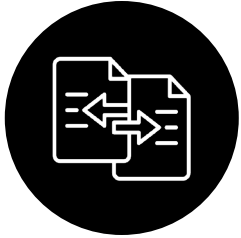# Simulations across borders
Using SPDRM's multi-site collaboration to unite global teams

Menelaos Pappas
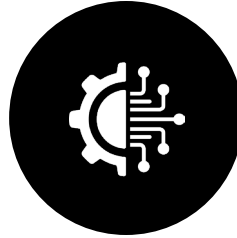
Problem Description
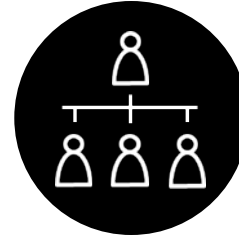
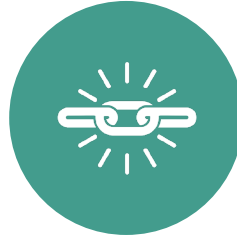| Information sharing and data transfer	Security and data protection	Infrastructure and technology	Organizational differences	Communication and coordination

Solutions

File access and caching

Data transfer optimization

Robust data transfer

Encrypted communication

Cloud compatibility

System Architecture

Front-end

Client Apps

SPDRM Client

ANSA

META

3rd party app

Back-end

Data Server

SPDRM Server

Data Vaults
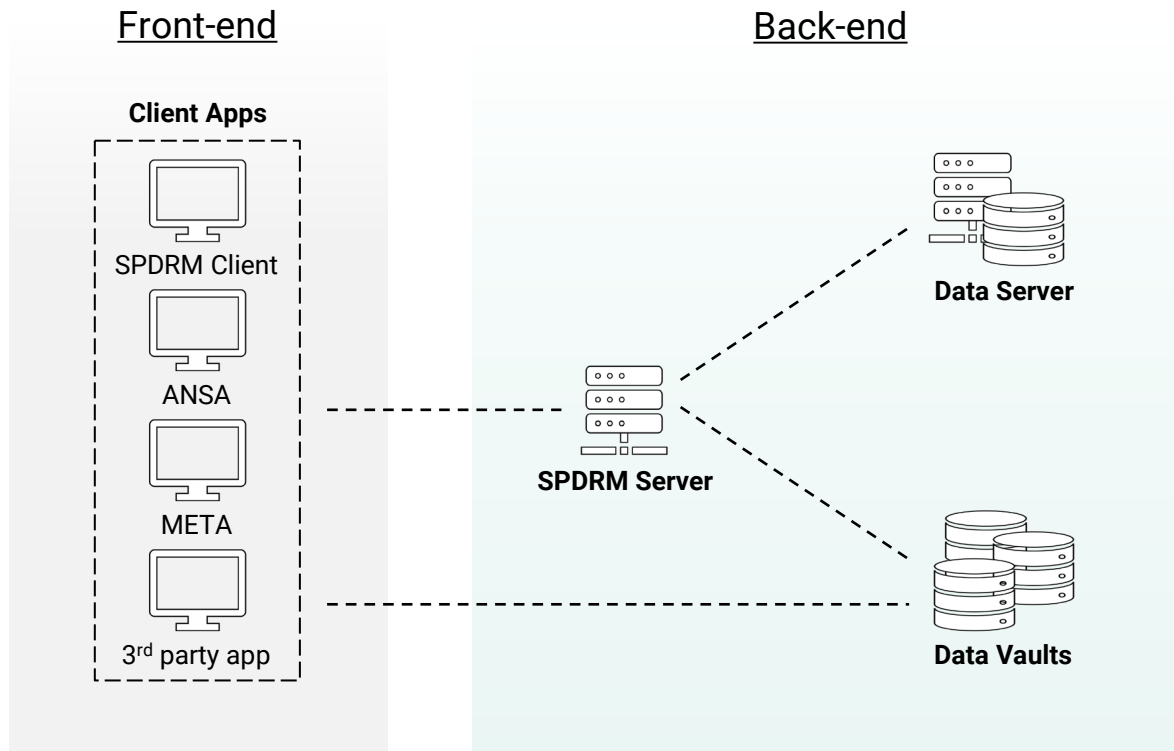
Multi-Site Architecture (RIOC)

Central
Site

Remote
Site

SPDRM
Server

Data
Server

Data
Vaults

RIOC
Server
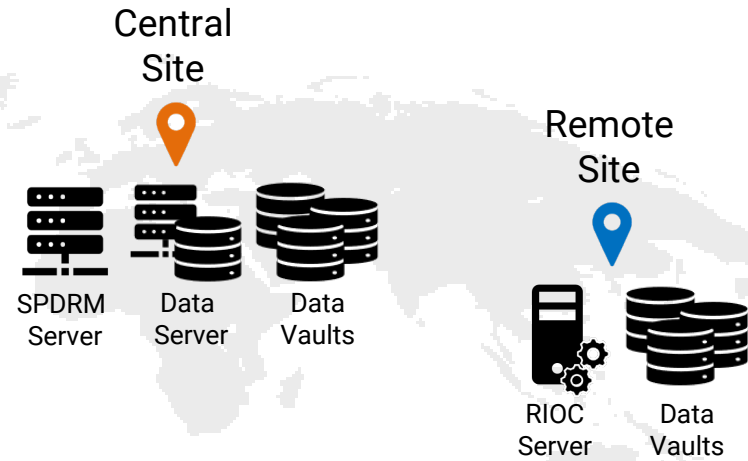
Data
Vaults

Deployed in production since 2018

File Access and Caching

User A

NFS/SMB

HTTPS

Local access to files

Local access to metadata

Central Site

Local access to files

Remote access to metadata

Remote Site

NFS/SMB

HTTPS

User B
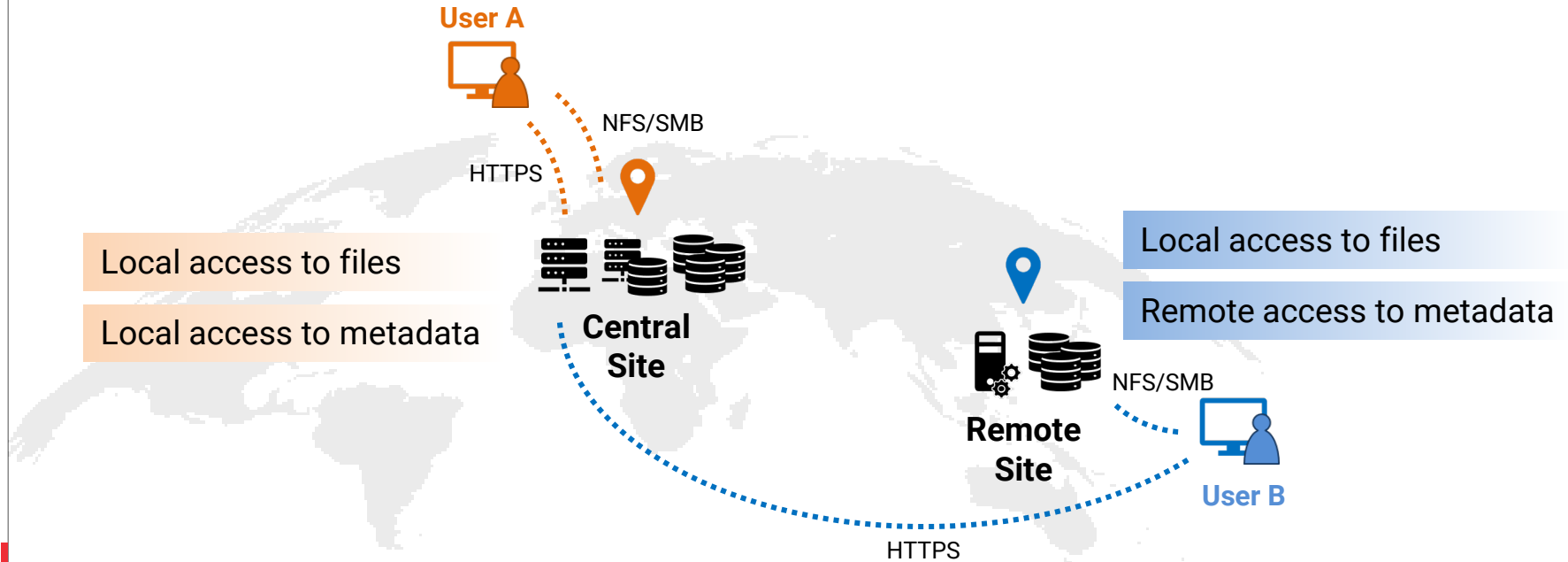
Data Transfer Optimization

Real time metadata updates on all sites

Real time local storage on all sites

Async replication

Central Site

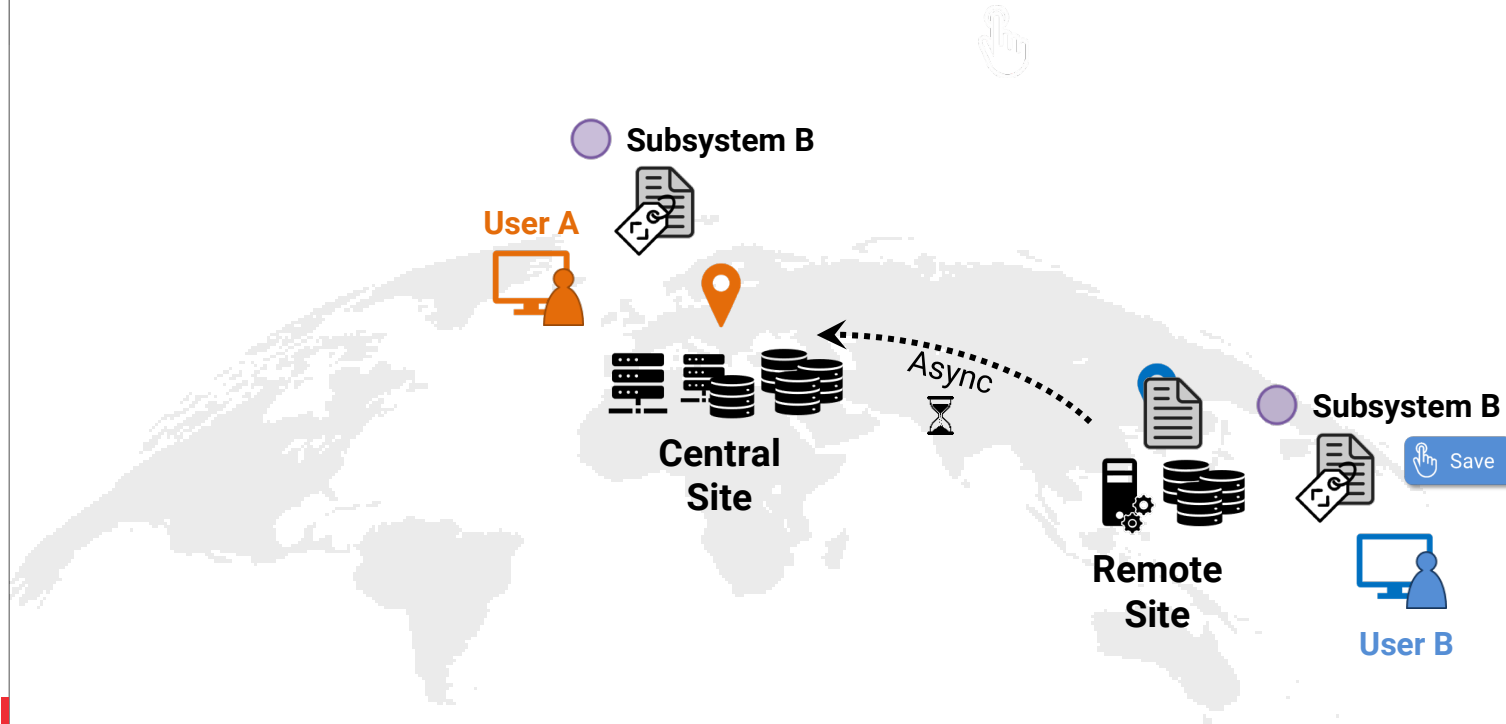**Remote Site**

On-demand replication

Data Transfer Example

Data Transfer Example

Subsystem B

User A

Central Site

Async

Remote Site

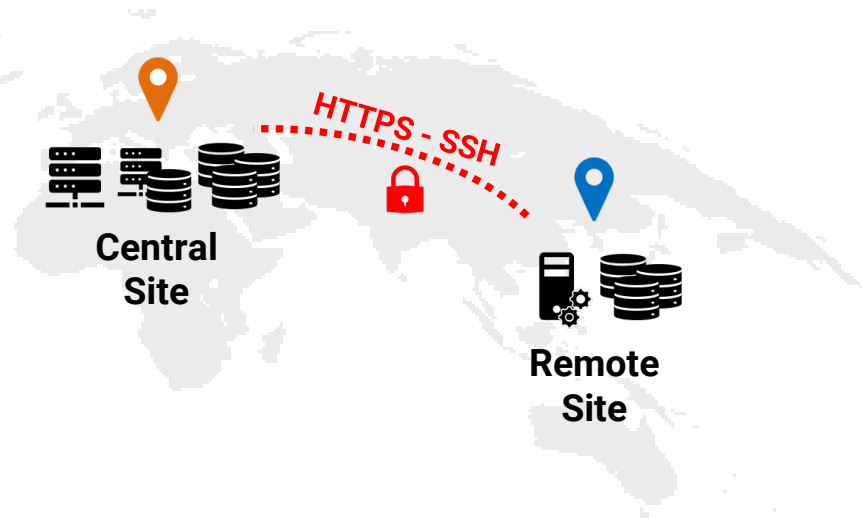Subsystem B

Save

User B

www.beta-cae.com
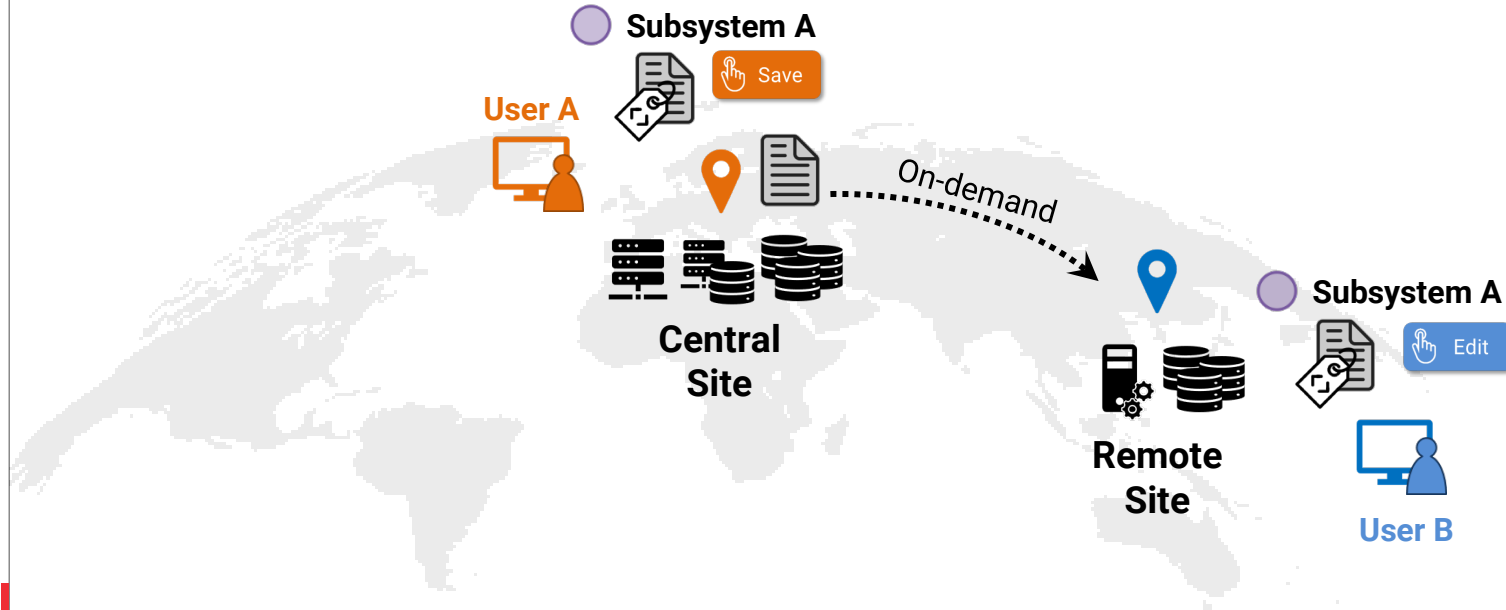
Encrypted Communication and File Transfer

Encrypted communication through HTTPS

Encrypted file transfer through SSH

Optional integration with 3rd-party data transfer tools (e.g Aspera)

HTTPS - SSH

Central Site

Remote Site

Scalability

Add any number of sites to an existing system

Central Site

Remote Site 2

External Supplier

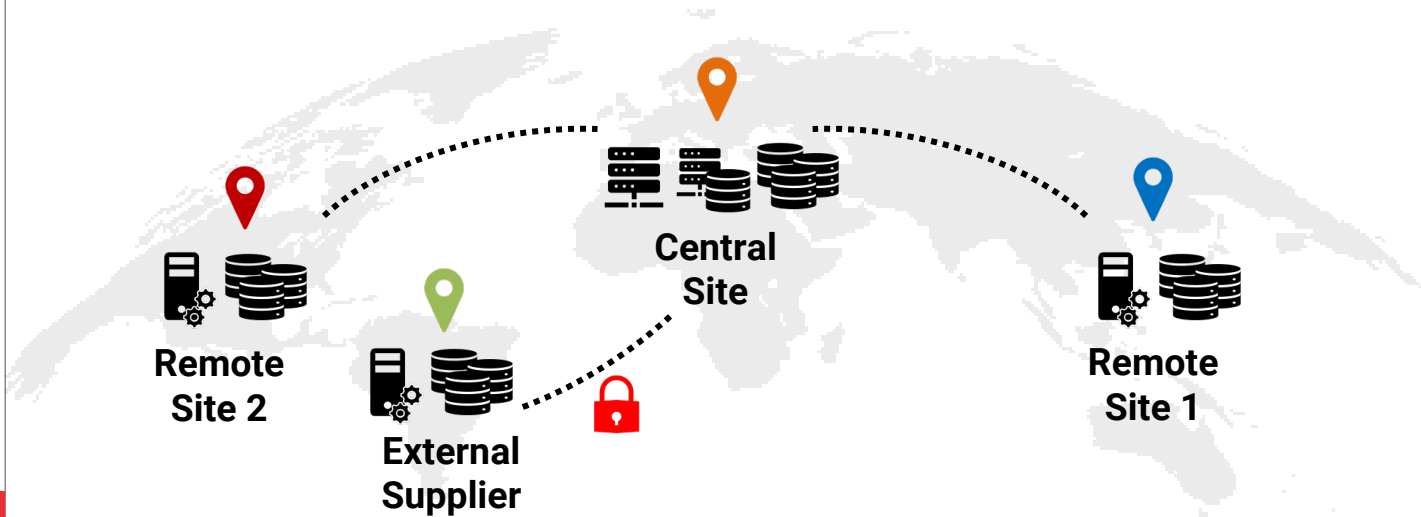**Remote Site 1**
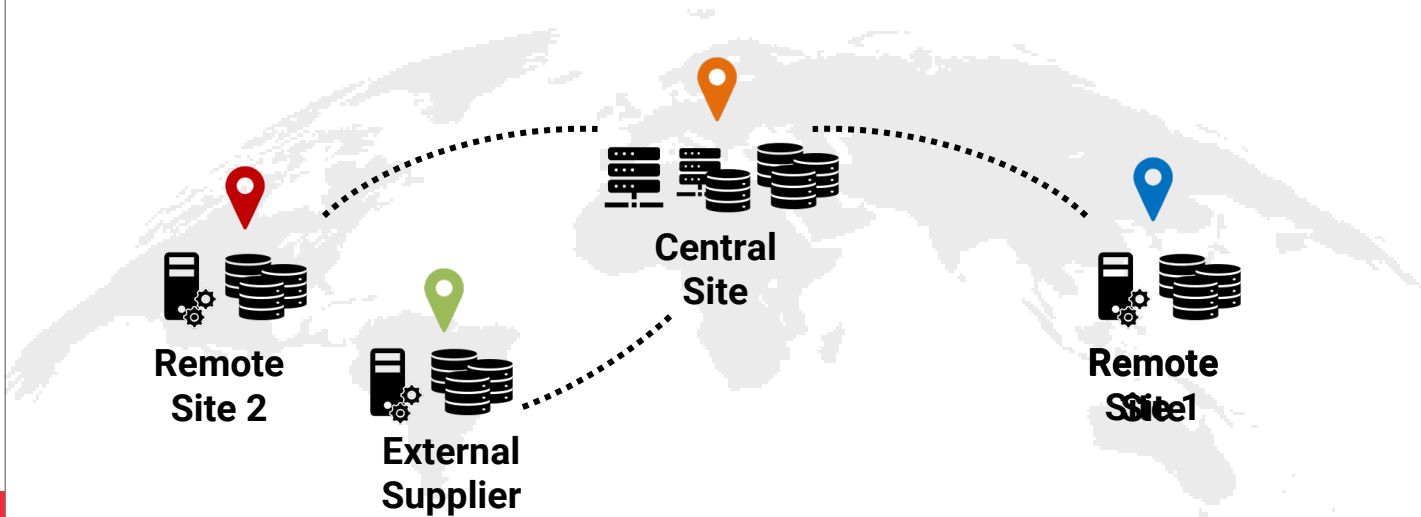
Data Security and Privacy

Add any number of sites to an existing system

Controllable data access to selected sites

Central Site
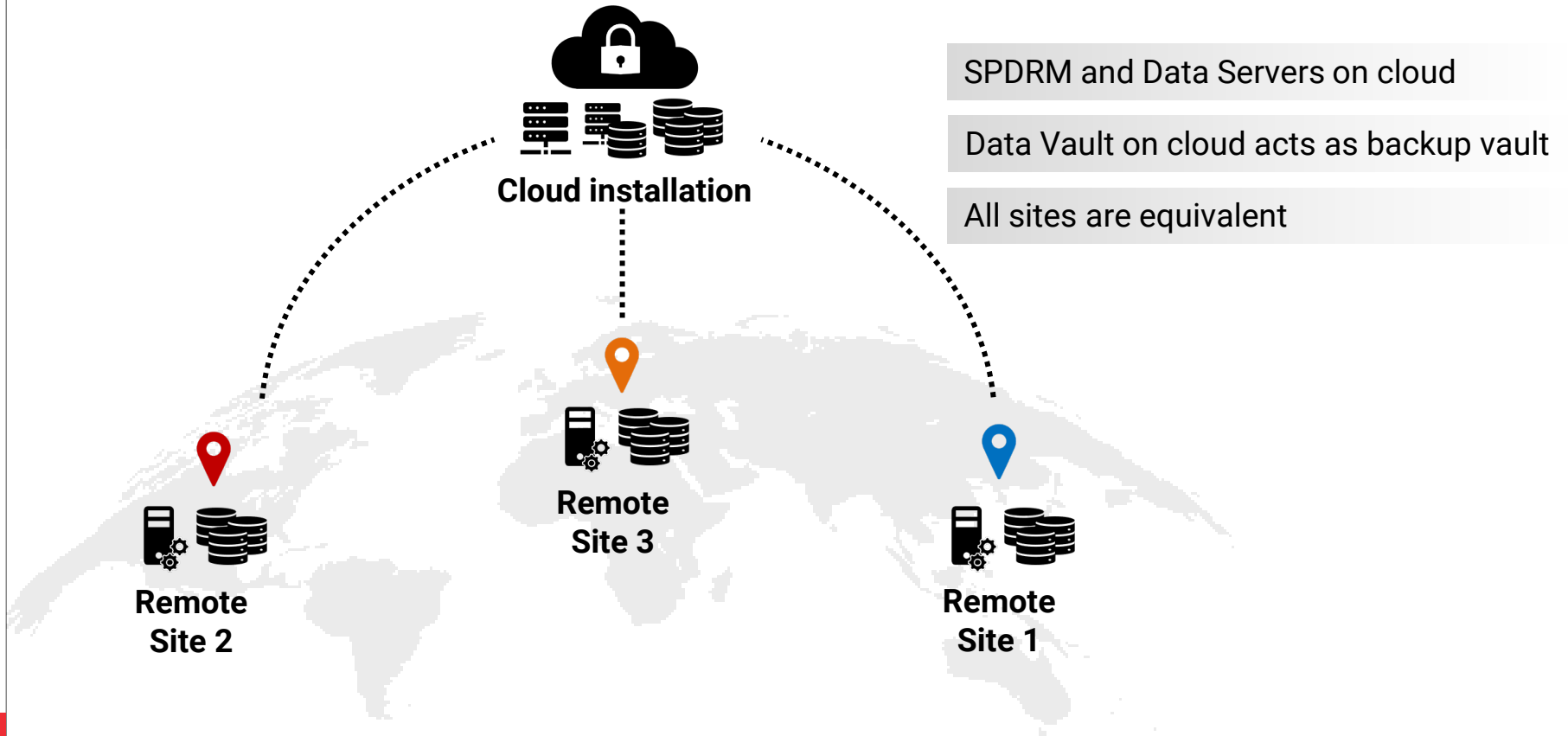
Remote Site 2

External Supplier

Remote Site 1

Site-to-site File Transfer Optimization

File transfer initiated from the nearest site

User D

Remote
Site 2

External
Supplier

User C

Central
Site

Remote
Site 1
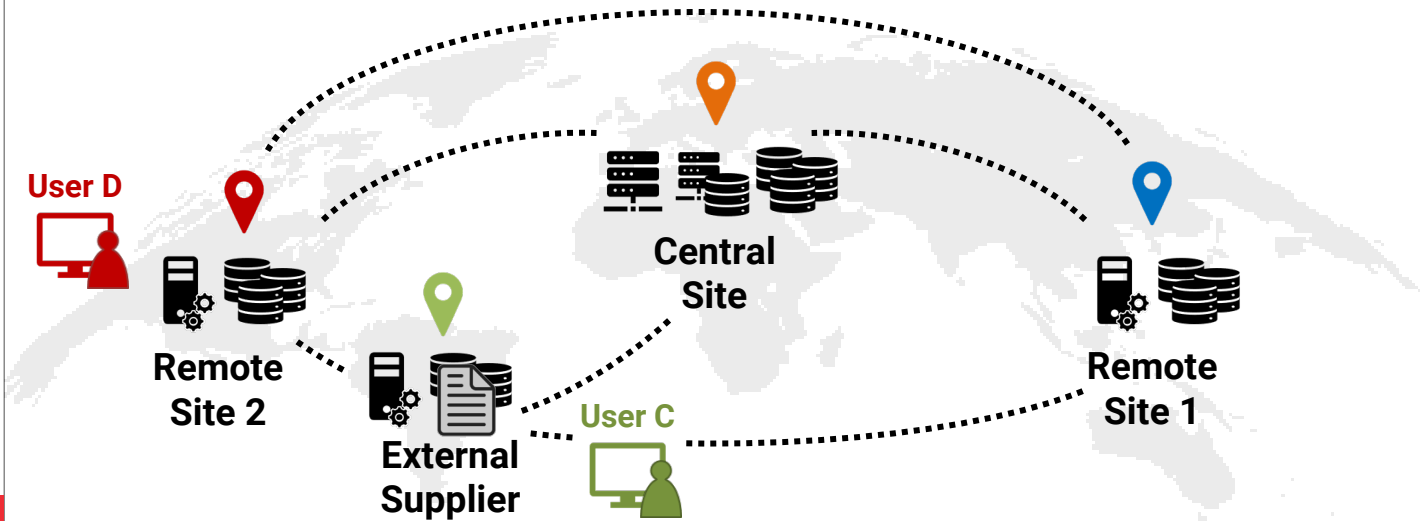
Cloud-enabled Solution: Architecture

Cloud installation

SPDRM and Data Servers on cloud

Data Vault on cloud acts as backup vault

All sites are equivalent

Remote Site 2

Remote Site 3

Remote Site 1

Cloud-enabled Solution: Benefits

Cloud installation

Easier IT maintenance

Scalability

Disaster mitigation

Security

Remote Site 3

Remote Site 2

Remote Site 1
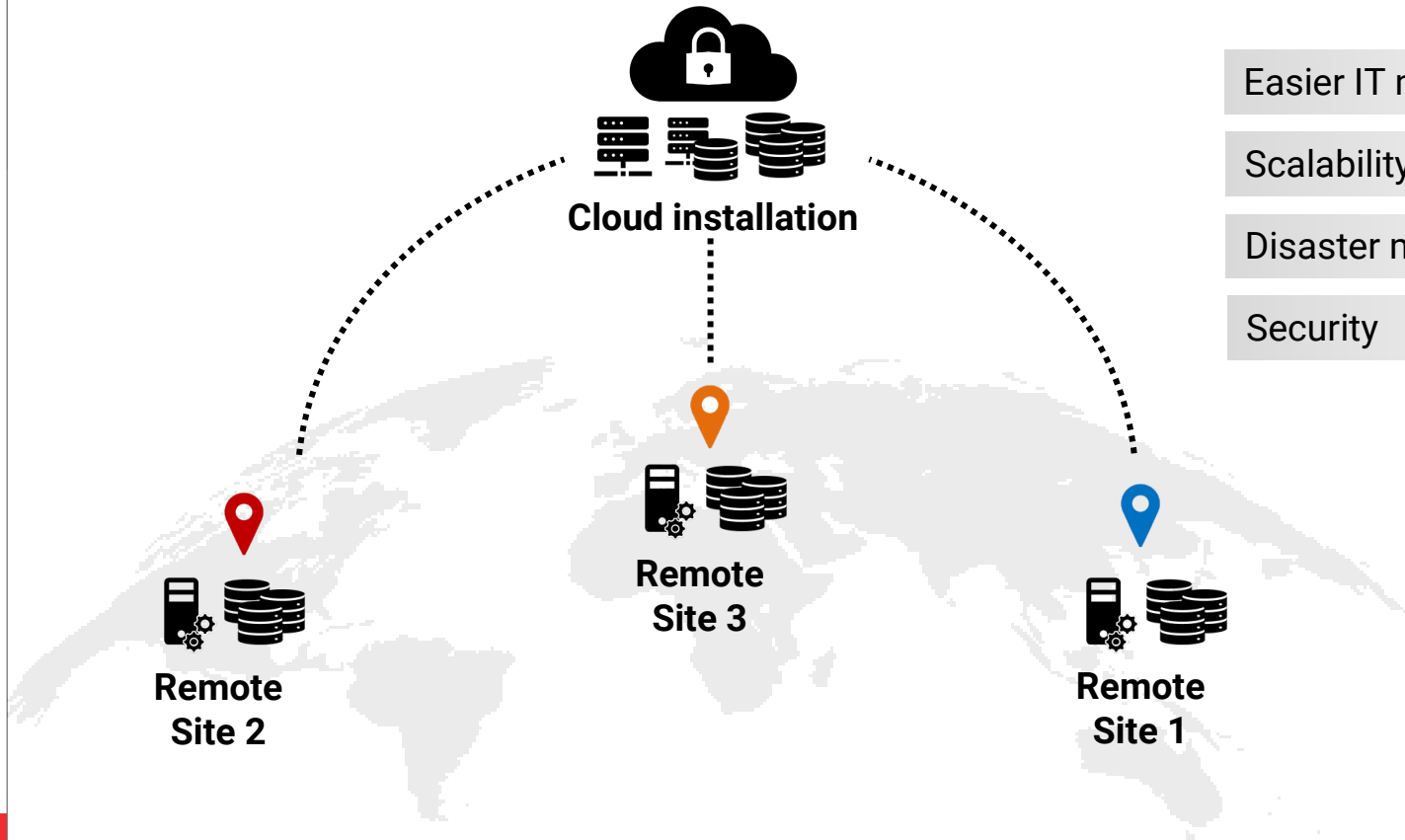
Cloud-enabled Solution: Data Security

Cloud installation

Remote Site 3

Remote Site 2

Remote Site 1

Easier IT maintenance

Scalability

Disaster mitigation

Security

Local storage of sensitive data
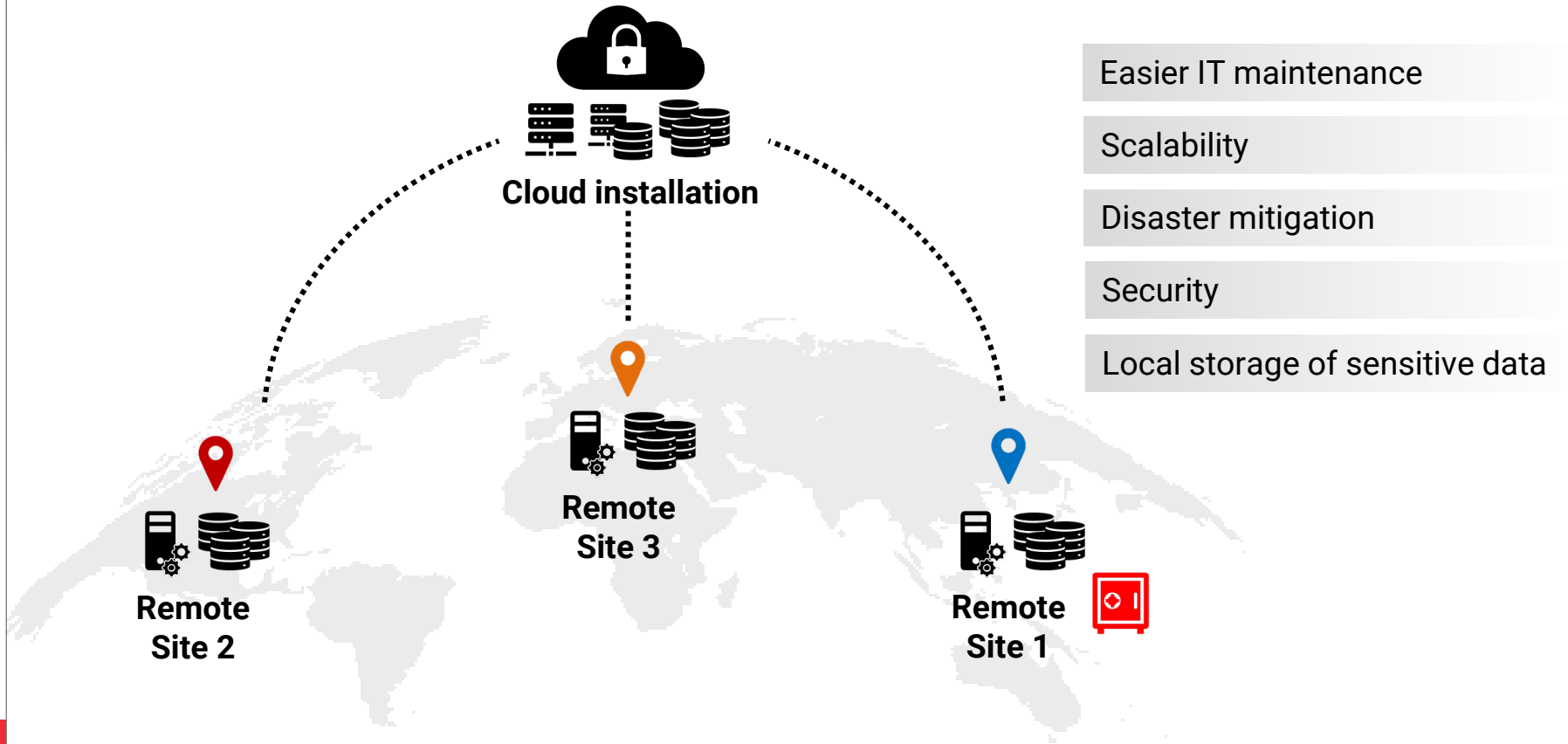
Towards a cloud-native solution

Cloud installation

Integration with S3 (Simple-Storage-Service)

Cost-effective storage on cloud

Horizontal scalable solution
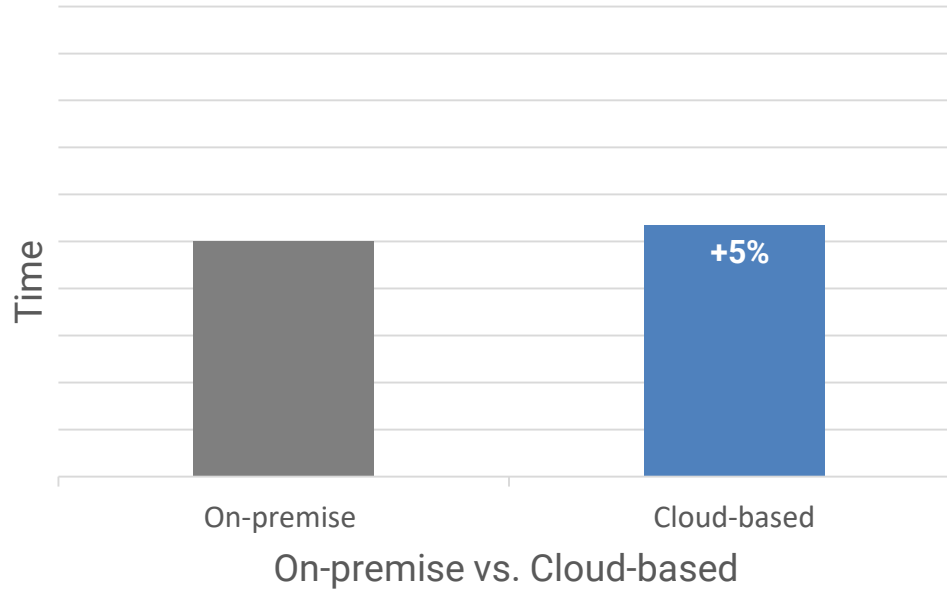
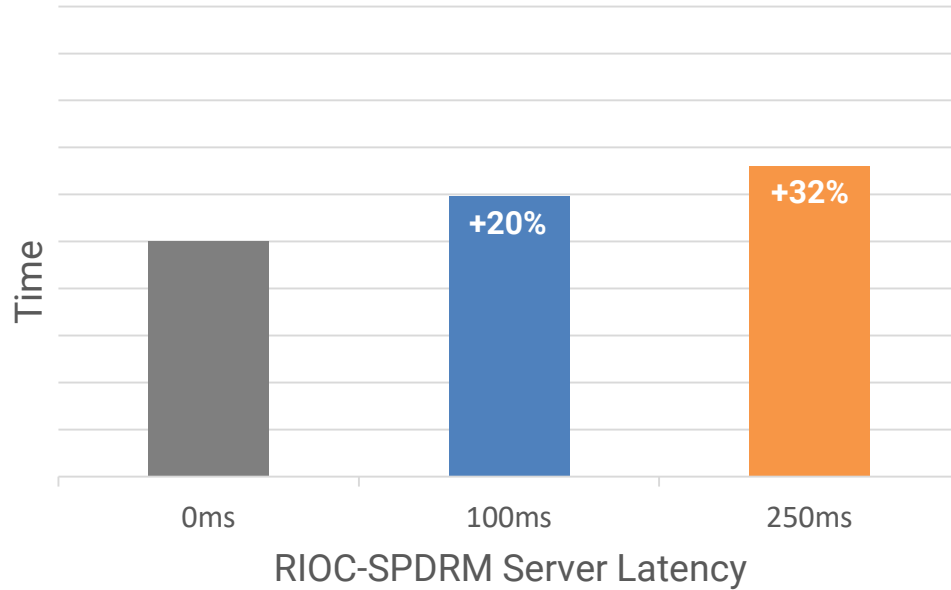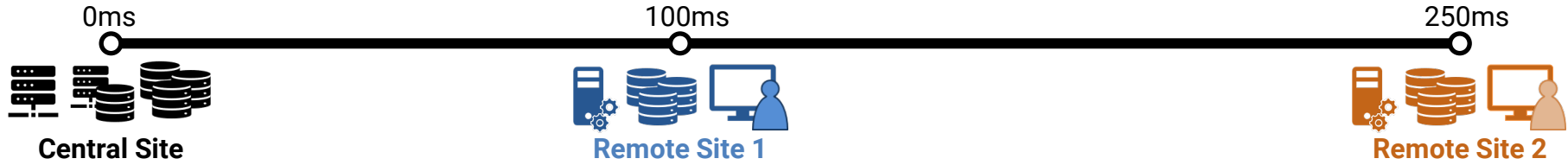# Performance Factors: Infrastructure

On-premise

Remote Site

Cloud-based

Remote Site

Time

+5%

On-premise   Cloud-based

On-premise vs. Cloud-based

Latency between RIOC-SPDRM Server: 45ms

Performance Factors: Latency

0ms — 100ms — 250ms

Central Site

Remote Site 1

Remote Site 2

Time

| | **+20%** | **+32%** |

0ms — 100ms — 250ms

RIOC-SPDRM Server Latency

Performance Factors: Bandwidth

100MB/s   10MB/s   3MB/s   1.5MB/s

Remote Site   **User A**   **User B**   **User C**

Time

100MB/s	10MB/s	3MB/s	1.5MB/s
	x1.2	x2	x2.5

Client-Vault Bandwidth

Latency between RIOC-SPDRM Server: 45ms
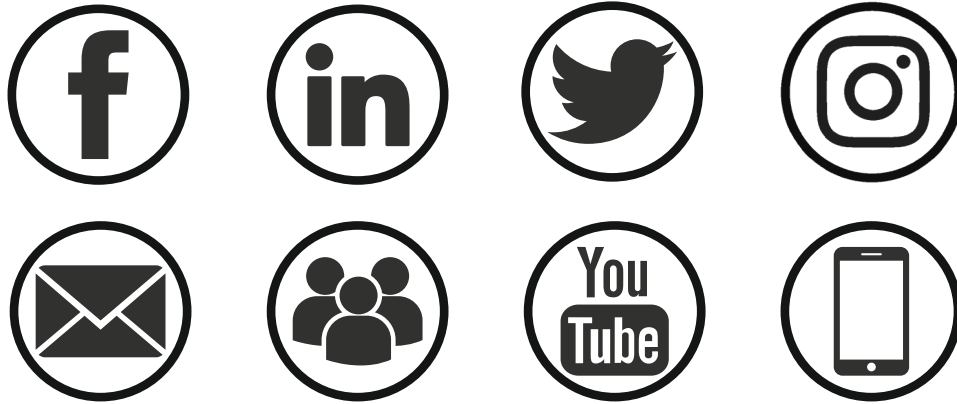
www.beta-cae.com
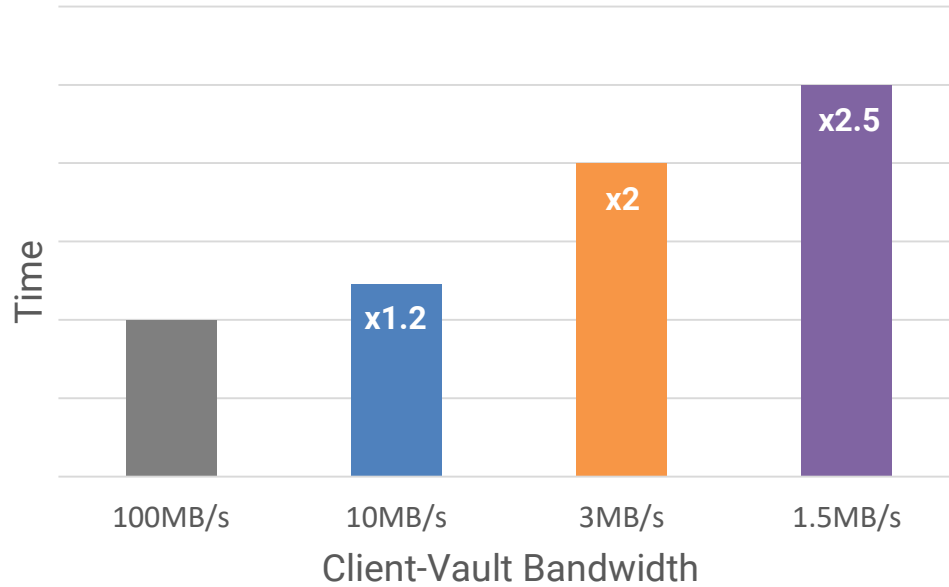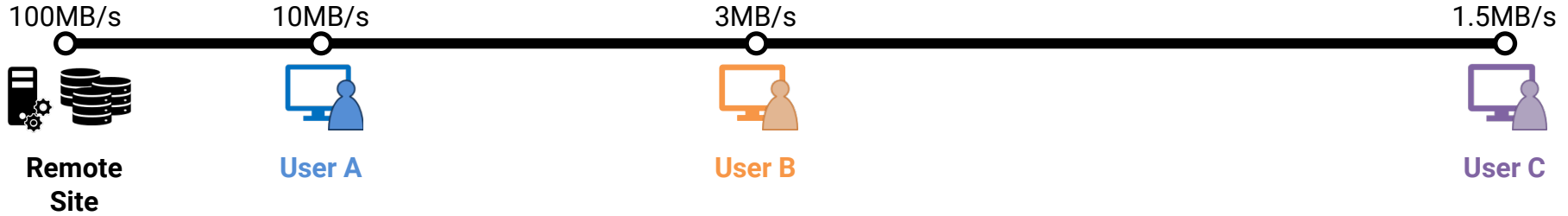
Conclusion

Investment in Research and Development on this area

Important enhancements on data transfer and encryption

Cloud-enabled solution

Tailored-made multi-site solutions

Keep investing in multi-site collaboration

BETA SIMULATION SOLUTIONS

Stay connected