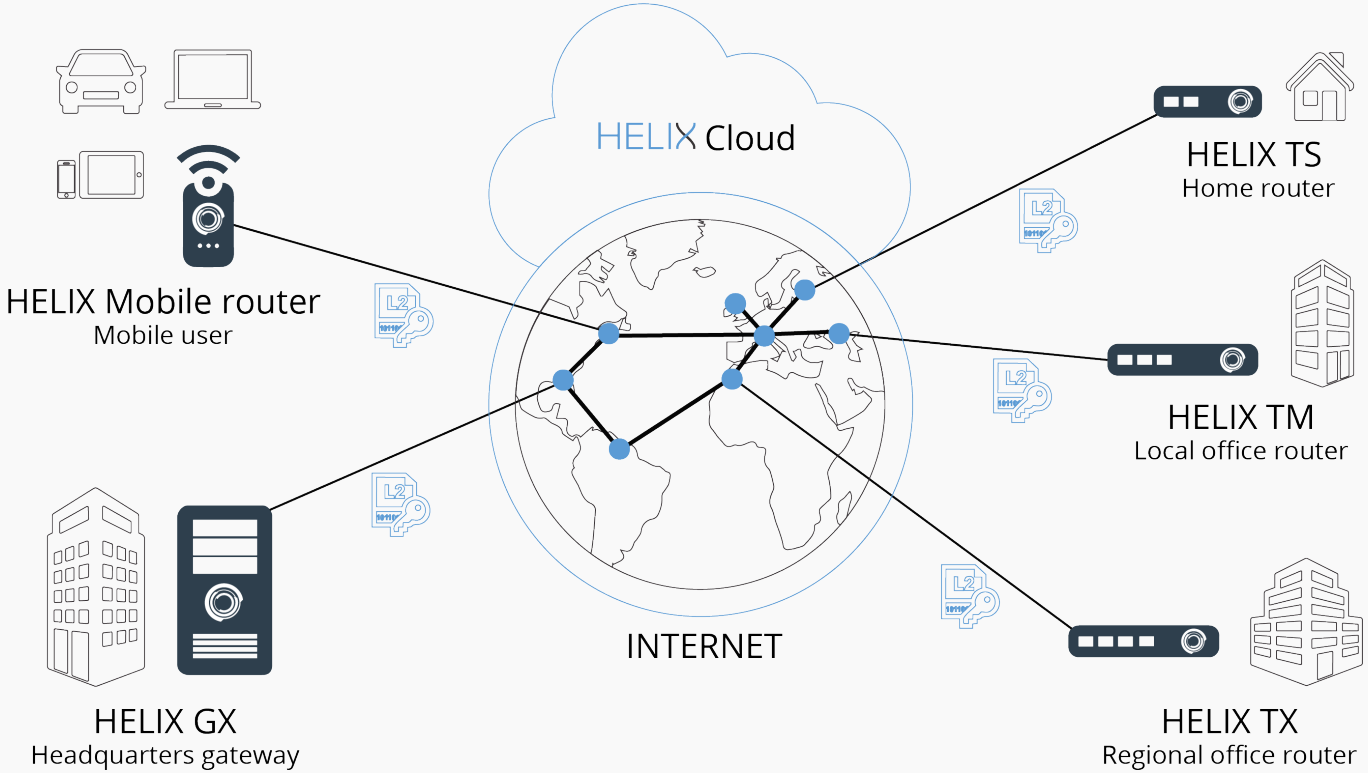
- Built-in A-Loop Module, which detects loops in a HELIX network.
- Supports both passive and active loop detection methods.
- In the passive method, A-Loop uses multicast and broadcast packet counts received.
- In the active loop detection method, A-Loop transmits a special Ethernet packet of a certain type every N seconds and analyzes response characteristics.

Last Mile Performance Boost: HELIX can enhance network connectivity to nearest POP



- On-Demand, simple L2 connectivity to boost last mile data connectivity over standard Internet
- Reduce latency and packet loss.
- Enhance security
- Improve bandwidth utilization.

Multi-industry solutions with HELIX Autonomus System



- HELIX for VOIP
- HELIX for IoT
- HELIX for Healthcare
- HELIX for Transport Networks
- HELIX for Financial Services
- HELIX for Educational Institutions
- HELIX for Public Networks
- HELIX for Media Networks

Learn more about the different applications of HELIX solutions: https://helixnetwork.world/solutions/

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Thank you!