LET'S TALK ABOUT CISCO TECHS

# SDN, complexity and TCO: looking for an easy way

07.11.2018 | Milano, Andrea Dainese

ABOUT

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- Network and Security Architect (15+ years' exp.)
- Security Evangelist (Blue Team)
- Automation Addicted/Developer (UNetLab)
- Cisco CCIE #38620/VMware VCP/Red Hat RHCE

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# COMPLEXITY

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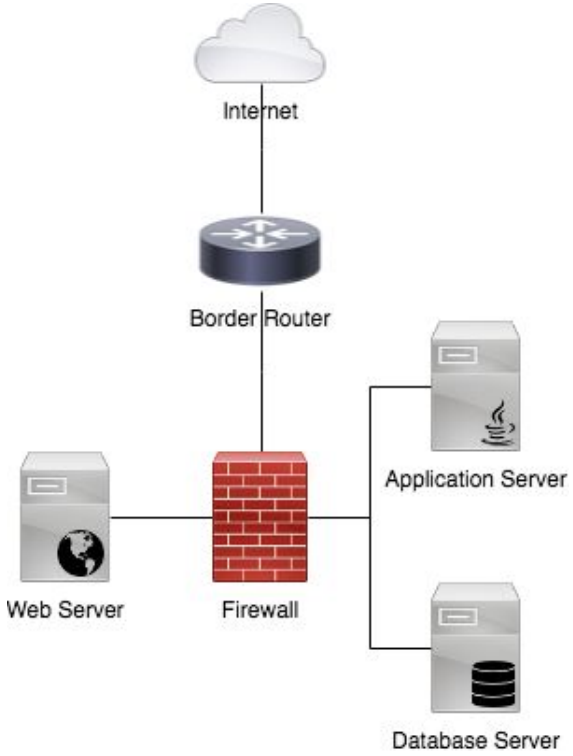
# Legacy Data Center (Yesterday)



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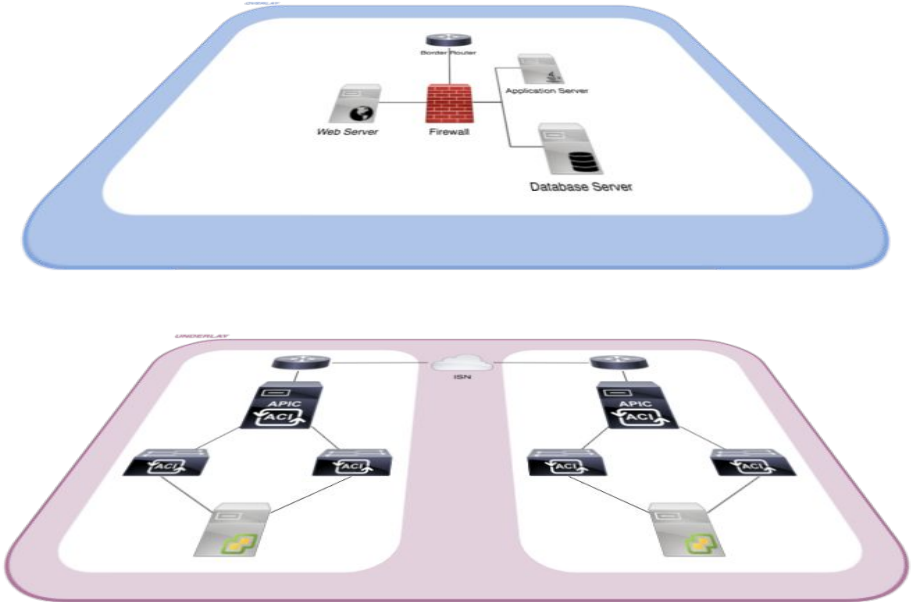
# New Generation Data Center



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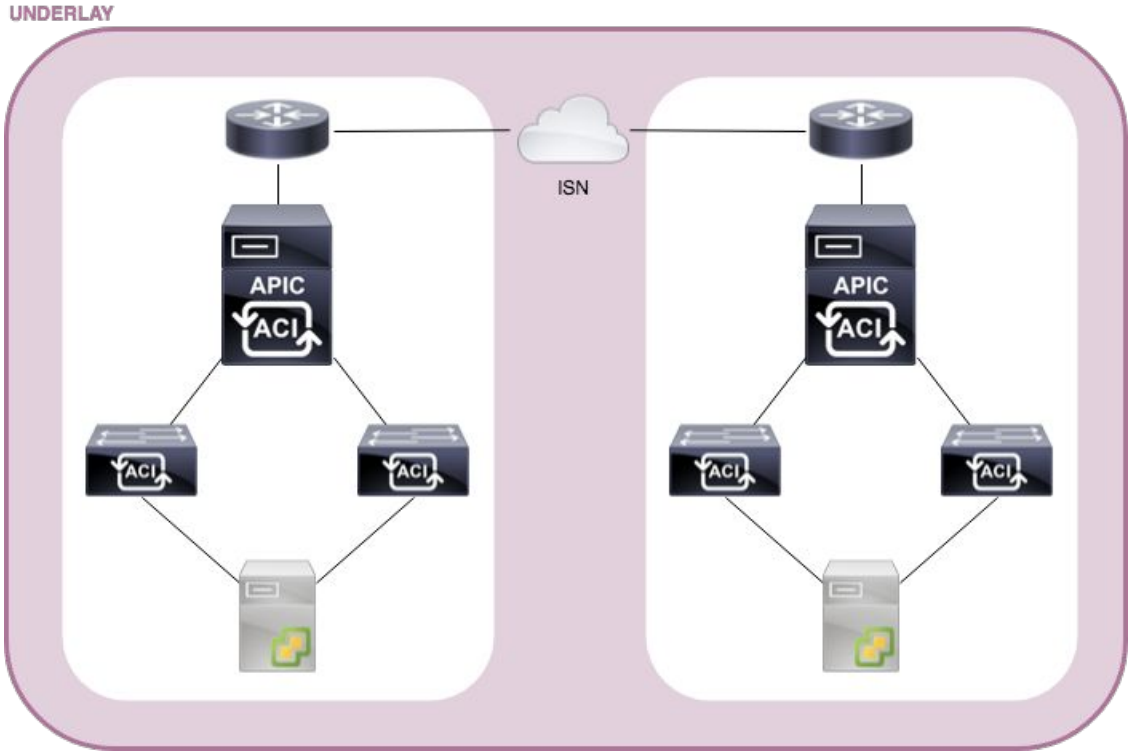
# New Generation Data Center (Underlay)



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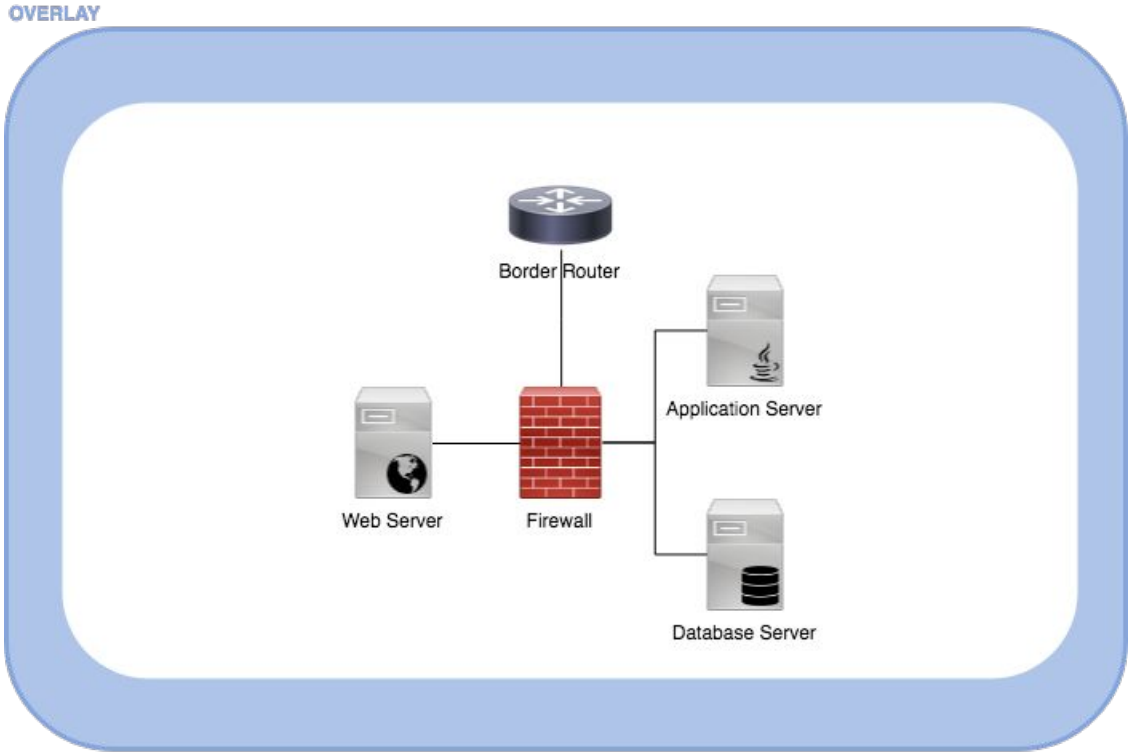
# New Generation Data Center (Overlay)



# HOW DO WE GET TO THIS?

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## Characteristics of Legacy Applications

- Designed "to work" not "to scale"
- Low Latency between components
- Installed on (hopefully) lossless network
- L2 adjacency for clustered components
- Sometimes relies on single components

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## Today's Requirements

- Security:
  - Intra application (secure the application itself)
  - Inter applications (avoid lateral movement)
- Scalability
- High Availability:
  - Local
  - Geographic
- Disaster Recovery

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## Application's Constraints

- Source code not available
- Documentation not available
- Original developers not available
- Based on legacy and non-upgradeable frameworks

## False Application's Constraints

- Too complex to change
- Too expensive to change

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## Remapping Today's Requirements

- Security:
  - Intra application ➤ Web Application Firewall
  - Inter applications ➤ Microsegmentation
- Scalability ➤ Load Balancers*
- High Availability:
  - Local ➤ Hypervisor HA and VMware FT
  - Geographic ➤ GSLB*
- Disaster Recovery ➤ Replicators with orchestrator

* Sometimes application cannot support load balancers

# WE'RE SOLVING APPLICATION LIMITS IN OTHER LAYERS

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## The Twelve Networking Truths (RFC1925)

***"(6) It is easier to move a problem around (for example, by moving the problem to a different part of the overall network architecture) than it is to solve it.***

***(6a) (corollary). It is always possible to add another level of indirection."***

Complexity is like entropy: moving a problem around, increase overall complexity.

# WE'RE INCREASING OVERALL COMPLEXITY AND COST

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## Proposed Solutions

A. Design scalable applications
B. ~~L2 Extensions~~
C. Stretched Data Centers

# CISCO ACI

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CISCO ACI

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## What is Cisco ACI?

- A scalable IP fabric
- A huge firewall
- A multi tenant platform
- An automatable network infrastructure
- A stretchable data center
- A data center ecosystem
- A single management point for the data center
- A SDN solution
- ...

CISCO ACI

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## Limits

- up to 200 leaf switches
- up to 24 spine switches (max 6 per POD)
- up to 3000 tenants
- up to 3000 VRFs
- up to 15000 BDs

- up to 10ms RTT for stretched fabric
- up to 50ms RTT for multi-POD
- up to 300ms RTT for remote leaf
- up to 1s RTT for multi-site

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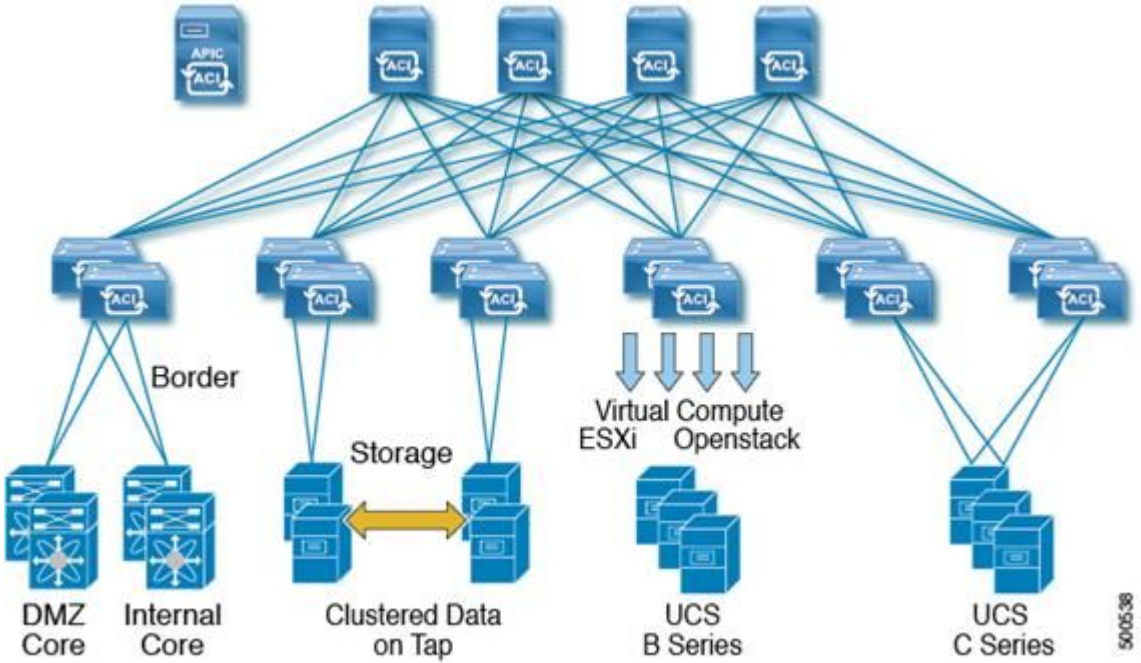
# Topologies: Fabric



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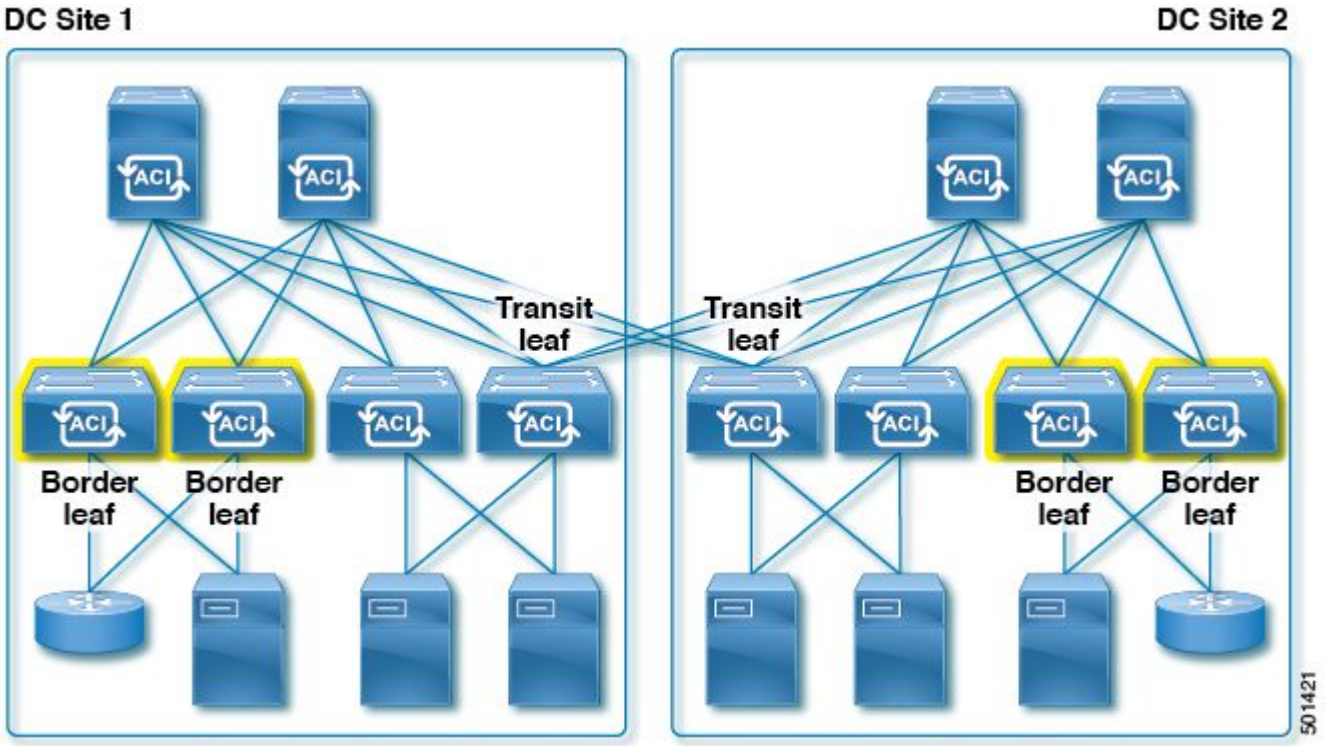
# Topologies: Stretched Fabric



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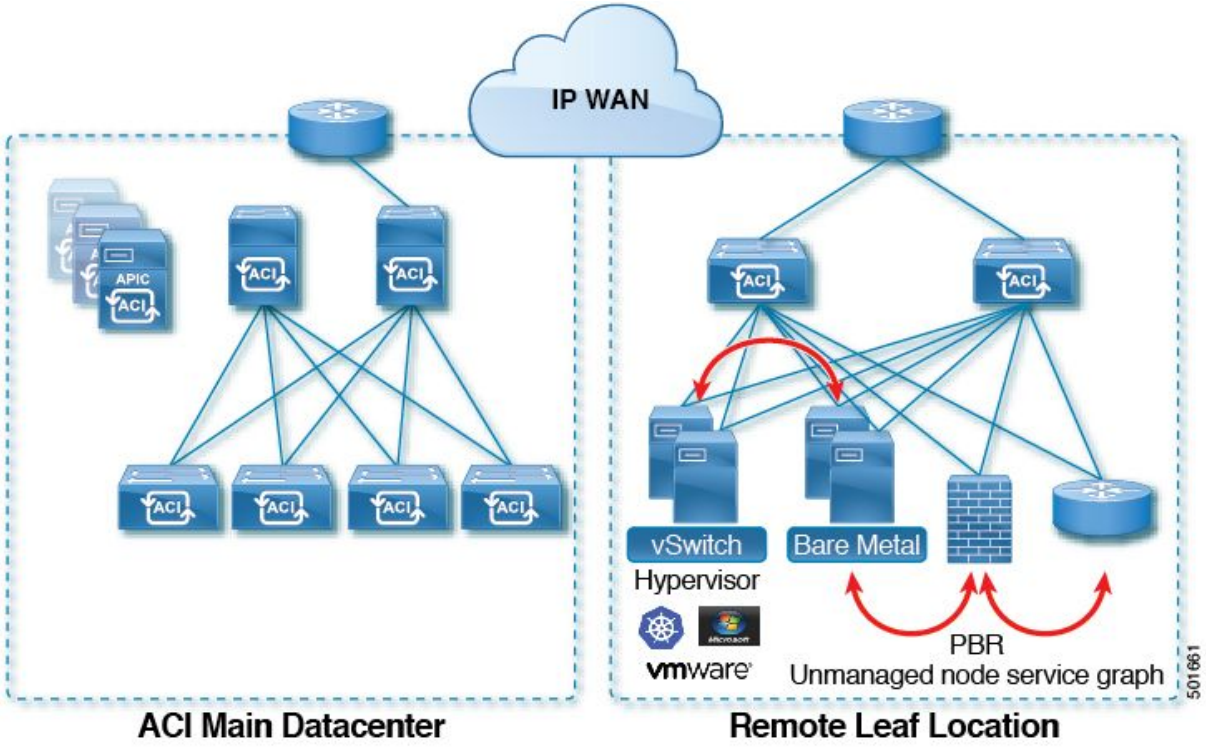
# Topologies: Remote Leaf



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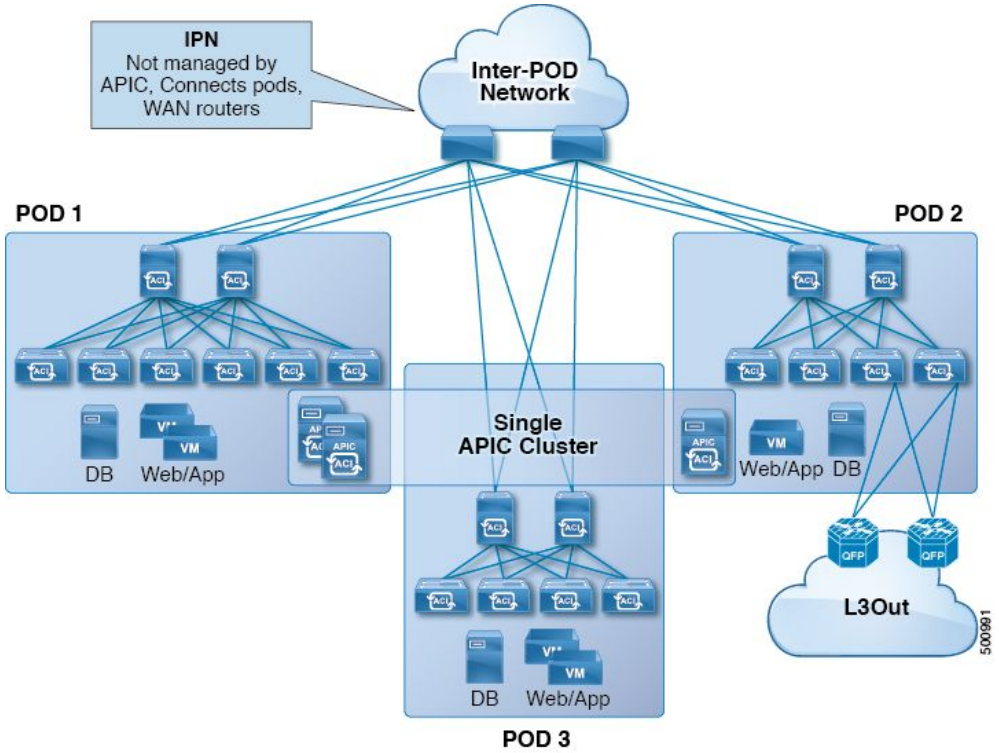
# Topologies: Multi POD



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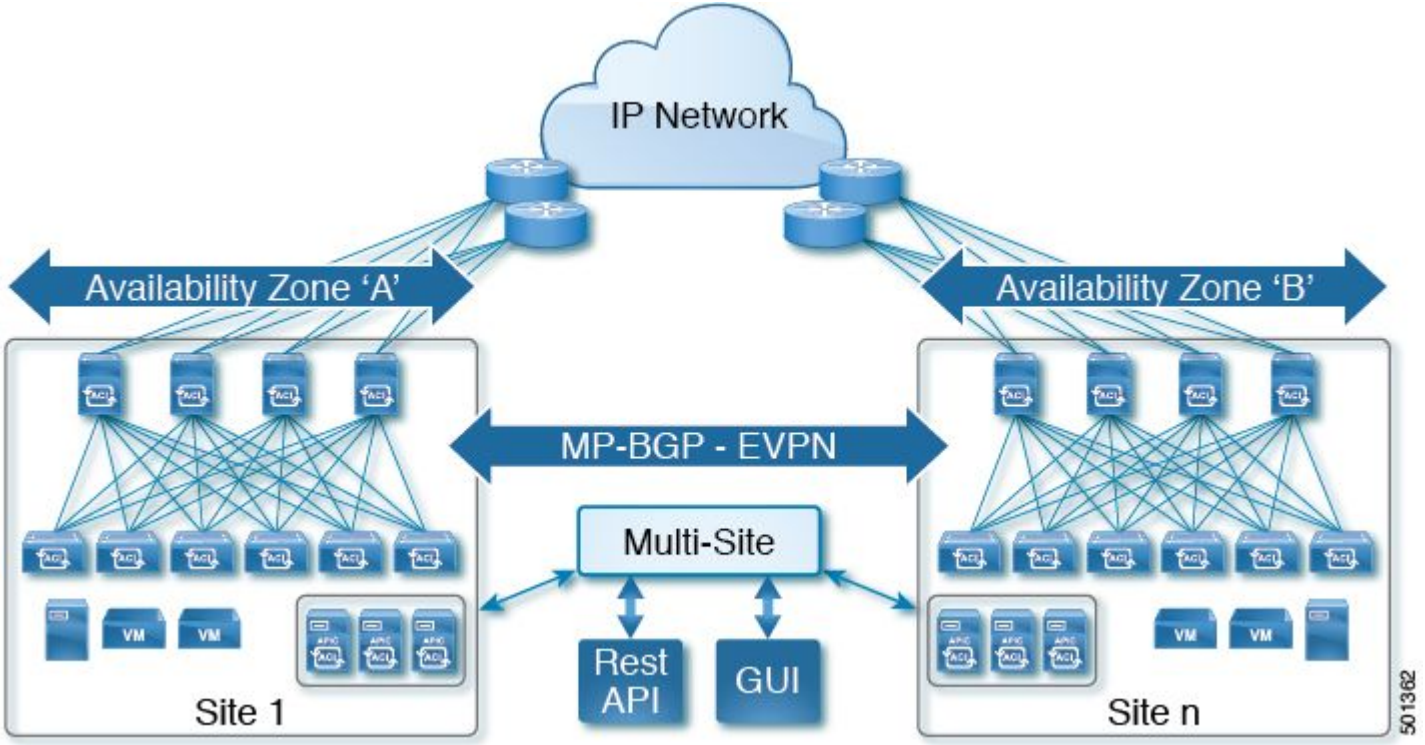
# Topologies: Multi Site



# NETWORKERS TODAY

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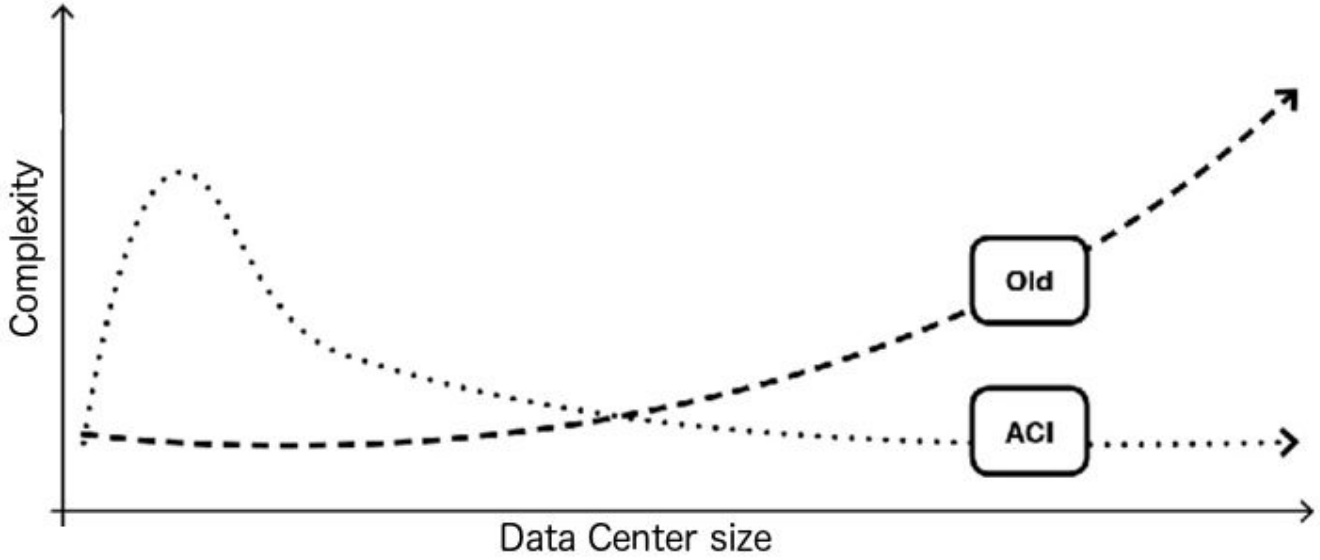
# Scalability VS Complexity



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## Less but more complex Data Centers

Piano di razionalizzazione delle risorse ICT (AGID)

- SPC Cloud
- Poli strategici nazionali
- Infrastrutture Gruppo A ➤ "non potranno essere effettuati investimenti"
- Infrastrutture Gruppo B ➤ "dovranno essere rapidamente consolidate"

https://pianotriennale-ict.readthedocs.io/it/latest/doc/03_infrastrutture-fisiche.html

NETWORKER

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## Required Skills Today (real example)

- Strong understanding of Linux/UNIX systems
- Practical knowledge of shell scripting and programming.
- Deep experience with configuration management systems.
- Experience building and managing containerized applications.
- Familiarity with automating distributed infrastructure and cloud services.

# QUESTIONS?

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# THANK YOU

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