



LET'S TALK ABOUT CISCO TECHS

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

07.11.2018 | Milano, Andrea Dainese

# ABOUT



## ANDREA DAINESE - SENIOR SYSTEMS ENGINEER

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



[andrea.dainese@gmail.com](mailto:andrea.dainese@gmail.com)



[www.linkedin.com/in/adainese](http://www.linkedin.com/in/adainese)



[@adainese](https://twitter.com/adainese)

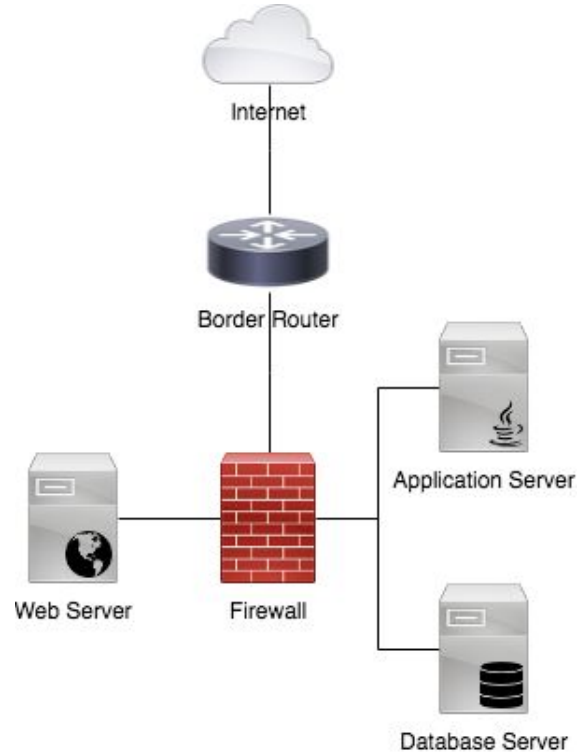
# COMPLEXITY



LET'S TALK ABOUT CISCO TECHS

# COMPLEXITY

## Legacy Data Center (Yesterday)

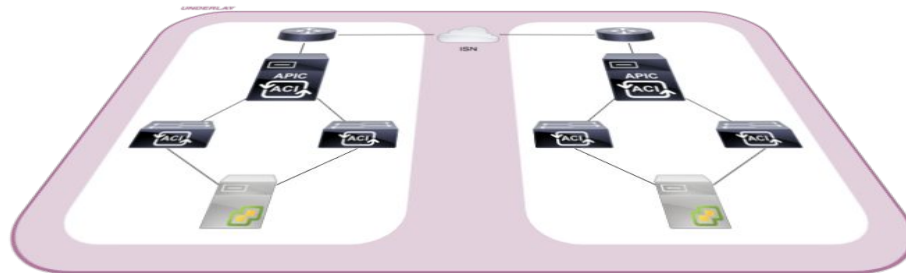
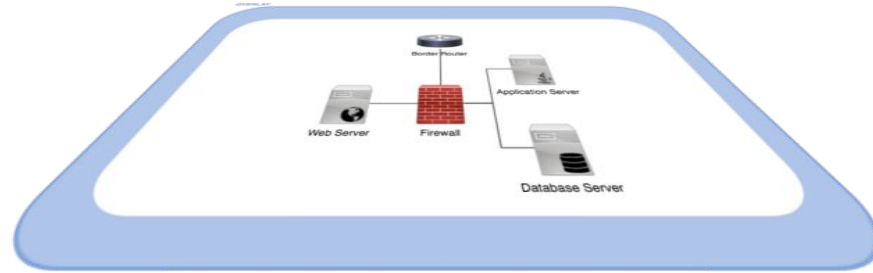


COMPLEXITY

CISCO#

LET'S TALK ABOUT CISCO TECHS

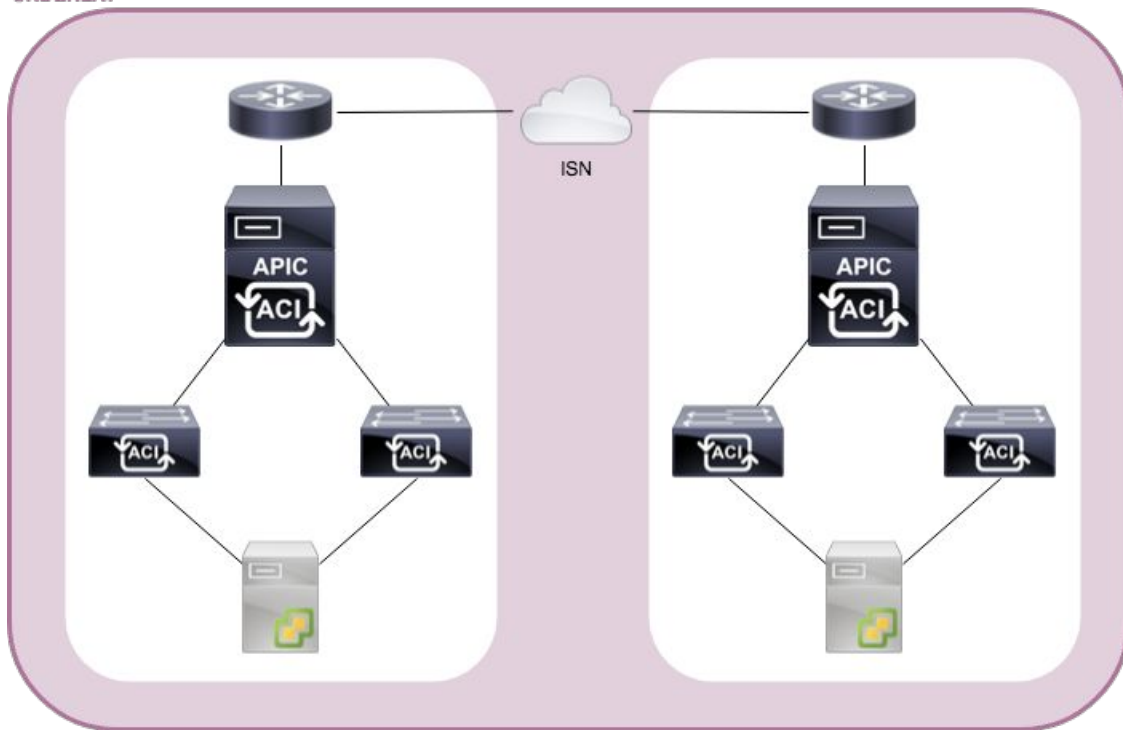
## New Generation Data Center



COMPLEXITY

## New Generation Data Center (Underlay)

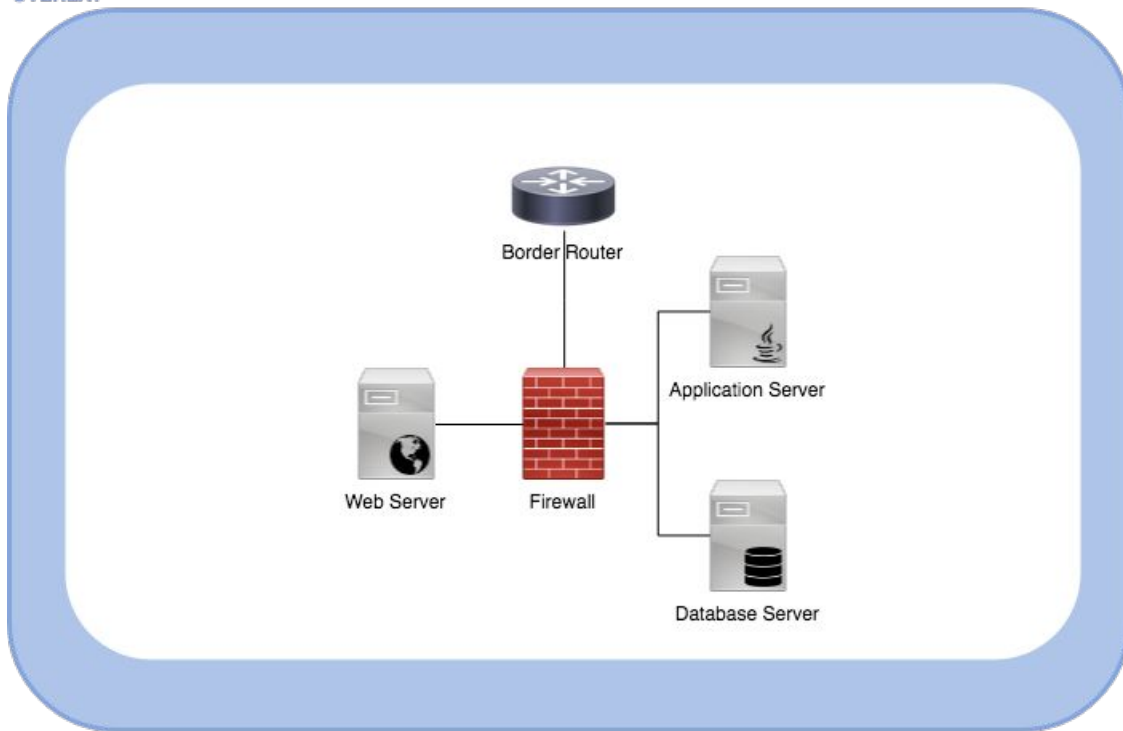
UNDERLAY



COMPLEXITY

## New Generation Data Center (Overlay)

OVERLAY



HOW DO WE GET TO  
THIS?



LET'S TALK ABOUT CISCO TECHS



## 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

# COMPLEXITY

## Today's Requirements

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



LET'S TALK ABOUT CISCO TECHS

## 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

## 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



LET'S TALK ABOUT CISCO TECHS

## 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**



LET'S TALK ABOUT CISCO TECHS

# COMPLEXITY

## Proposed Solutions

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



LET'S TALK ABOUT CISCO TECHS



# CISCO ACI



LET'S TALK ABOUT CISCO TECHS

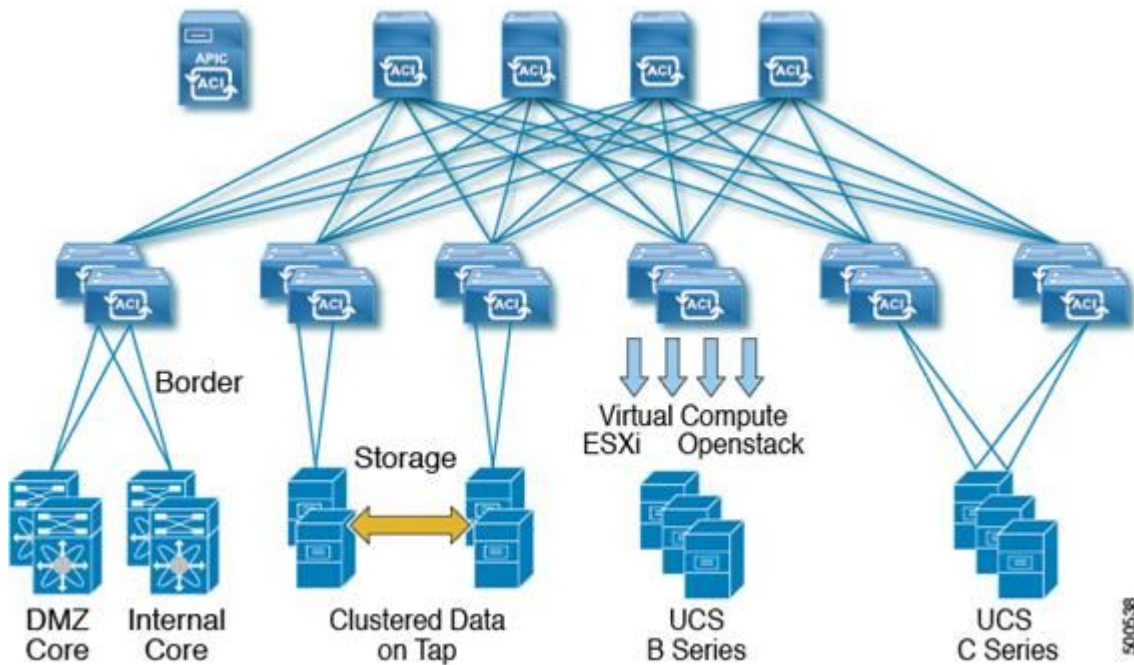
## What is Cisco ACI?

- 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
- ...

## 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

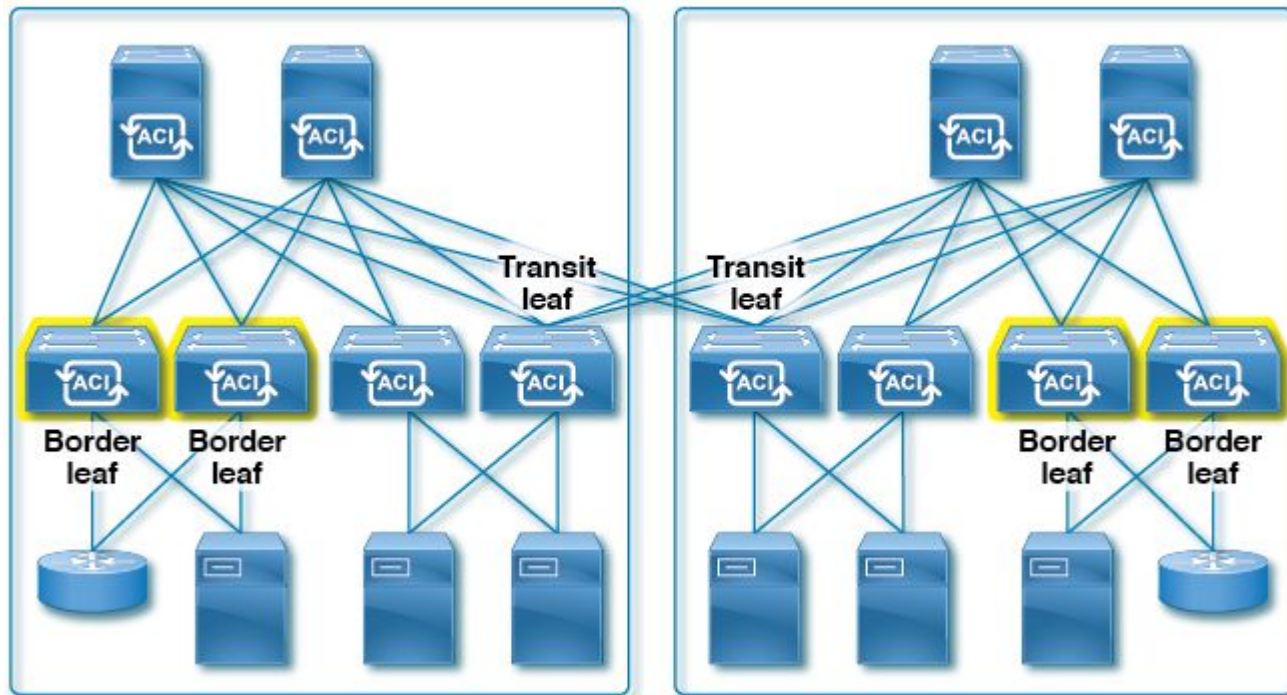
## Topologies: Fabric



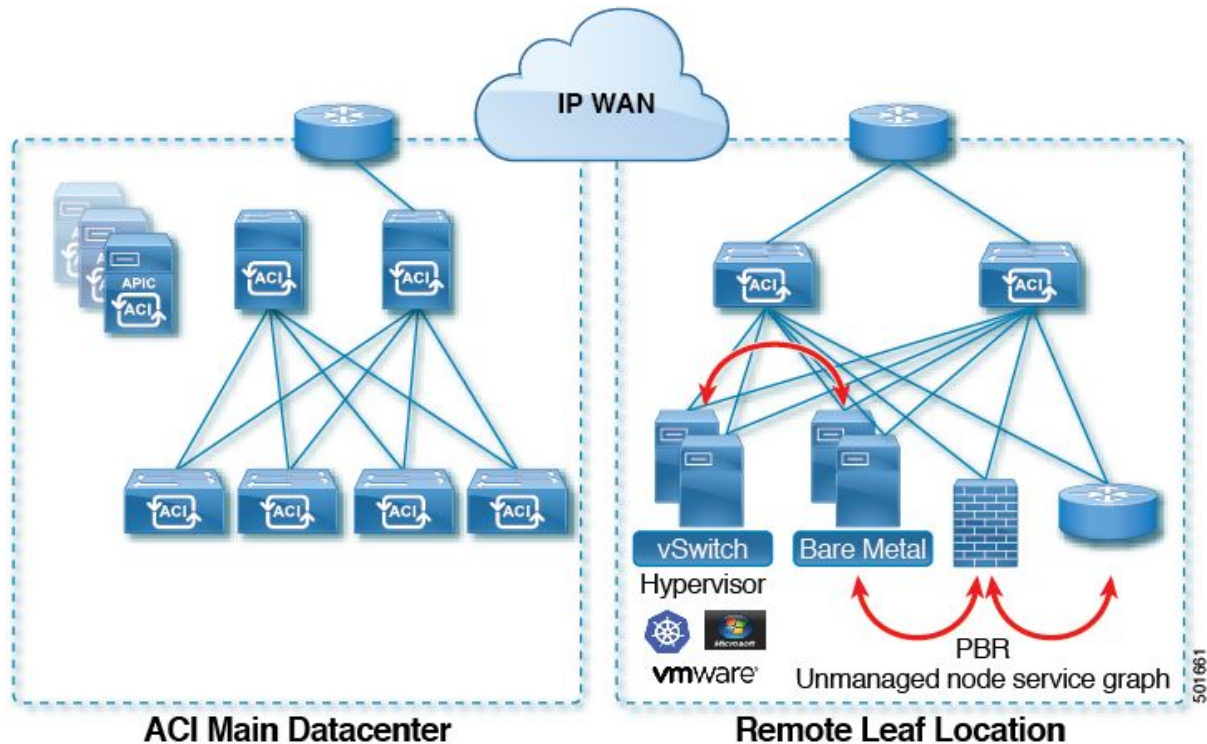
## Topologies: Stretched Fabric

DC Site 1

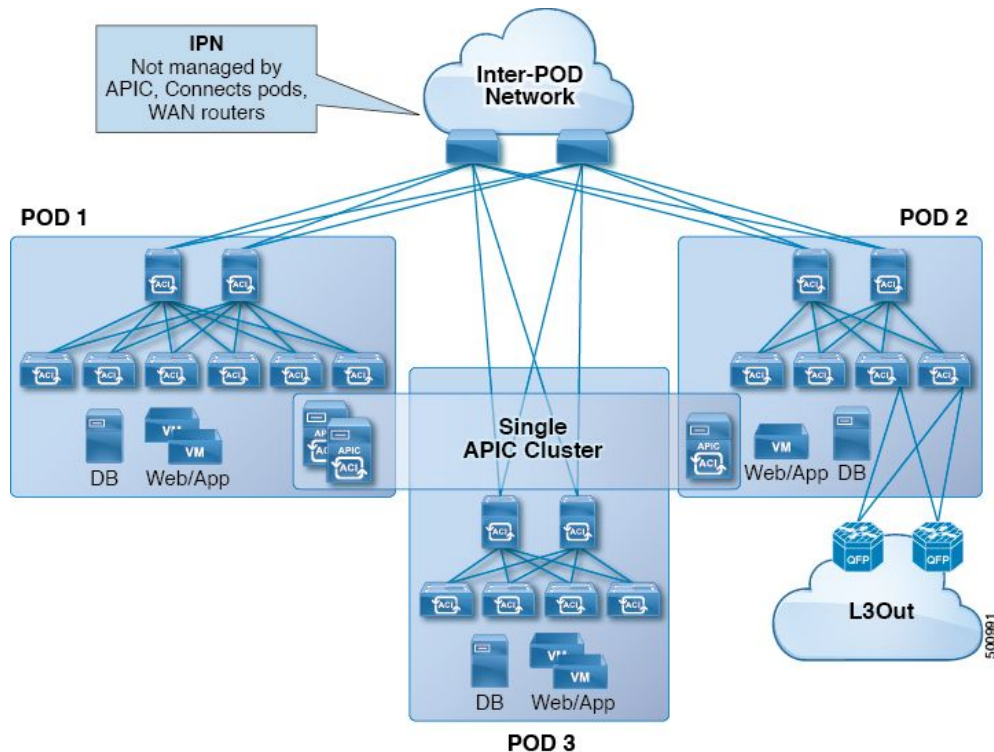
DC Site 2



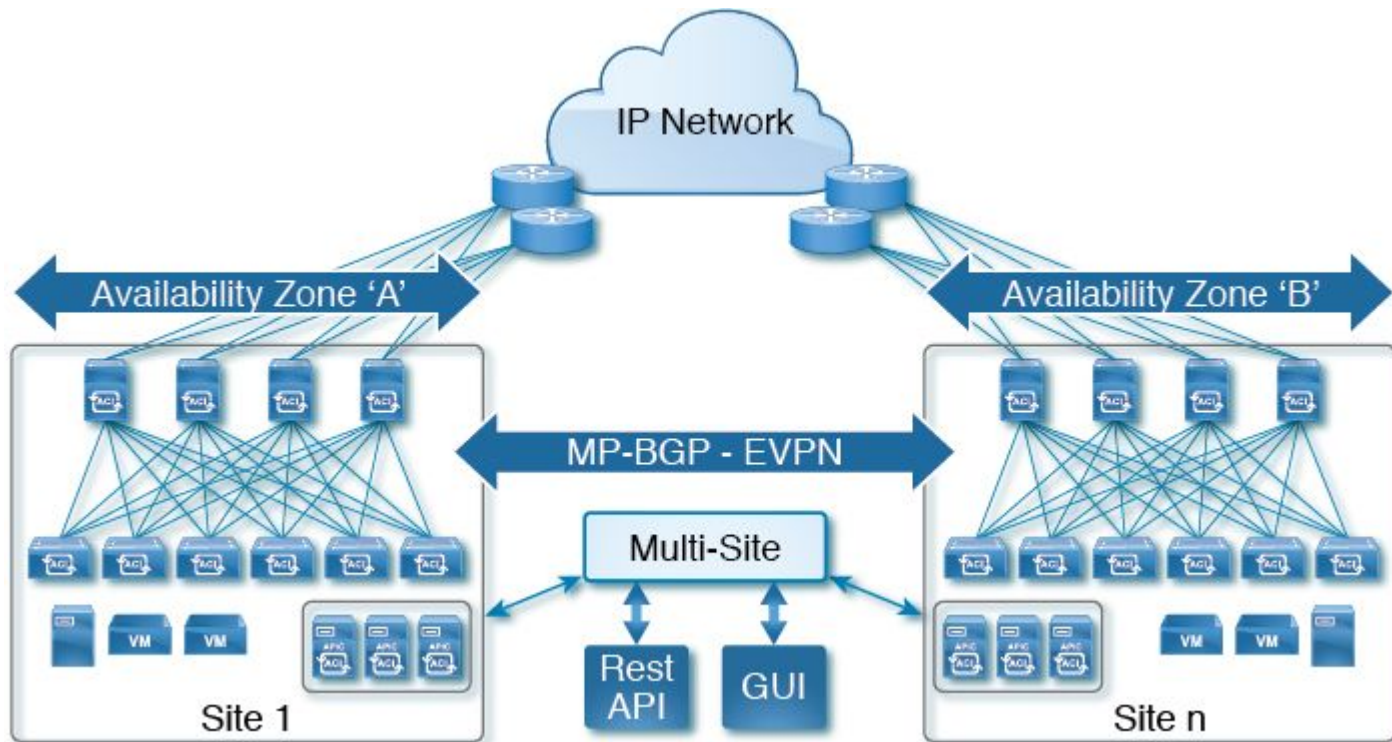
## Topologies: Remote Leaf



## Topologies: Multi POD



## Topologies: Multi Site



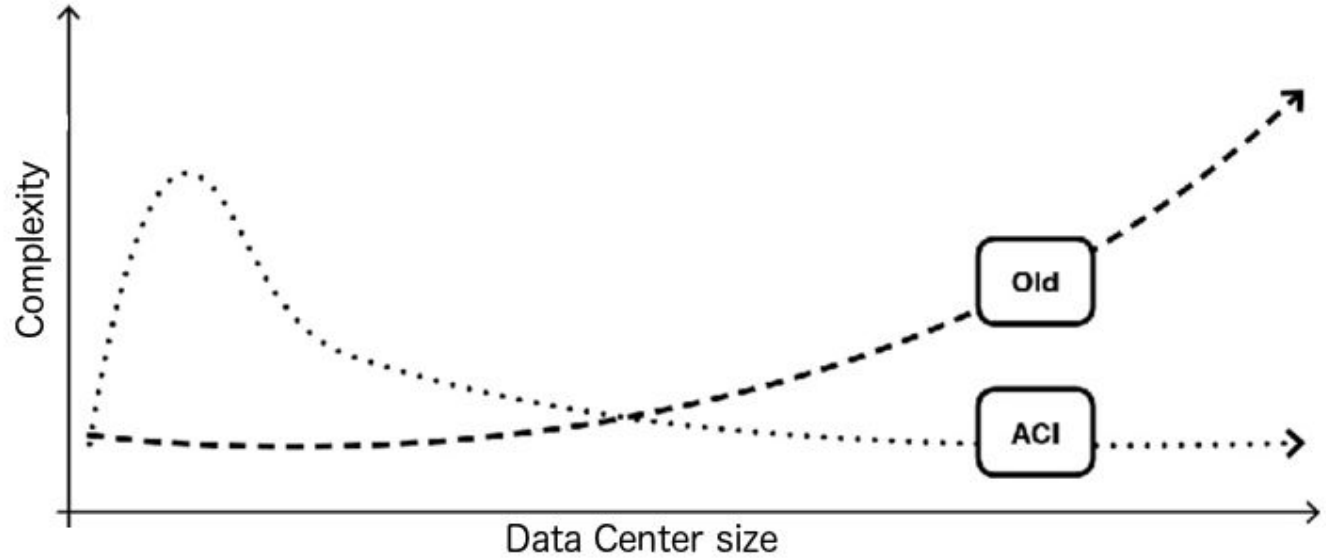


# NETWORKERS TODAY



LET'S TALK ABOUT CISCO TECHS

## Scalability VS Complexity



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

## 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?

THANK YOU



LET'S TALK ABOUT CISCO TECHS