Vcinity

ULTIMATE ACCESS

Introductions

Vcinity Team - Federal

Steve Wallo
CTO
sjwallo@vcinity.io

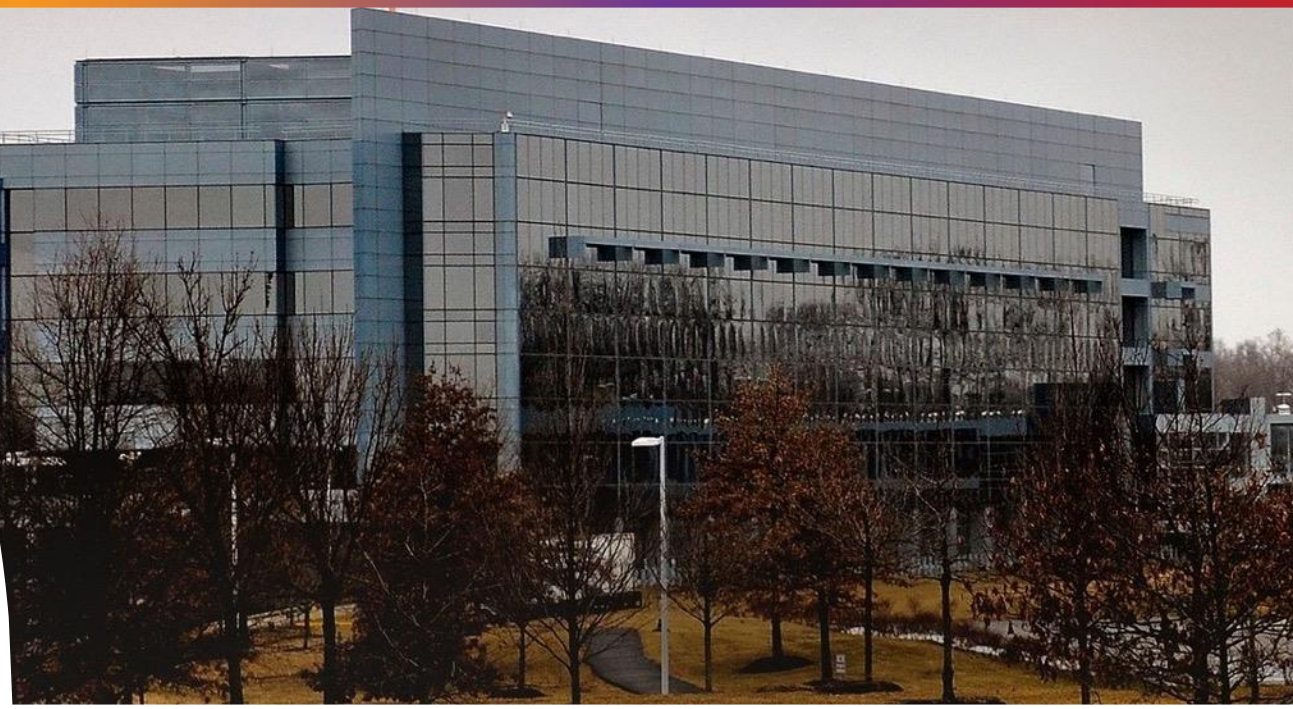
Craig Graulich
SVP of Global Sales & Federal
cgraulich@vcinity.io

Kim Roberts
Director of Sales, Federal DOD/IC
kroberts@vcinity.io
301-523-5467

Bob Johnson
Sr. Solutions Architect Federal
bjohnson@vcinity.io
703-350-2225

Vcinity

- Enables data movement and remote data access over the WAN at unprecedented speeds and distances
- $90 million in funding from the DOD/IC
- Deployed in mission critical networks for >10 years
- Extensive patent portfolio
- COTS Technology Offerings
- Dell OEM Engineered Solution

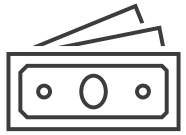


Data location is often at odds with mission objectives

Vcinity connects the right data,
at the right time,
to the right person or app,
to create advantage…

… It's about time-to-insight time-to-decision time-to-action.

Delays in mission-critical data



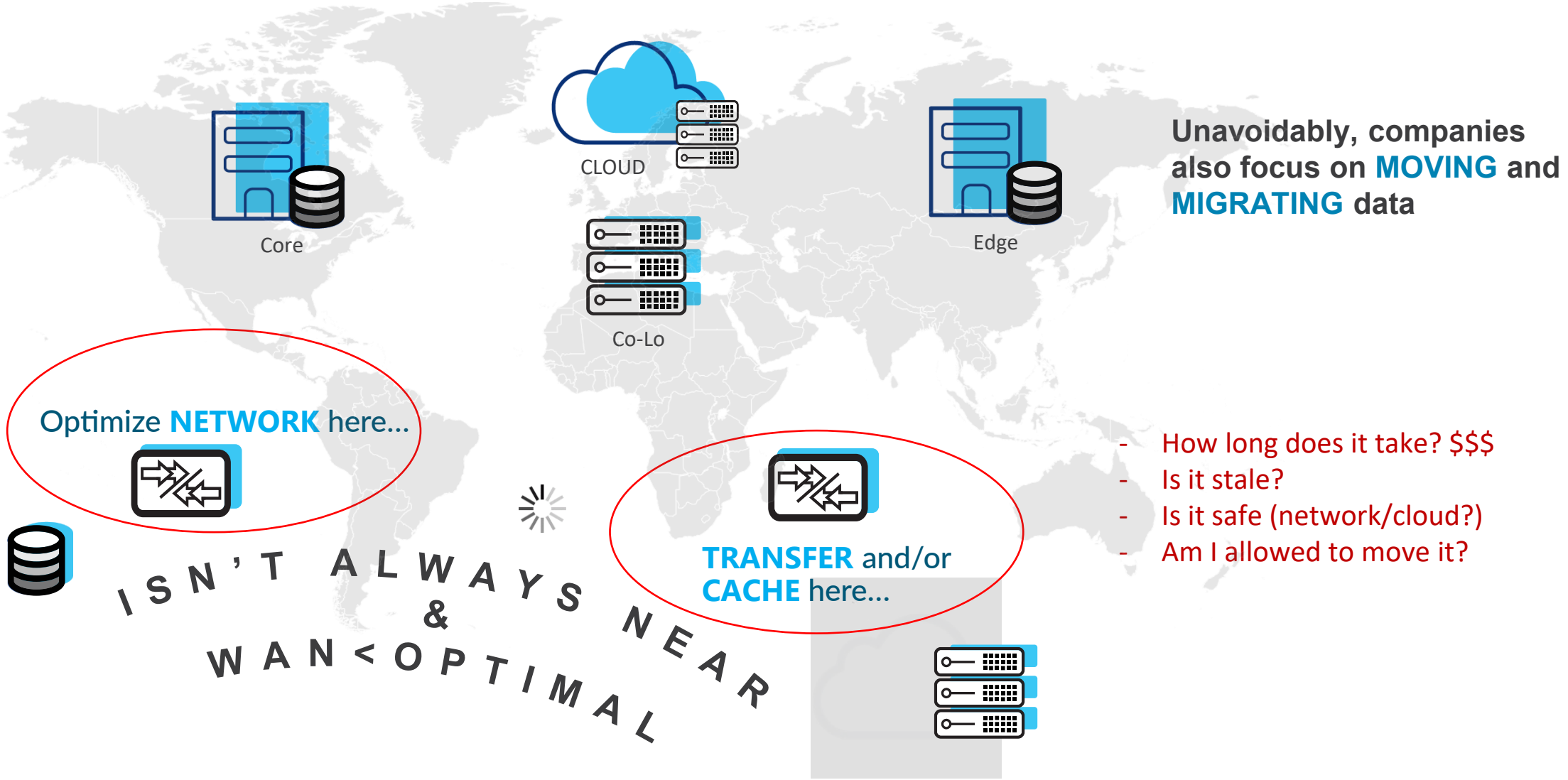
Increased infrastructure + operational costs

Deceased security from copy sprawl

Competitive disadvantage to adversaries

Delays time to insight, decision, and action

Data is Everywhere
….but is it where it's needed?



Unavoidably, companies also focus on MOVING and MIGRATING data

- How long does it take? $$$
- Is it stale?
- Is it safe (network/cloud?)
- Am I allowed to move it?

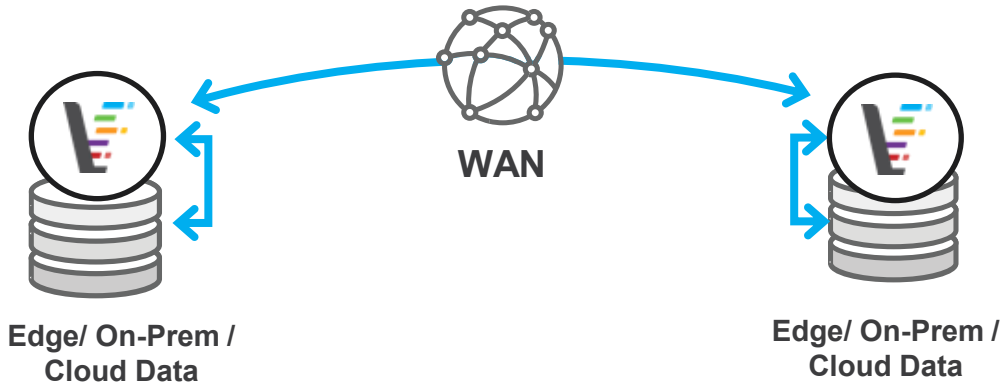
Traditionally the data still must be near the compute and network usage is sub optimal

Vcinity Edge Access

…a continuous data pipeline

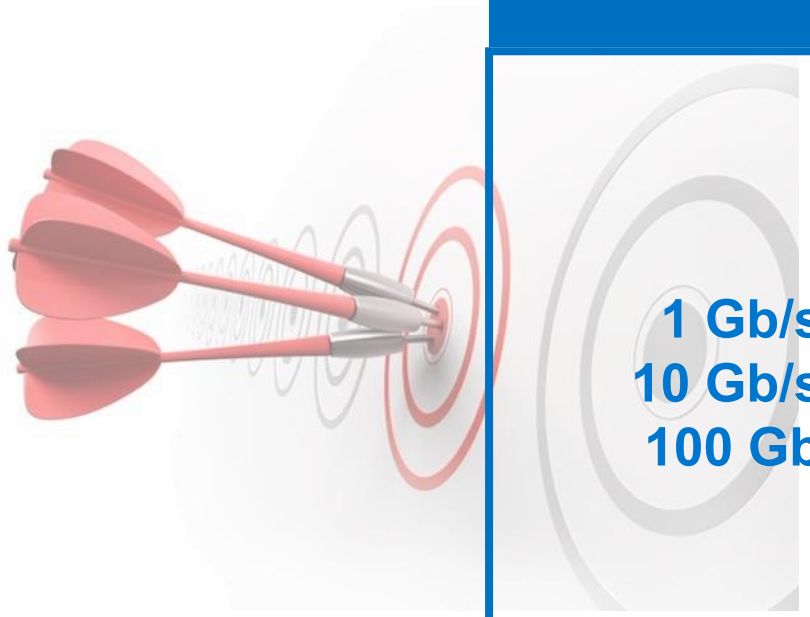
HYPER-FAST DATA MOVEMENT

Accelerated data movement from edge to core to cloud, even over low bandwidth/ high-latency links



- **Accelerate data transfer from Edge to core to cloud:** deliver a capability that is not available anywhere else
- **Extend value of existing infrastructure:** Vcinity can deliver data faster, enabling enhanced outcomes and business value

VCINITY PERFORMANCE



Data Transfer rates <24 hours

1 Gb/s – 10 TB
10 Gb/s – 100 TB
100 Gb/s – 1 PB

No Compression or De-Duplication

Vcinity Edge Access

…a continuous data pipeline

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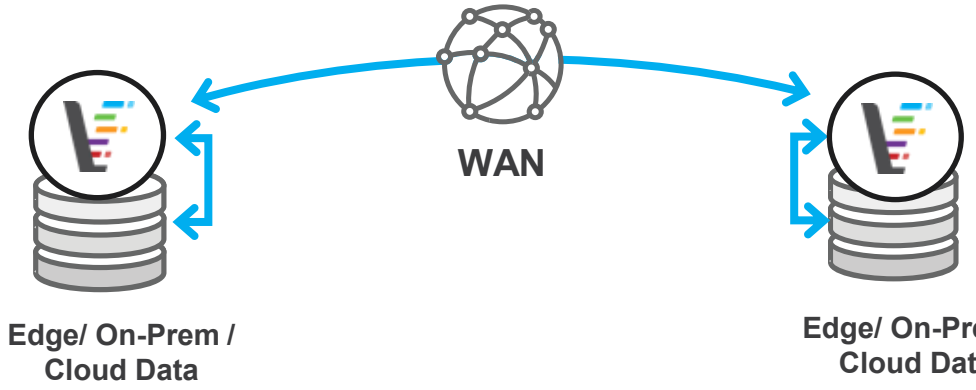

- **Accelerate data transfer from Edge to core to cloud:** deliver a capability that is not available anywhere else
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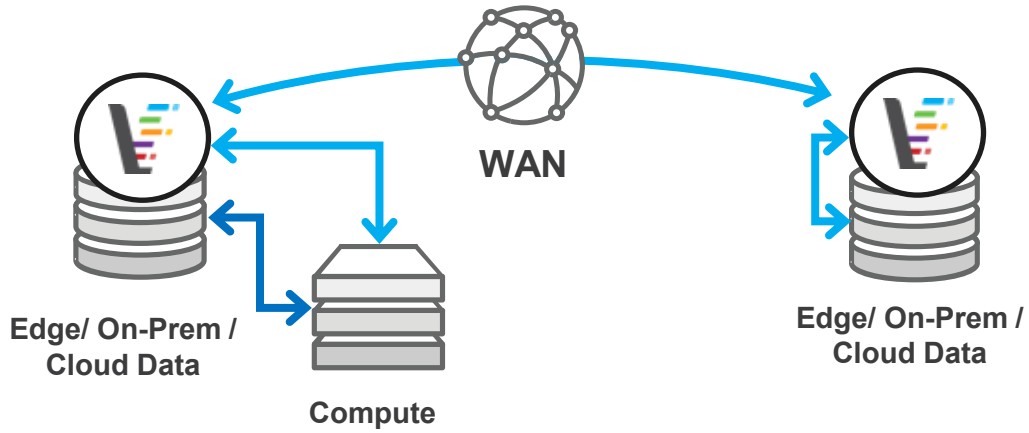
REMOTE DATA ACCESS

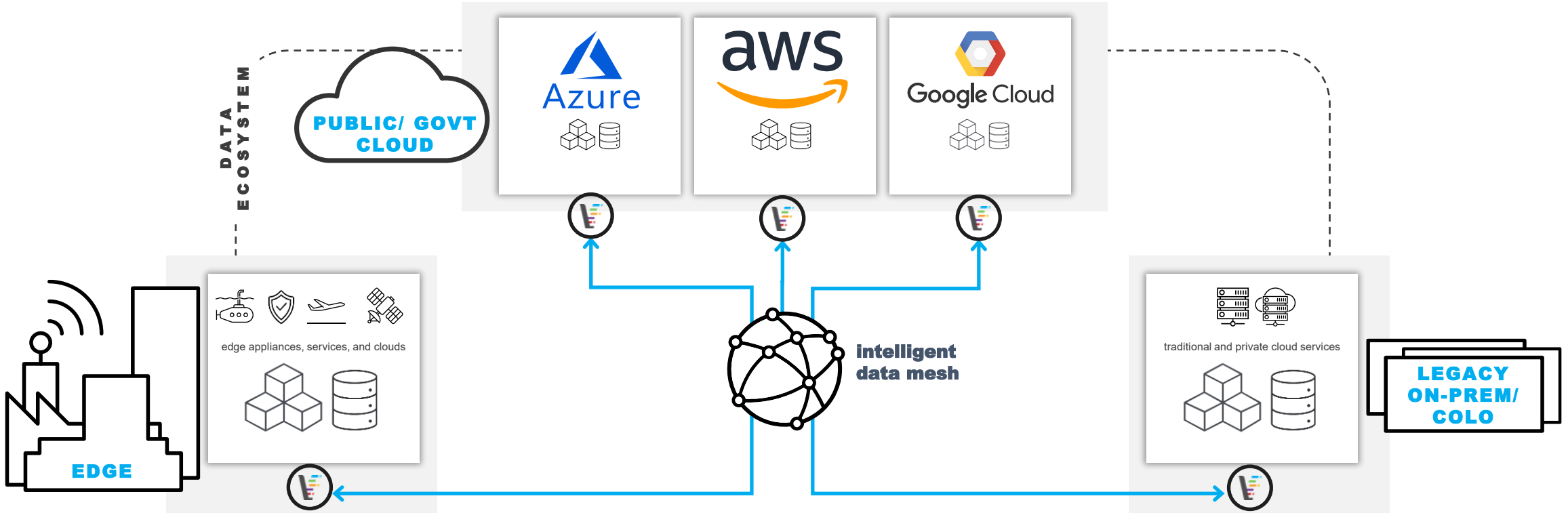
Enable real-time application compute on any data, across any distance, at any scale



- **Application flexibility:** Enable data access and utilization to users on-premises or in the cloud, no waiting for data transfers!
- **Global scalability for dispersed or hybrid environments**: Instantly share data at scale across great distances without creating copies

Vcinity enables an Intelligent Data Mesh

Creating a continuous data-pipeline from edge to core to cloud



MODERN OPERATIONAL EXPERIENCE

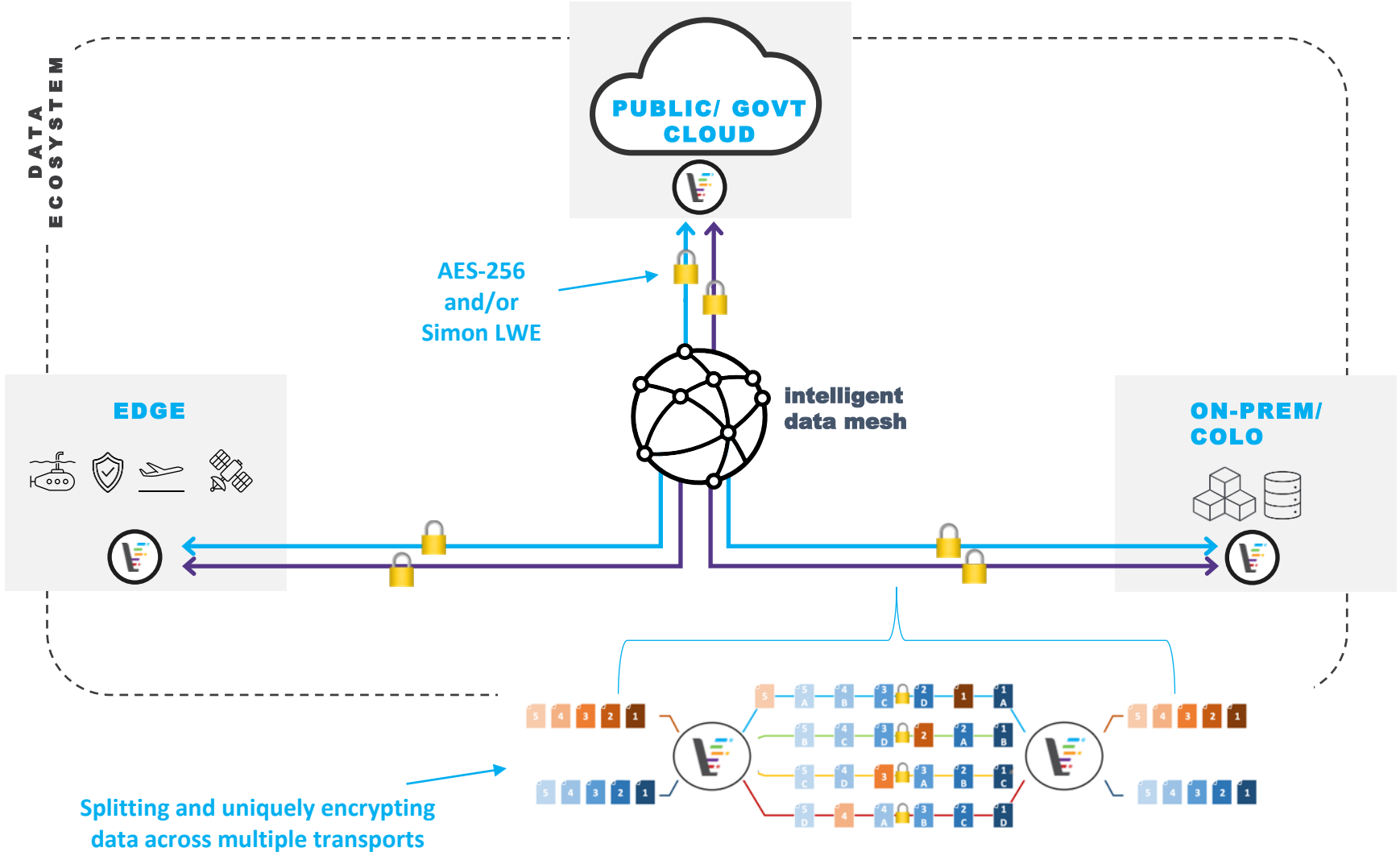
Flexibility and control to operate seamlessly across hybrid, multi-cloud environments

ACCELERATED DATA MONETIZATION

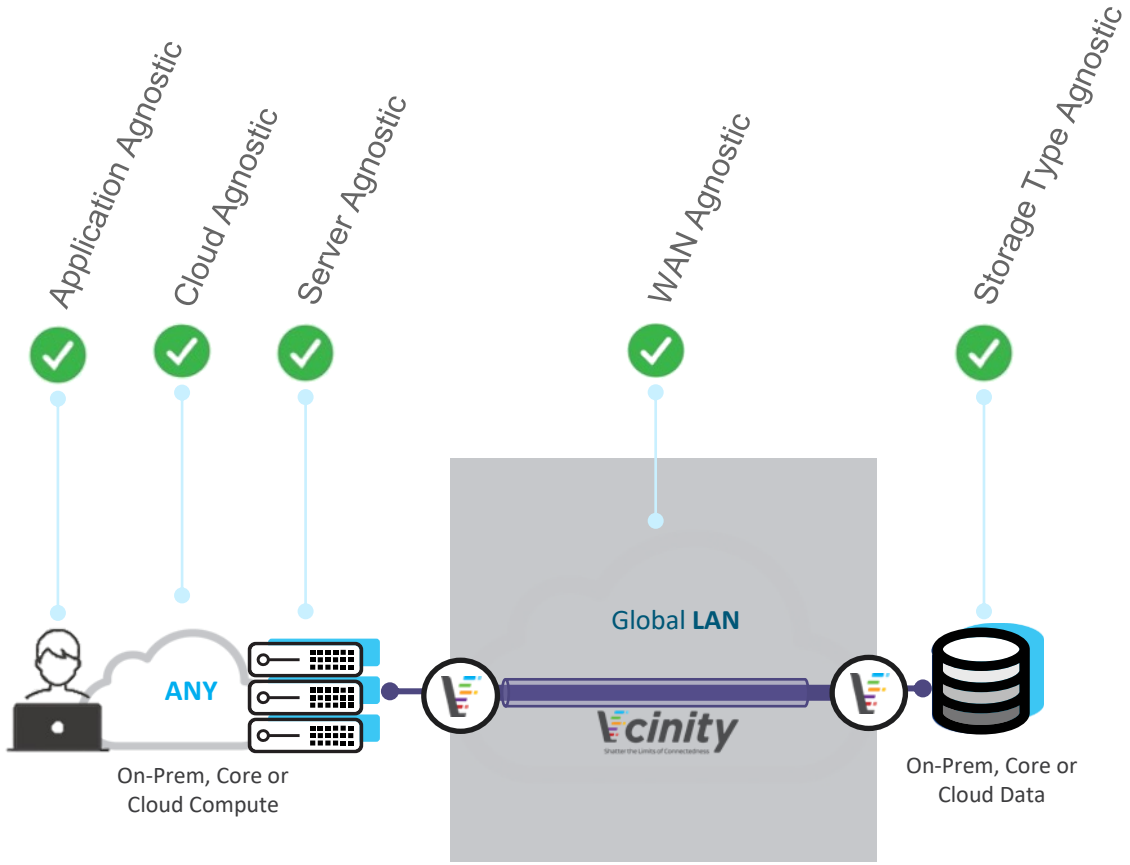
Consistent, secure, real-time access to data anywhere to fuel intelligent insights and action

Specifically, a Secure Intelligent Data Mesh

Protecting data in-flight through encryption and obfuscation



Fast Access to your Data without Compromise

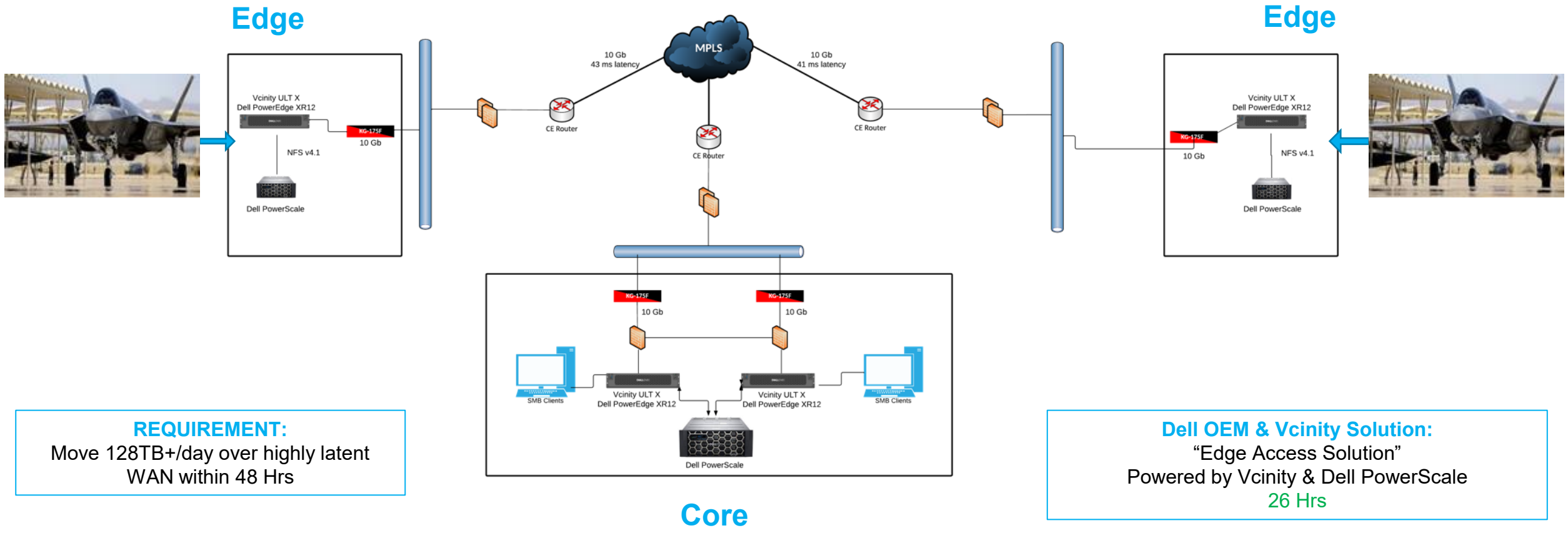


- Don’t touch the data
- No changes in application
- No compression, no de-dup
- No SW or agents to install
- No WAN accelerators, No Edge Filers
- No Caching Appliances
- No Changes on Physical LAN
- No Changes to the Storage

Examples

Vcinity FSI Aeronautics

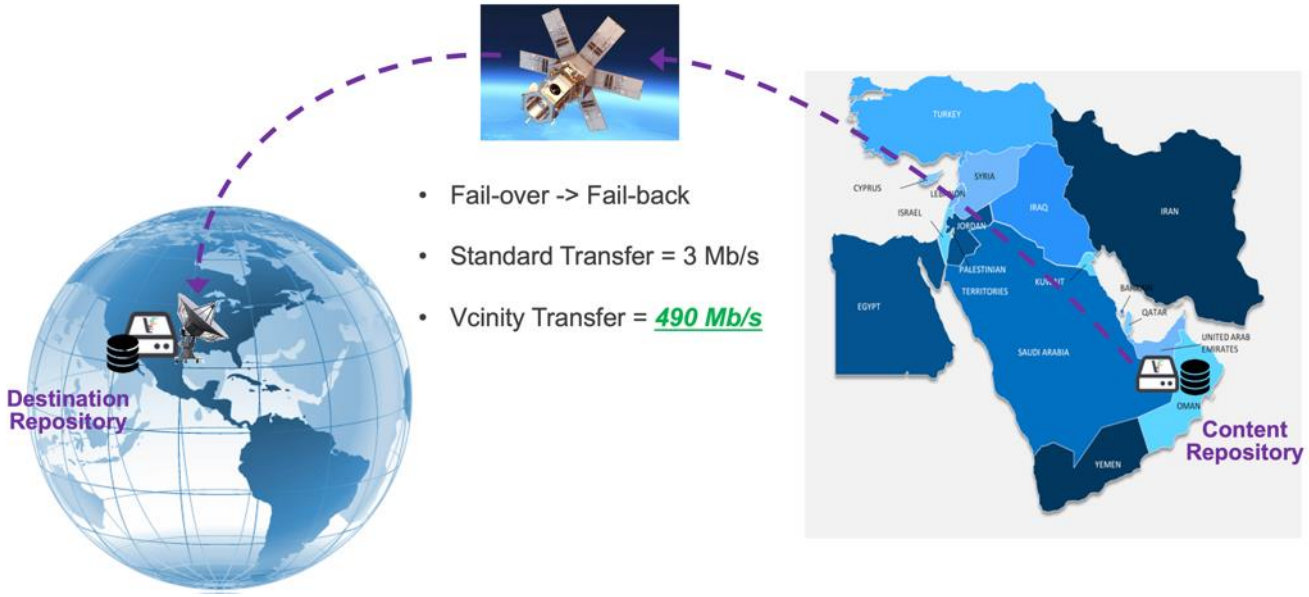
Edge Data Transport



REQUIREMENT:
Move 128TB+/day over highly latent WAN within 48 Hrs

Dell OEM & Vcinity Solution:
"Edge Access Solution"
Powered by Vcinity & Dell PowerScale
26 Hrs

Test Case: Space Force



About test case:

Tested Failover and Performance

- Multiple links were tested for combining bandwidth and failover between links
- The circuit was 500 Mb/s at 500ms of latency
- All failover/failback testing was successful
- Performance went from 3 Mb/s (traditional) to 490 Mb/s with Vcinity

Benefits:

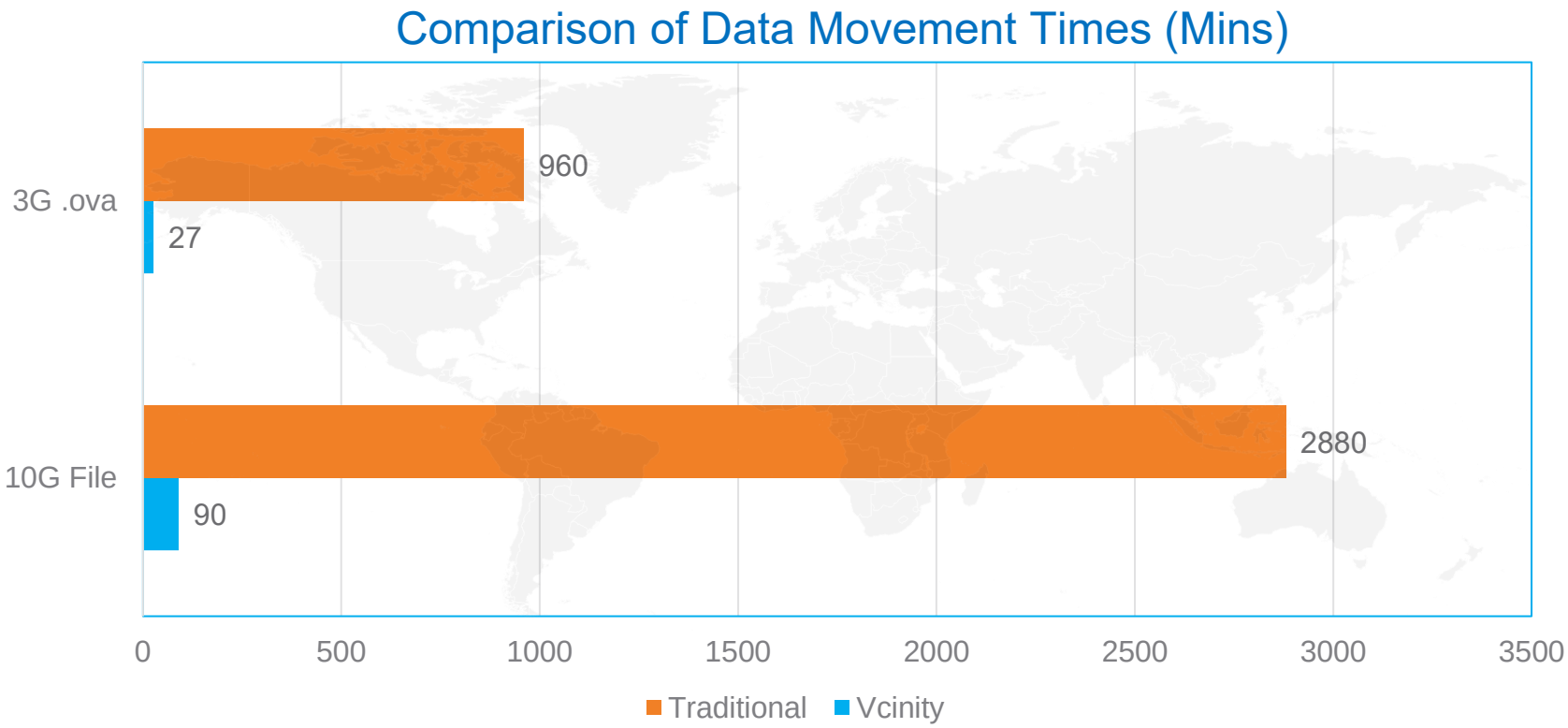
- Faster movement of data over satellite networks
- Ability to aggregate link for more bandwidth
- More efficient throughput requires less bandwidth
- More predictable transfer times

Ship to Shore via Satellite

- Reduced time to transfer 3GB .ova file from 1.5 Hours down to 27 minutes
- Reduced time to move 10GB file from 48 Hours down to 90 minutes

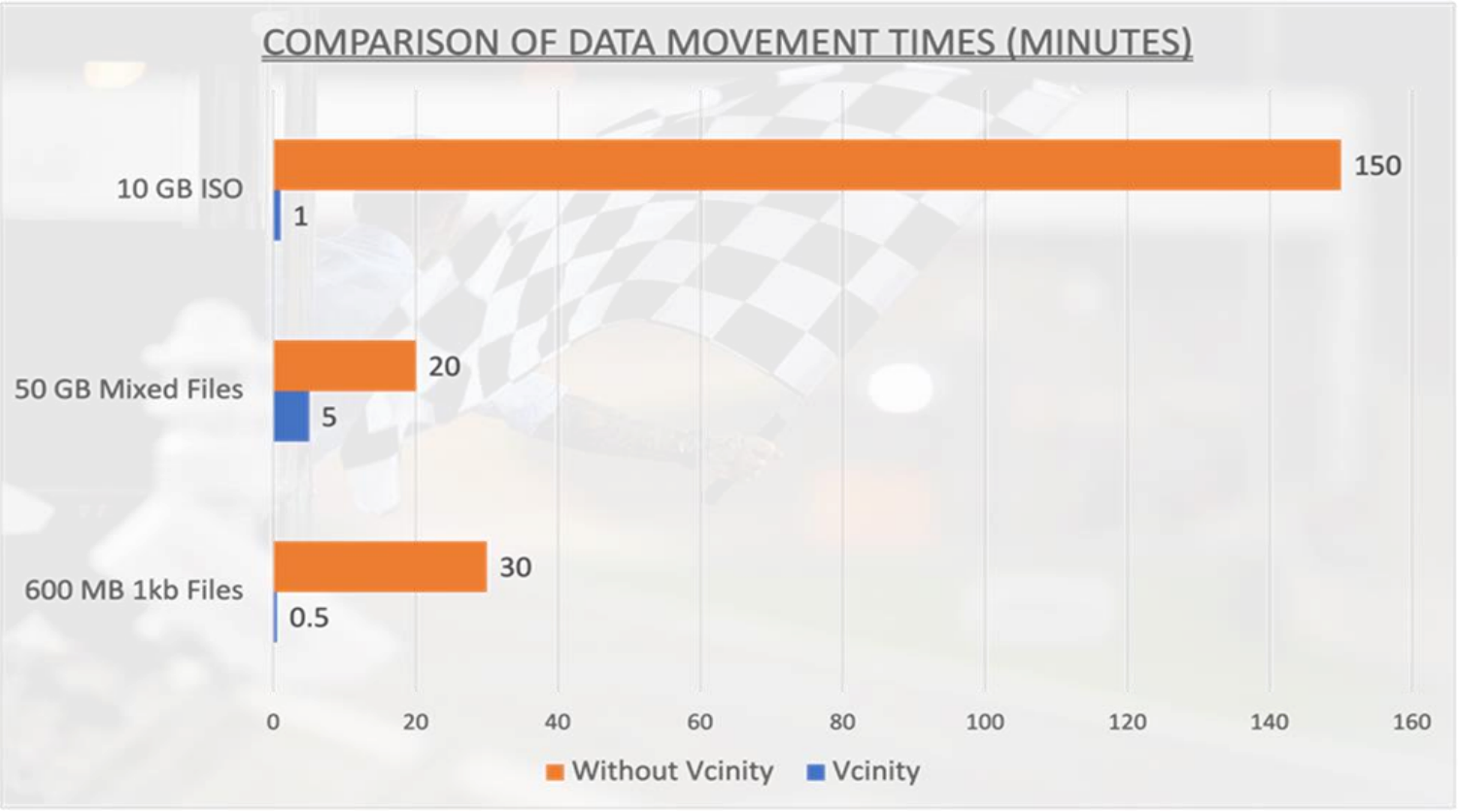
200 – 300 M/S

BW – 20 Mb/s

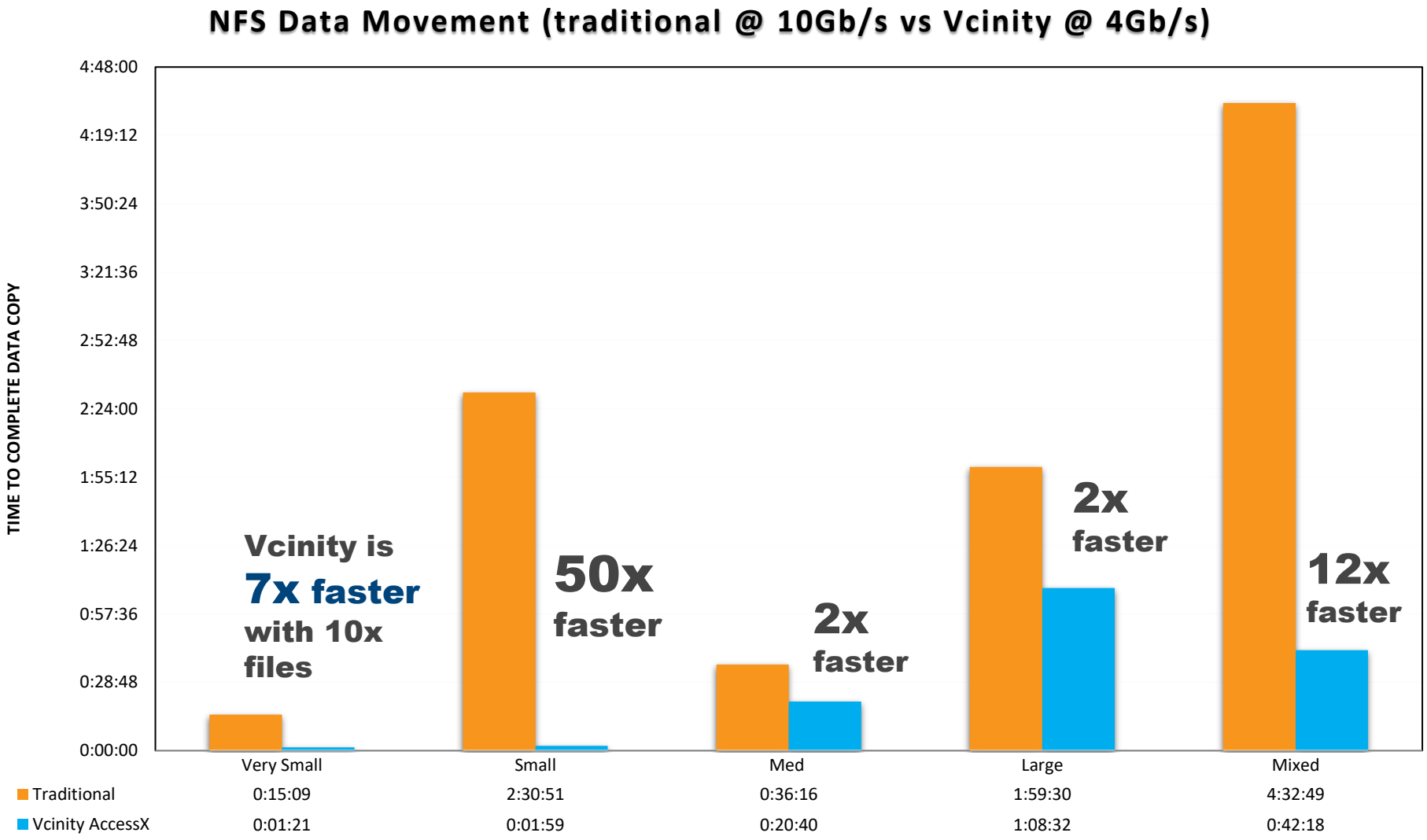


Results – F1 Racing Team

- Reduced time to transfer 50GB mixed file set from 20 minutes to 5 minutes
- Reduced 600MB mixed file set with 1kb files from 30 minutes to 90 seconds
- Reduced time to move 10GB iso from 2.5 hours down to 60 seconds



Results – Mixed Files Size Types



Use Case: DOD/ Remote Image Analysis

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TRADITIONAL TECH

	Timestamp
Zoom Out	:15
New Coordinate	:39
Zoom In	:52
Annotate Image	1:05
Finished	**65 sec**

Analyst accessing data from <300 miles away

Plus 24 hours to get the data flown to the US

WITH VCINITY

Timestamp	
:03	Zoom Out
:14	New Coordinate
:17	Zoom In
:22	Annotate Image
22 sec	Finished

Analyst accessing data from a global distance

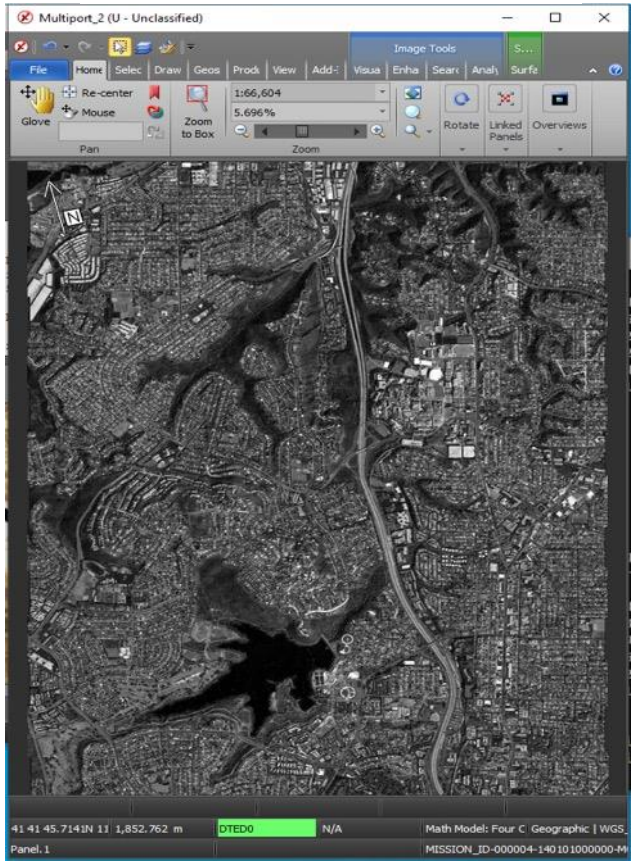
Proof of Concept Scenarios

- Executed a series of scenarios with SOCET GXP, with and without RSETs pre-generated
- Measure time from ‘Open File’ request to ‘File Usable’ in SOCET GXP

Observations:

- Changes to Network Latency **negatively impacted** opening files over the network when using SOCET GXP Only.
- Changes to Network Latency **did not impact** opening files over the network when using SOCET GXP and Vcinity.
- **Over 100 Simultaneous Users** Simulated with no noticeable degradation

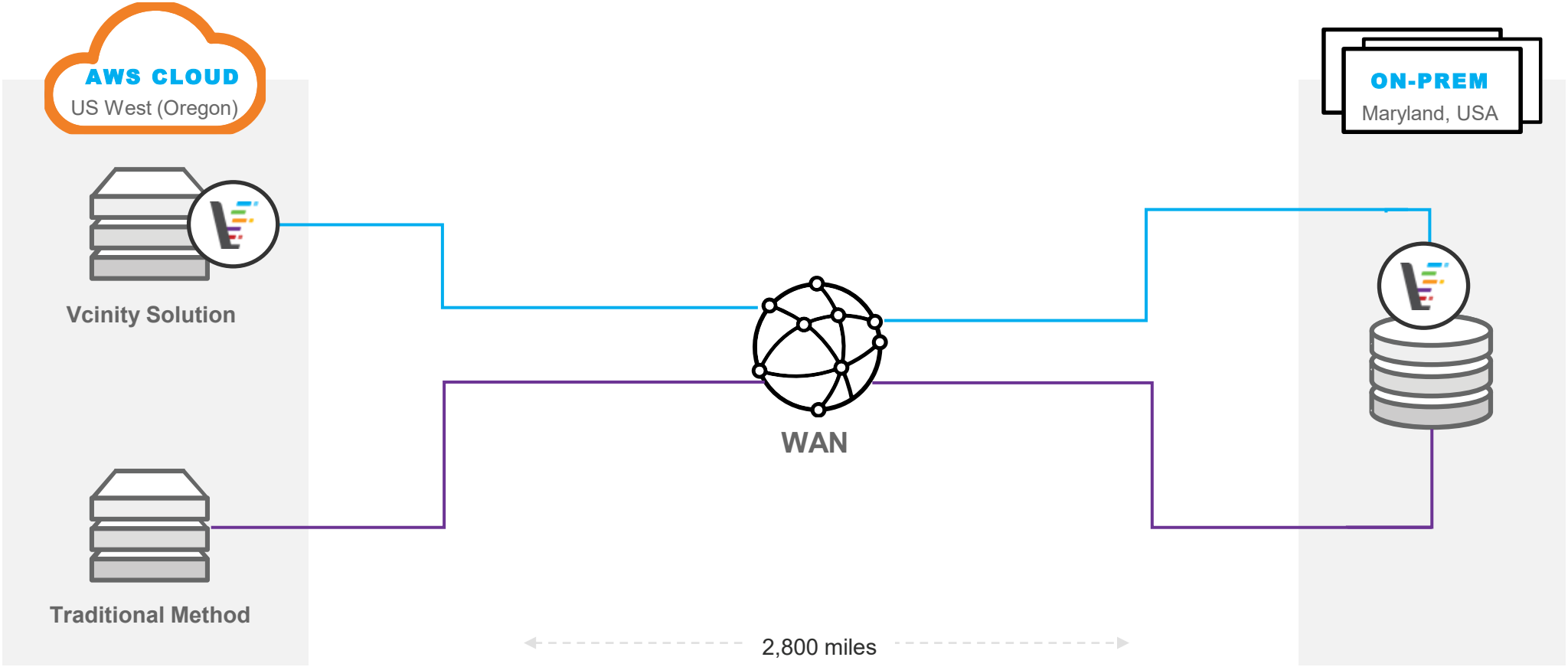
Space Dynamics Laboratory
Utah State University



Emulate GH B30. ~130MB with 52 MB for RSET

Live Demonstration

Data movement and remote data application execution

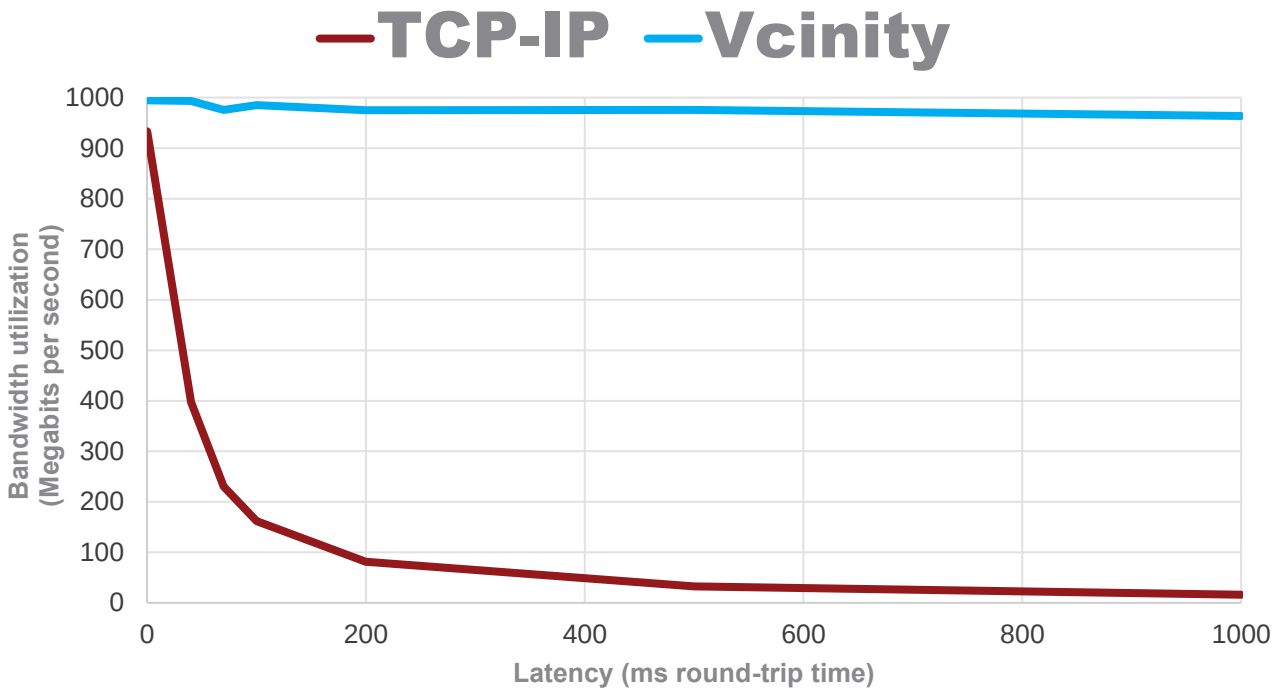


How it Works

What we do

Create a continuous data pipeline by using the network for data instead of overhead

- **Vcinity sustains throughput over distance**
  - ✓ >90% of allocated bandwidth per flow
  - ✓ End to End flow-control
- **Advanced error correction and recovery**
- **Works over any IP based transport**
  - ✓ Internet
  - ✓ Dedicated links
  - ✓ Satellite
  - ✓ 5G / LTE



1 GB file copy over 1 Gb/s (1000 Mb/s) Ethernet WAN

Filling the pipe

Goodput versus Throughput

Folks will argue that the entire pipe or bandwidth is being utilized.

- But what is filling that pipe?
- Is it data? *(Which we are calling Goodput)*
- Or is it a combination of Goodput and Overhead?

Goodput + Overhead = Throughput

The percentage of Goodput varies under TCP & UDP Protocols due to Overhead.

Filling the pipe continued…

Limitations with Traditional Protocols

TCP – Found on the Transport Layer (4) is the Transmission Control Protocol (TCP), which is built on top of the Internet Protocol (IP), Layer (3) commonly known as TCP/IP.

High Overhead – Leaving the remainder for Goodput of data.

Good for error recovery (Without Latency), Resends transmissions

UDP – The User Datagram Protocol (UDP) is a connectionless communication protocol for transporting packets across networks.

Low Overhead *(From a pure network perspective)*

No Error Recovery at the network layer

Recovery Responsibility moved up the stack

Filling the pipe continued…

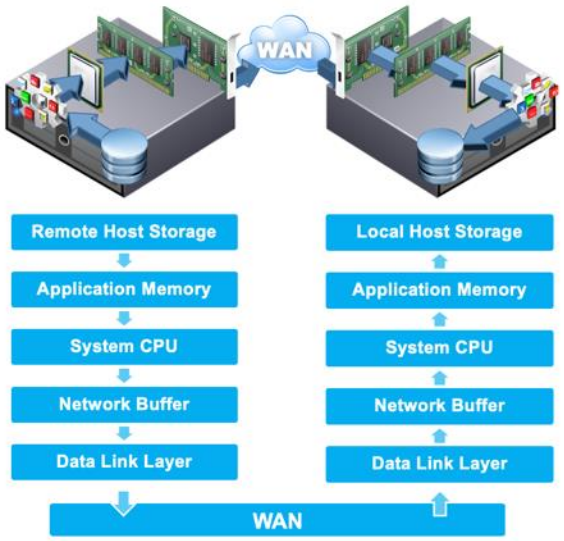
What kills the effective use of these techniques?

WAN Distance (…aka Latency)

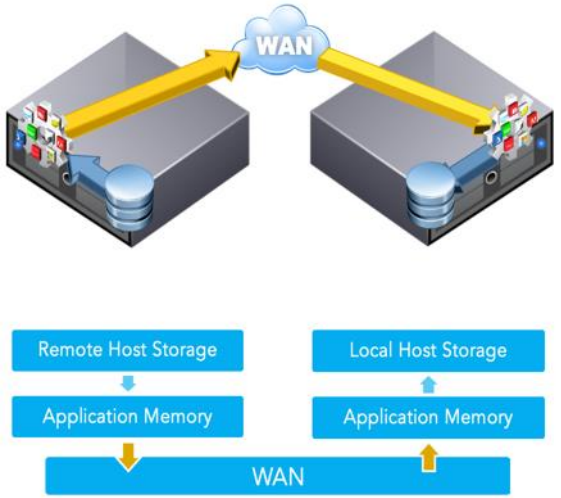
Filling the pipe continued…

So, what to do?

TCP



RDMA

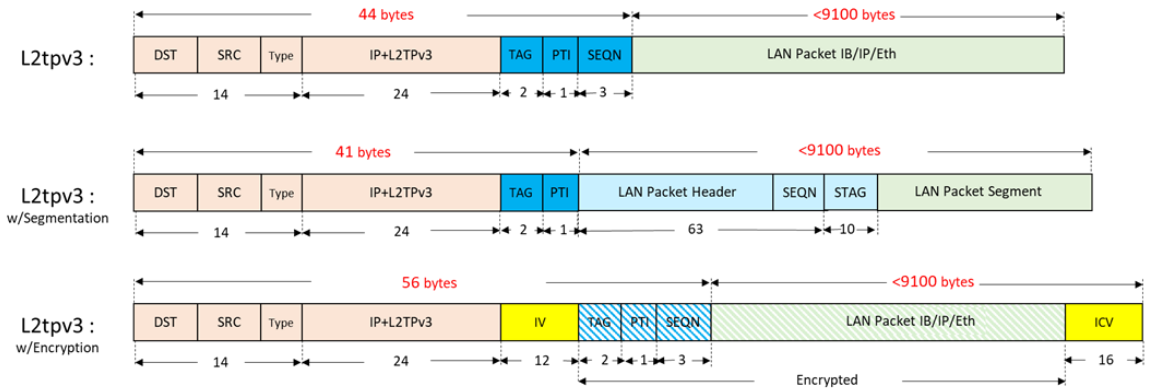


RDMA Pros: Highly Efficient (HPC Protocol), Lightweight, Very Fast

RDMA Cons: Can't work over distance***** ***Until Now***

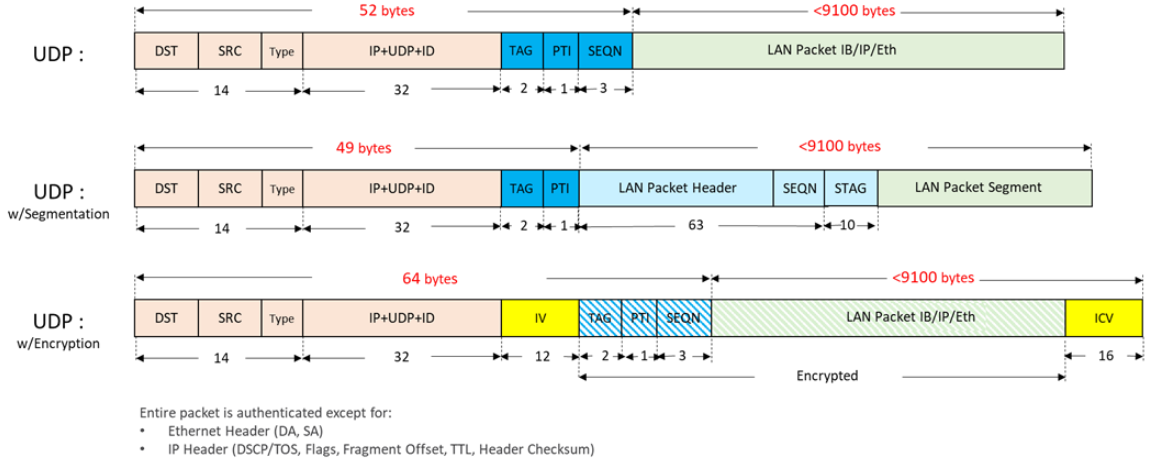
Encapsulation

L2TP over IP



L2TPv3 over IP utilizes the IANA-assigned IP protocol ID 115

L2TP over UDP



Entire packet is authenticated except for:
- Ethernet Header (DA, SA)
- IP Header (DSCP/TOS, Flags, Fragment Offset, TTL, Header Checksum)

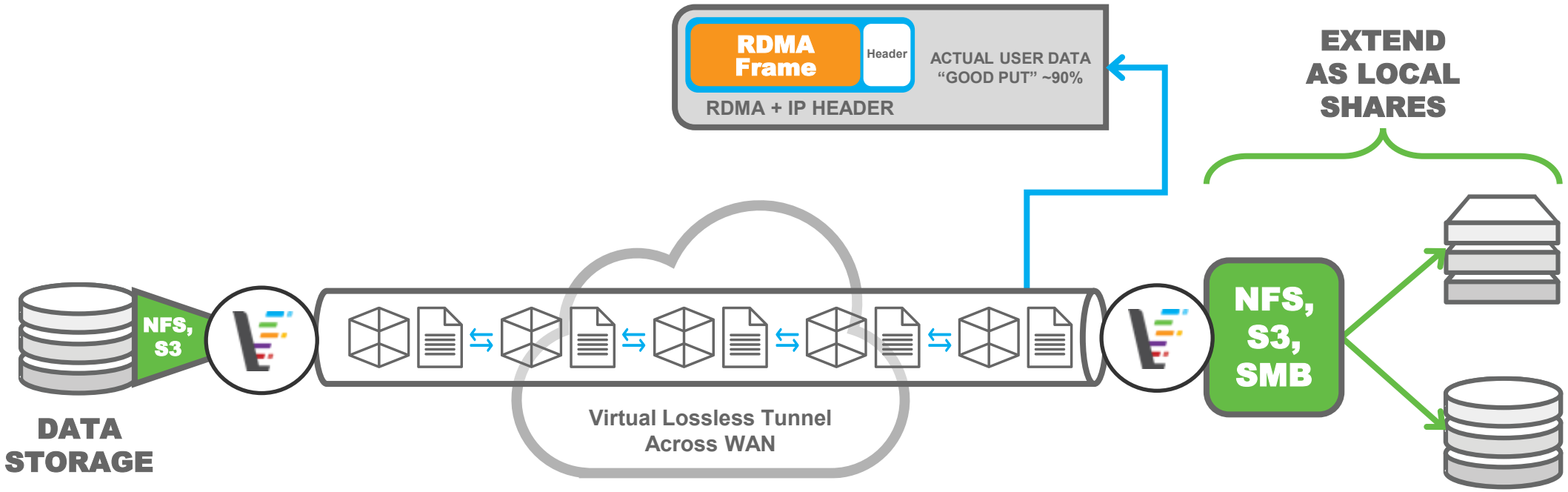
L2TPv3 over UDP utilizes the IANA-assigned IP protocol ID 17

The default UDP port is 1701 (L2TP)

IANA-defined UDP ports should NOT be used for L2TP encapsulation configurations. Suggested UDP port numbers to use are between 18,000 and 65,536

How we do it

Creating a virtual, lossless network



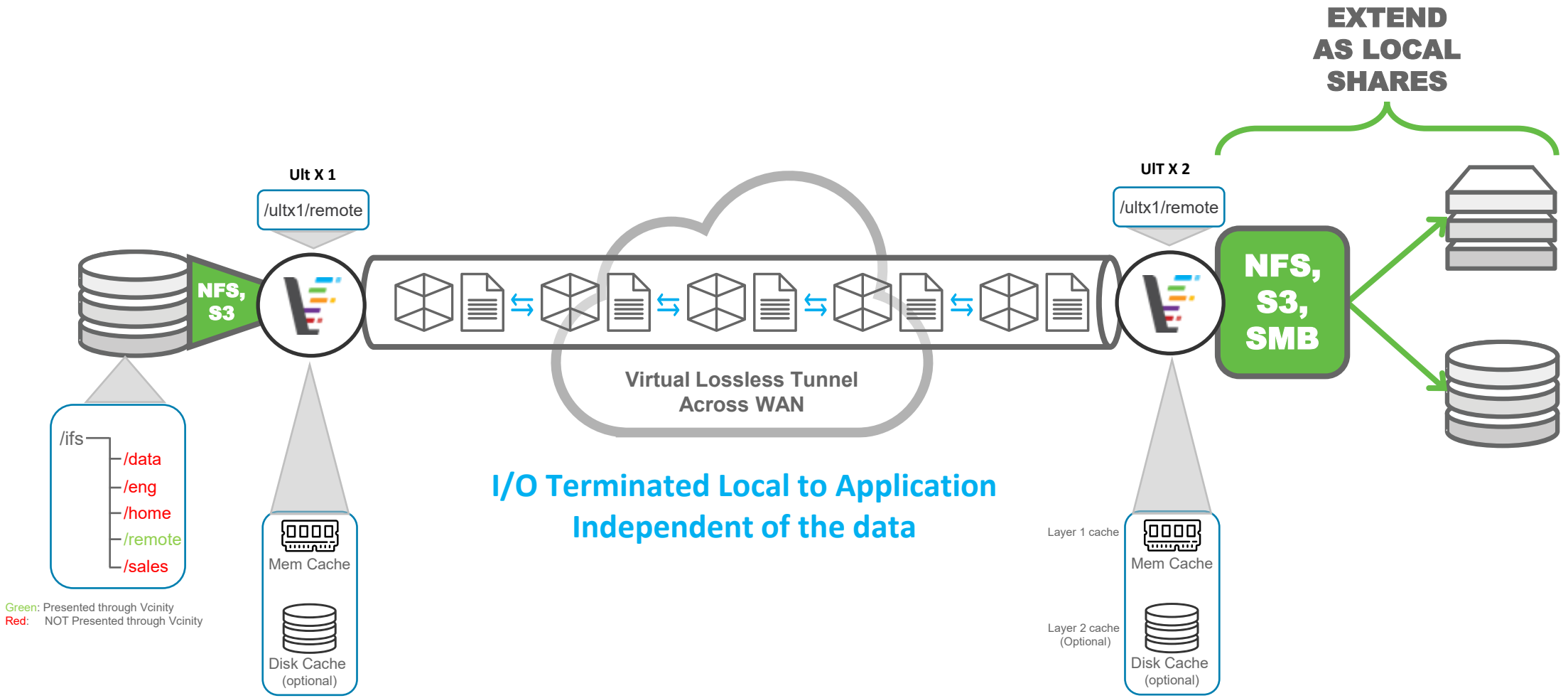
Utilize RDMA over the WAN

Secure the connection between nodes

No compression or de-dupe – not manipulating the data

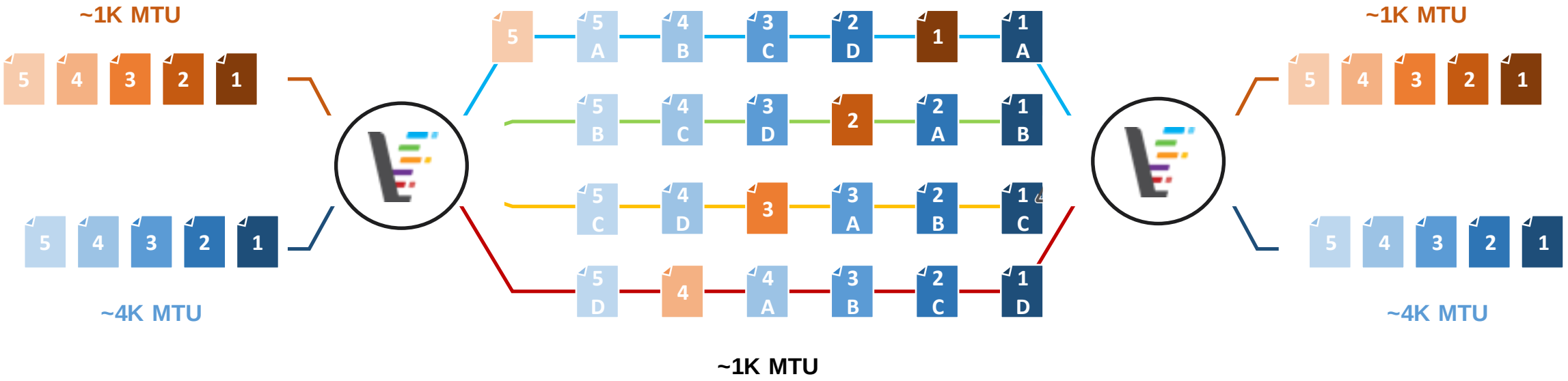
How we do it Continued…

Creating a virtual, lossless network



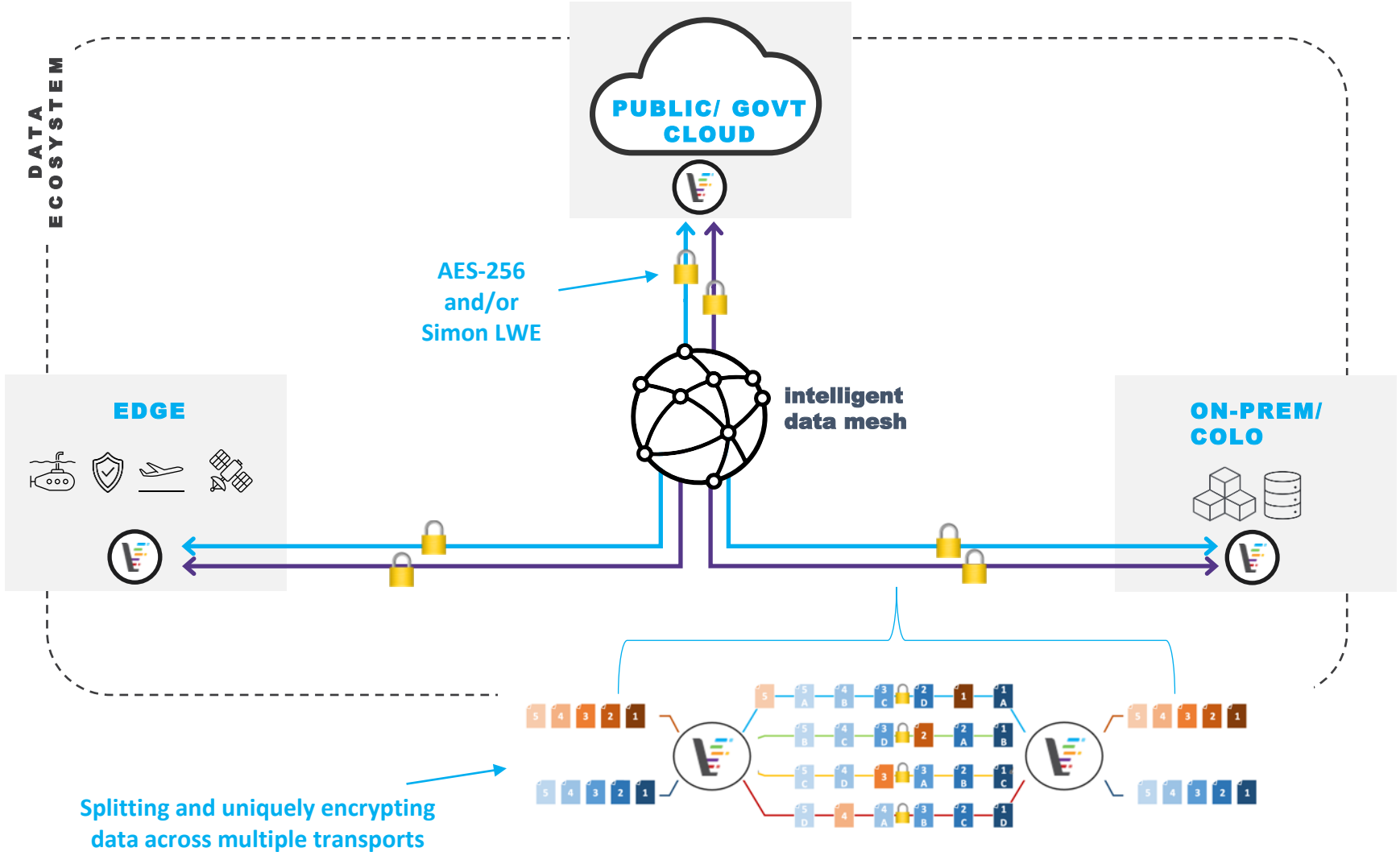
DataPrizm Concepts

Two flows with two, four-color DataPrizms with Segmentation



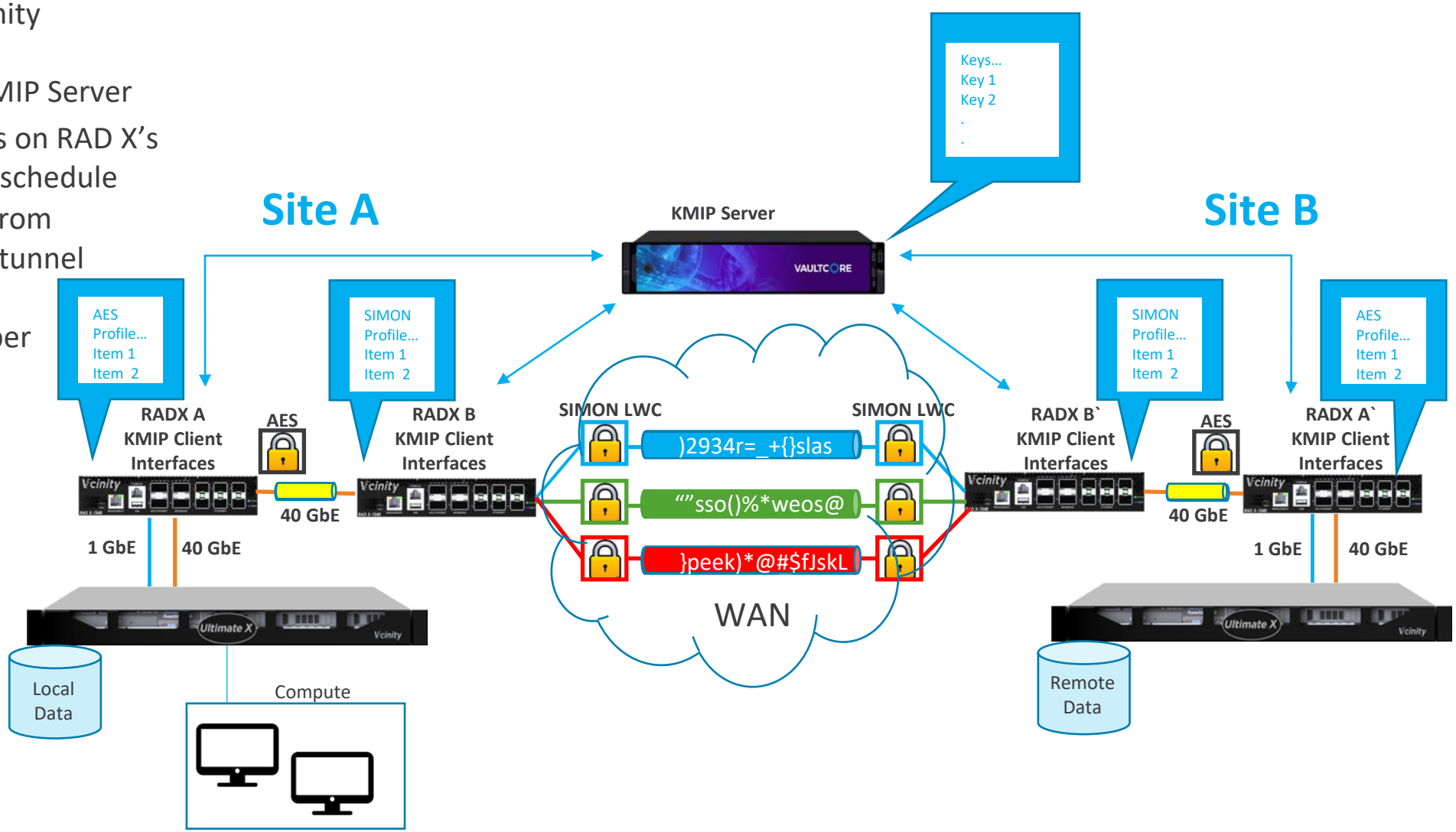
Specifically, a Secure Intelligent Data Mesh

Protecting data in-flight through encryption and obfuscation



Secure Transport

- Install TLS certs for KMS on Vcinity RAD X clients
- Generate symmetric keys on KMIP Server
- Create KMIP encryption profiles on RAD X's - define key rotation and rekey schedule
- RAD X's fetch block of 10 keys from KMS KMIP server and apply to tunnel (KMIP client)
- RAD X's rotate keys and rekey per encryption profile schedule



The product portfolio…

Vcinity ULTIMATE ACCESS

Application Services
ULT X & VAccess

VM Up to ~2G

Bare Metal
Up to ~4G

S3 3xVM
Up to ~5G

Various Scale
Out & Scale Up
Optional
Configurations

Network Services
RAD X

Software Only

4x10G

4x25G

2x100G

R6525, R650, XR11, XR12 or XR4000

R750xa