

MULTI-CAMPUS LAYER2 NETWORK FABRIC

William Dauchy - Gandi.net

Kernel Recipes 2015



GANDI.NET



DOMAIN
NAMES



SSL



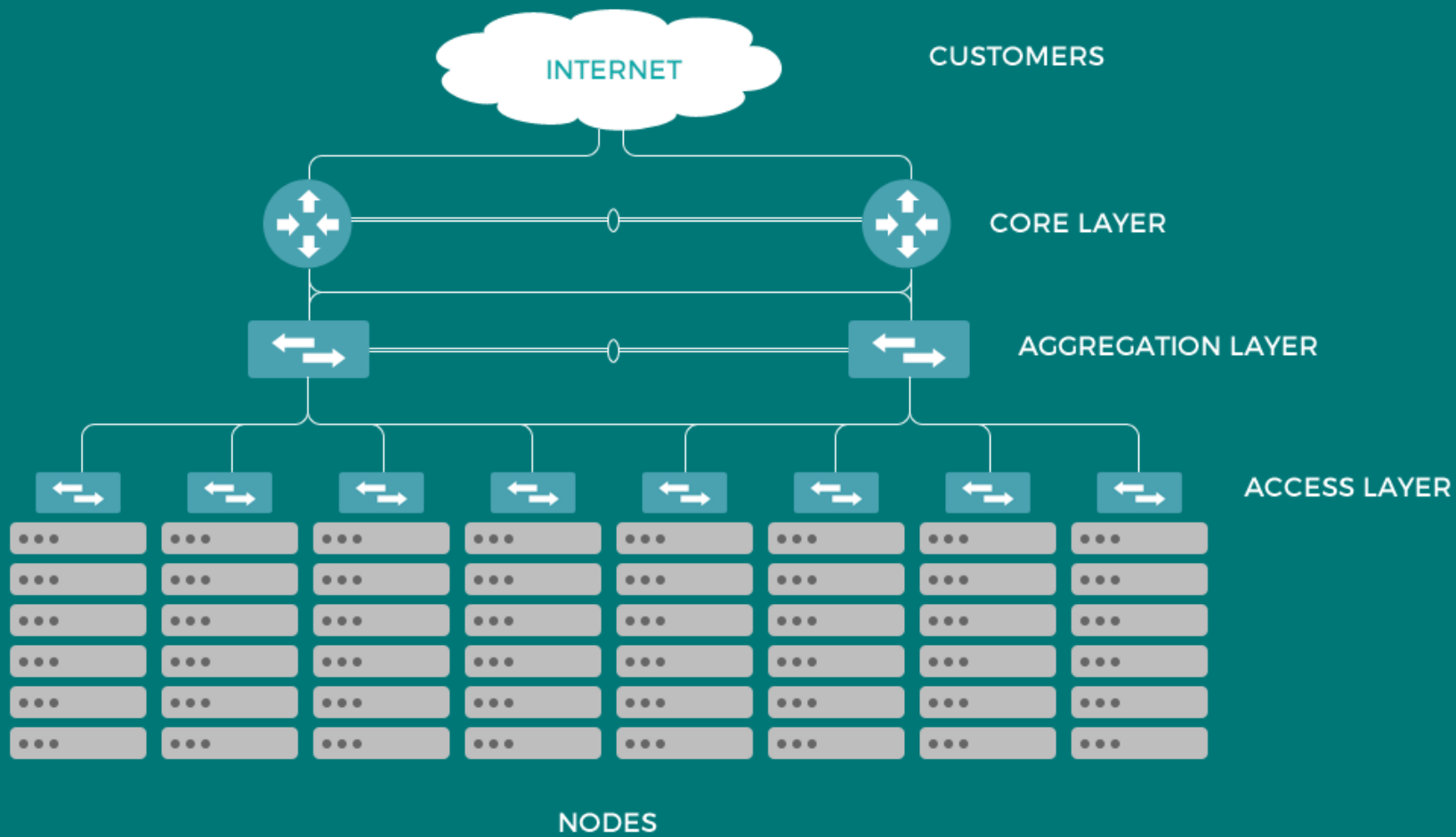
SIMPLE
HOSTING



SERVER

KERNEL RECIPES 2013

- provide large scale multi-tenancy

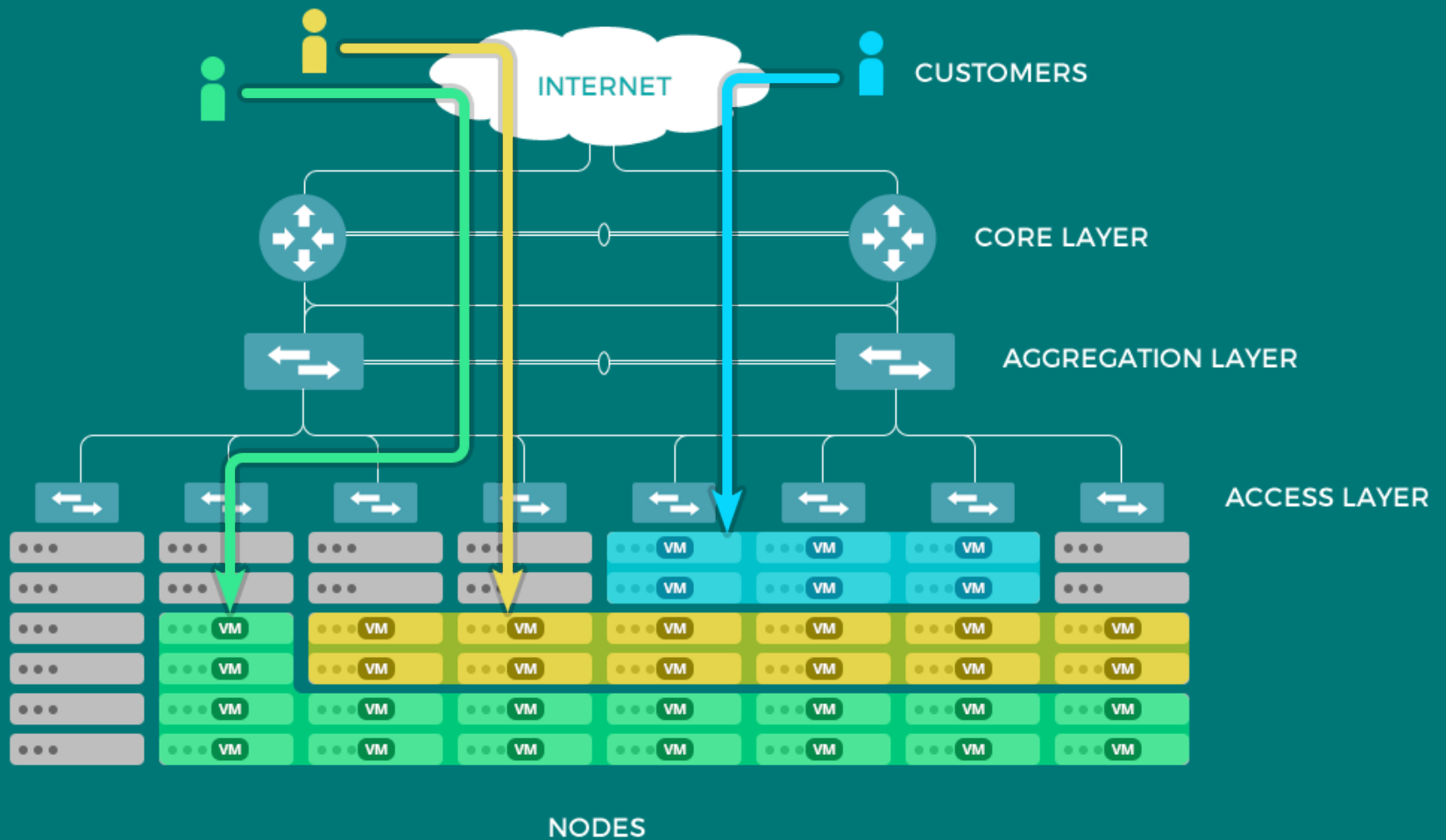


KERNEL RECIPES 2013: REQUIREMENTS

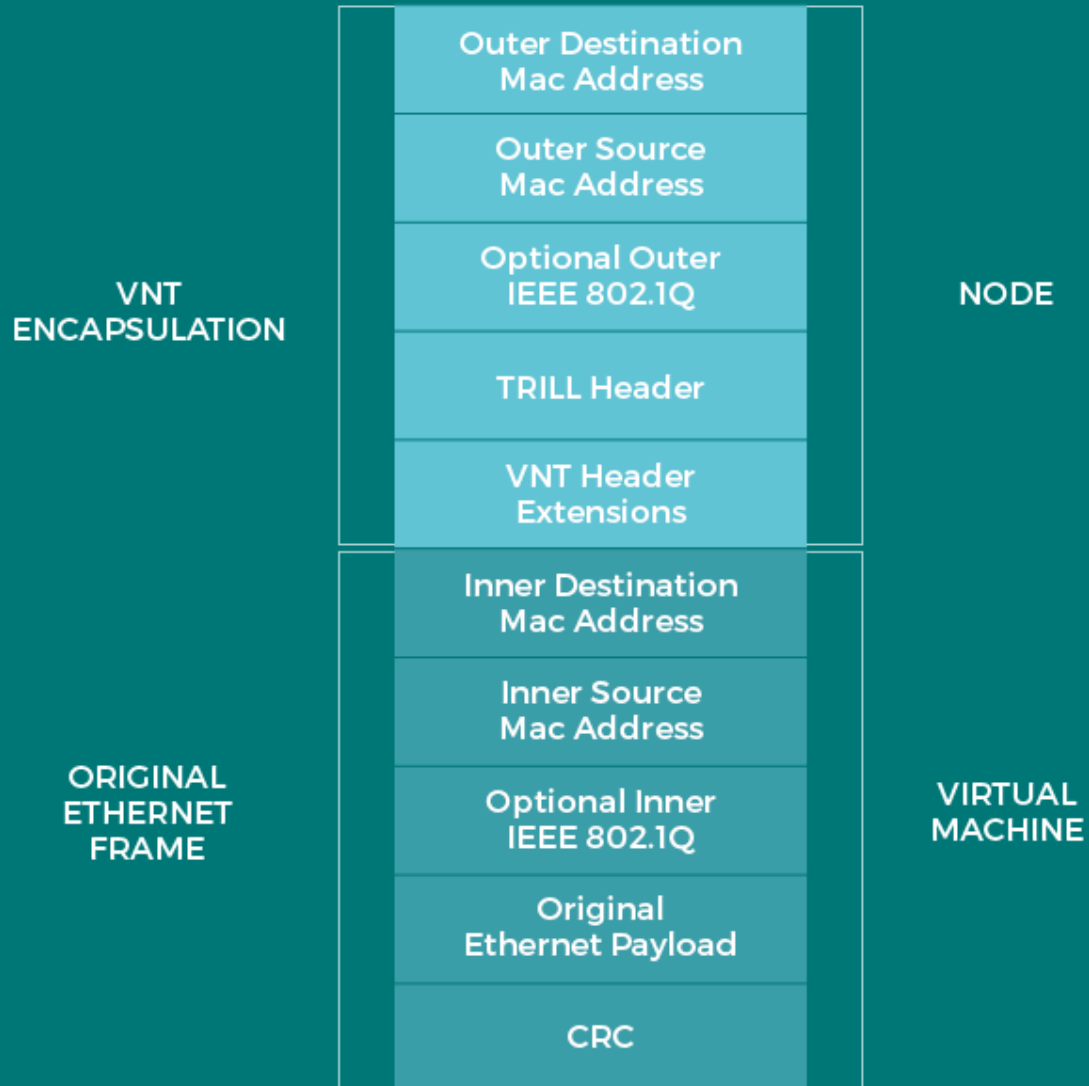
- Seamless VM mobility
- Easy management
- Layer 2 core scaling
- Fault resilience
- VLAN scalability

LARGE SCALE MULTI-TENANCY

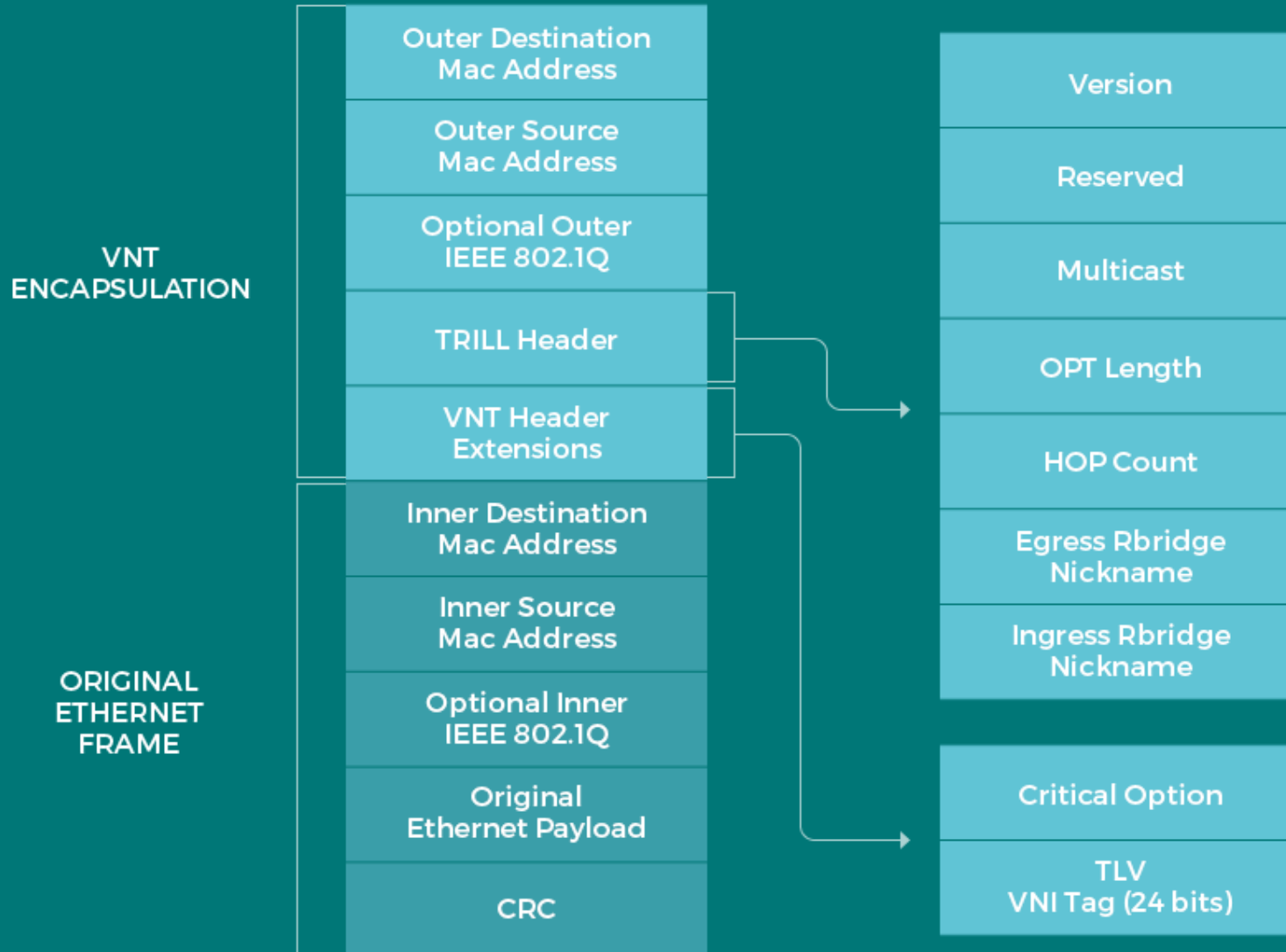
Multiples users using same resources



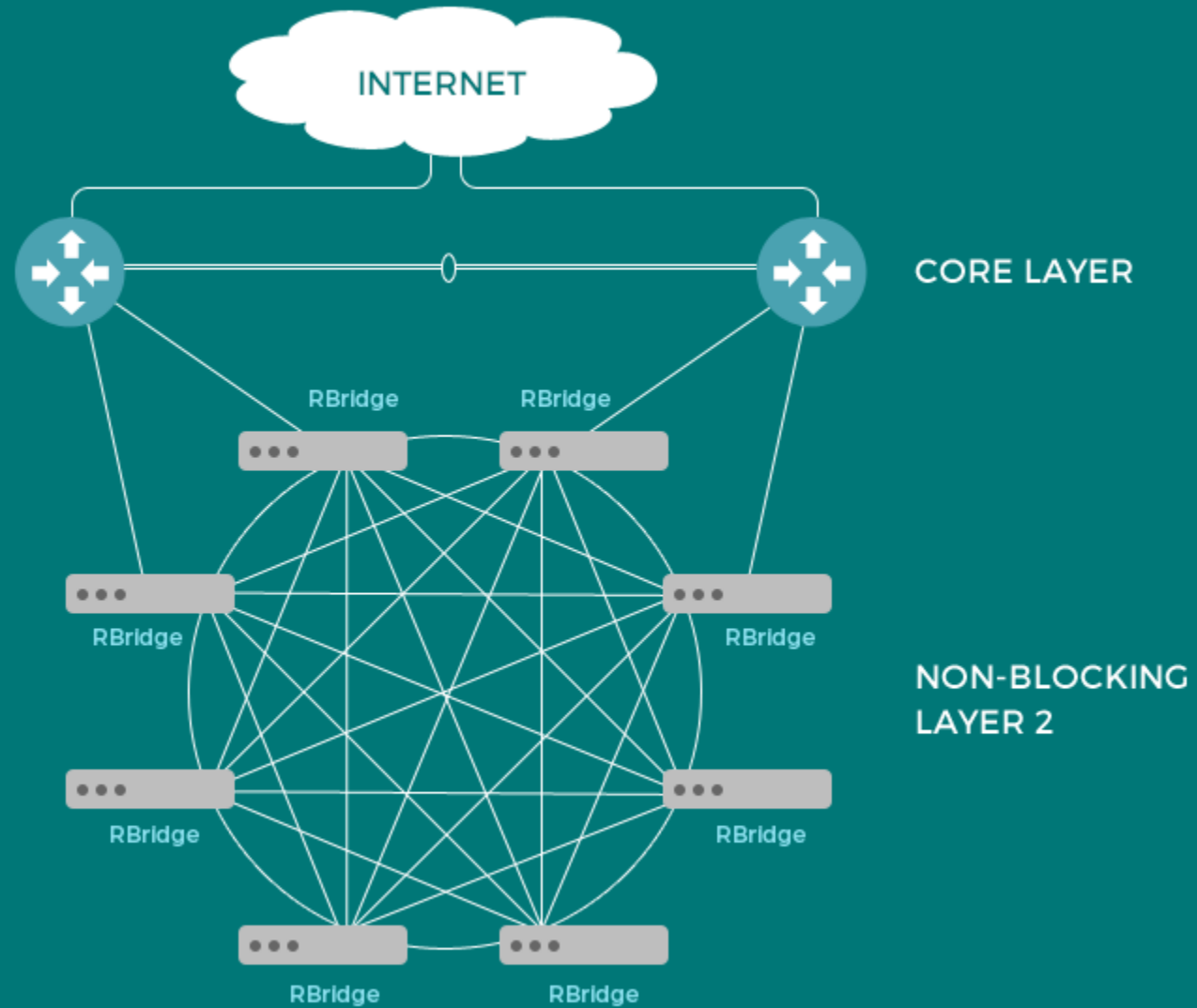
HEADER



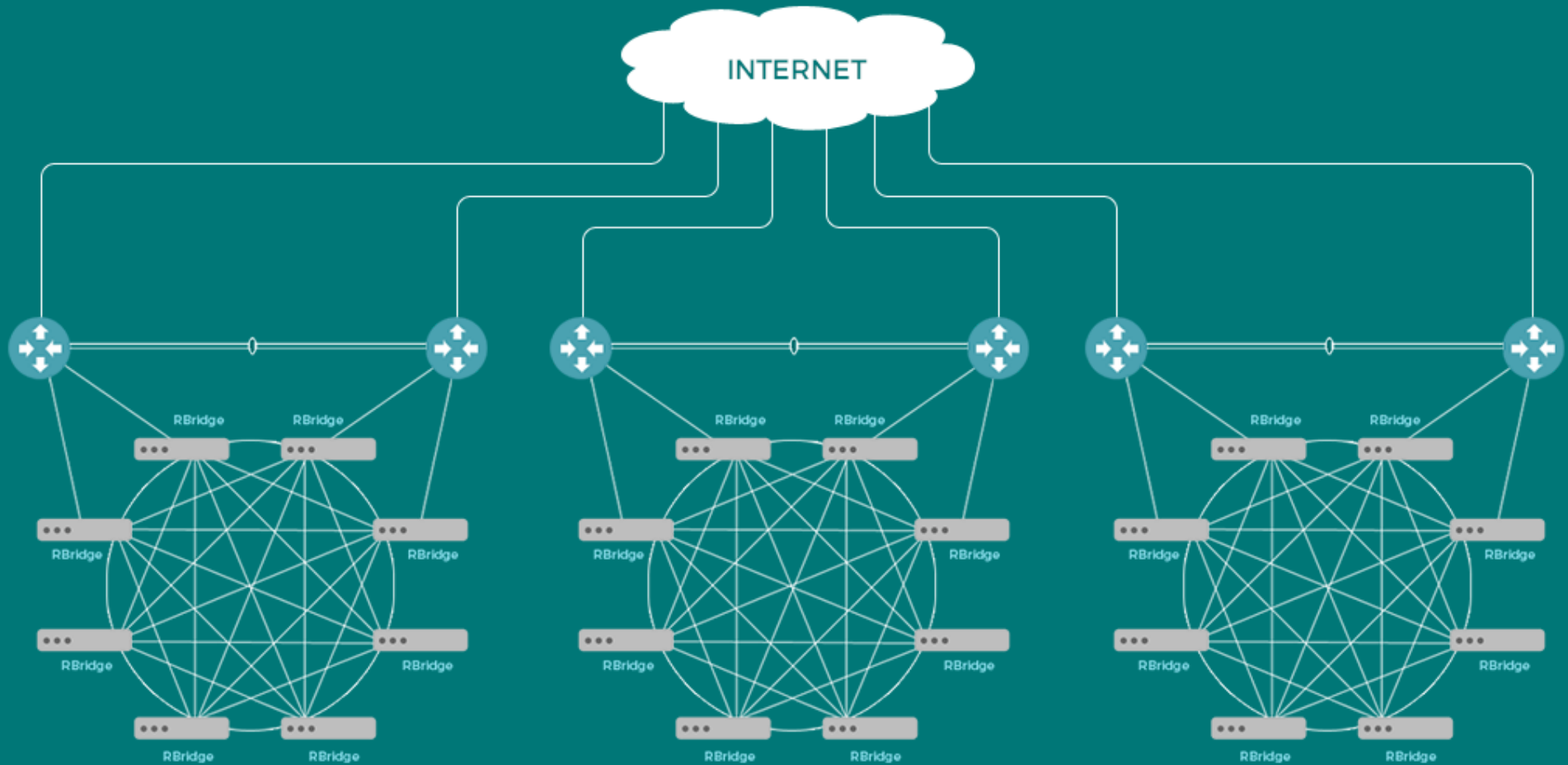
TRILL + VNT FRAME FORMAT



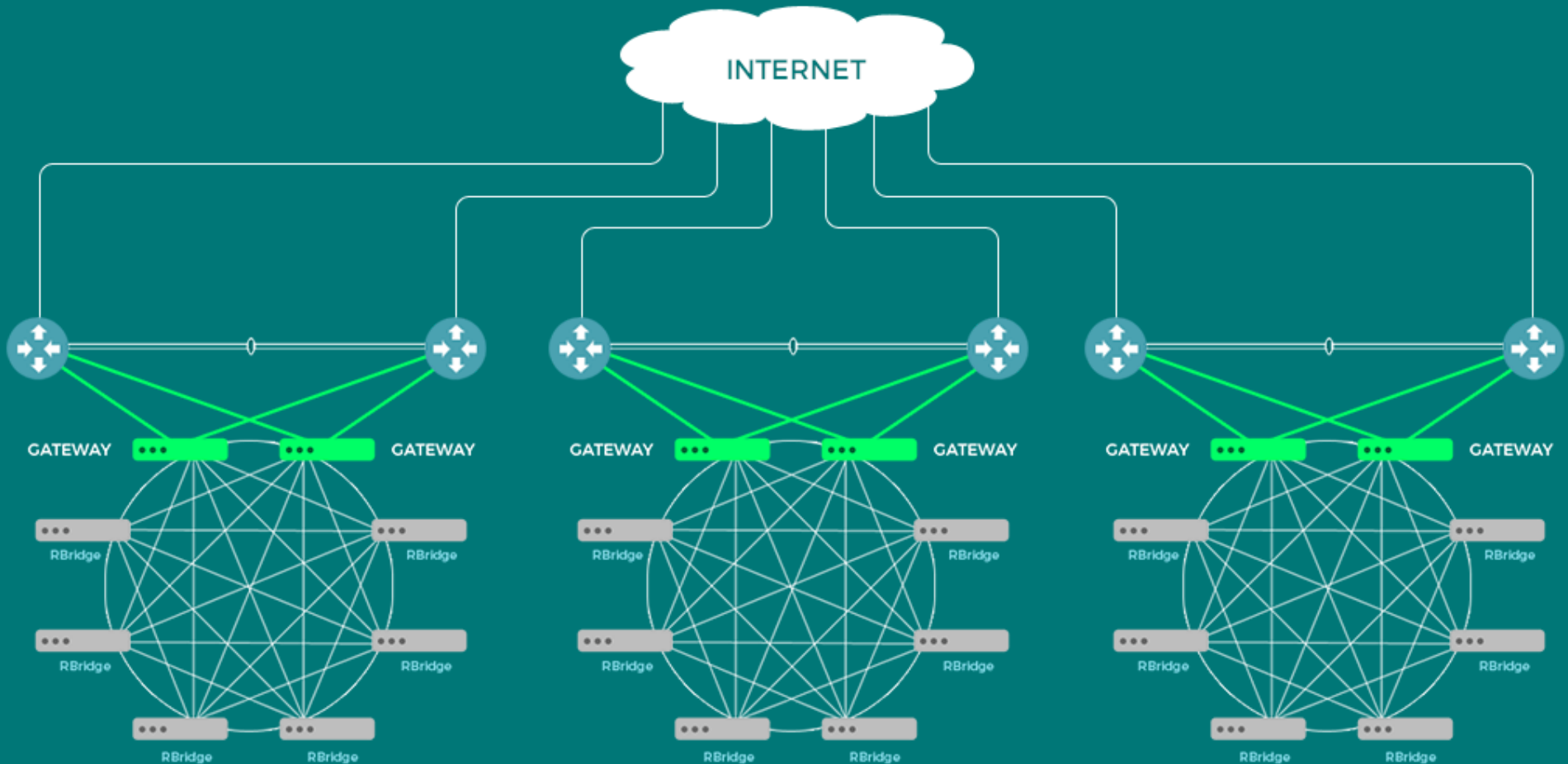
TRILL BASED DATA CENTER



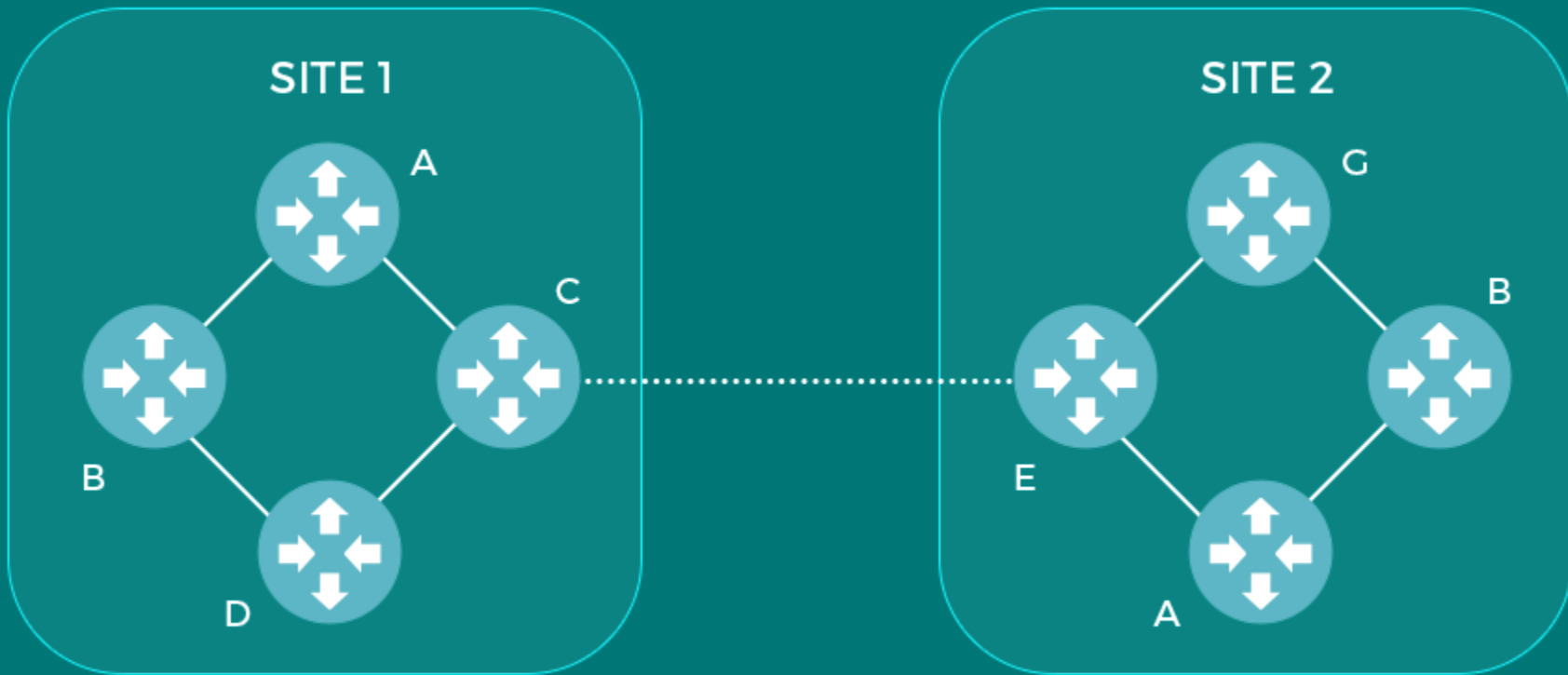
MULTI CAMPUS DATACENTER



MULTI CAMPUS TRILL BASED DATACENTER



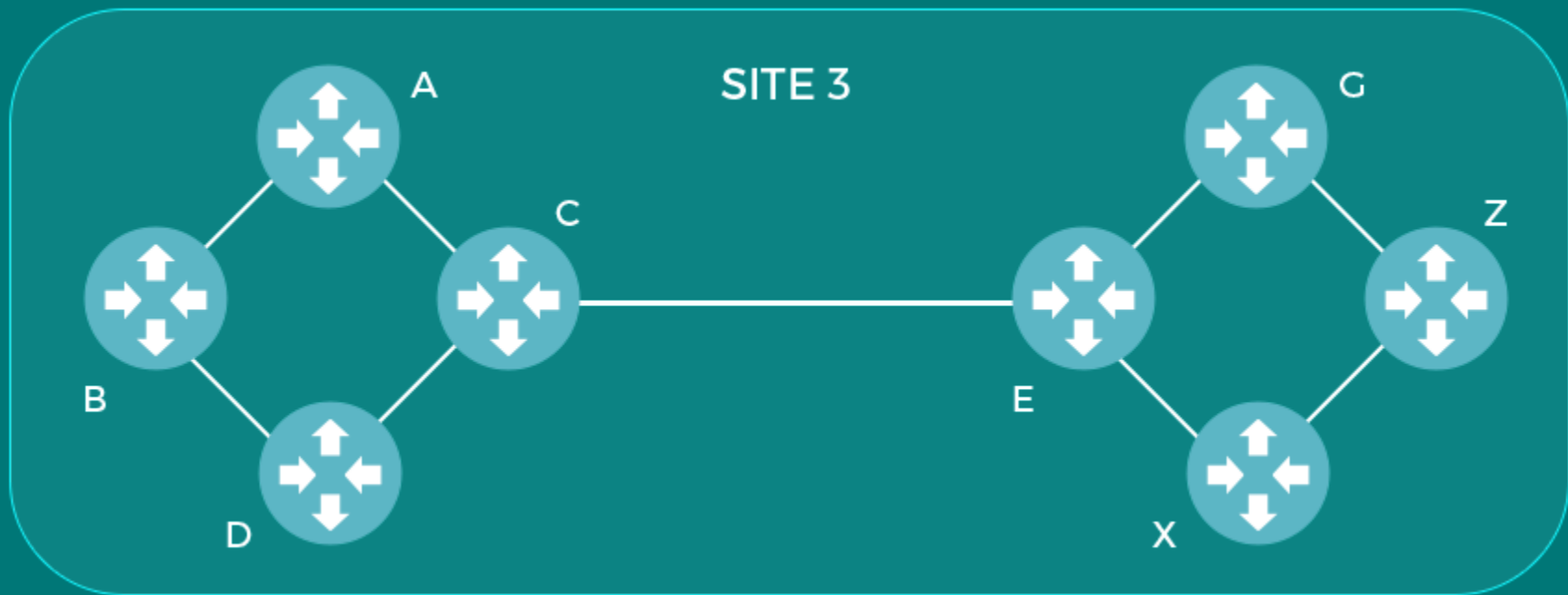
THE OBVIOUS SOLUTION



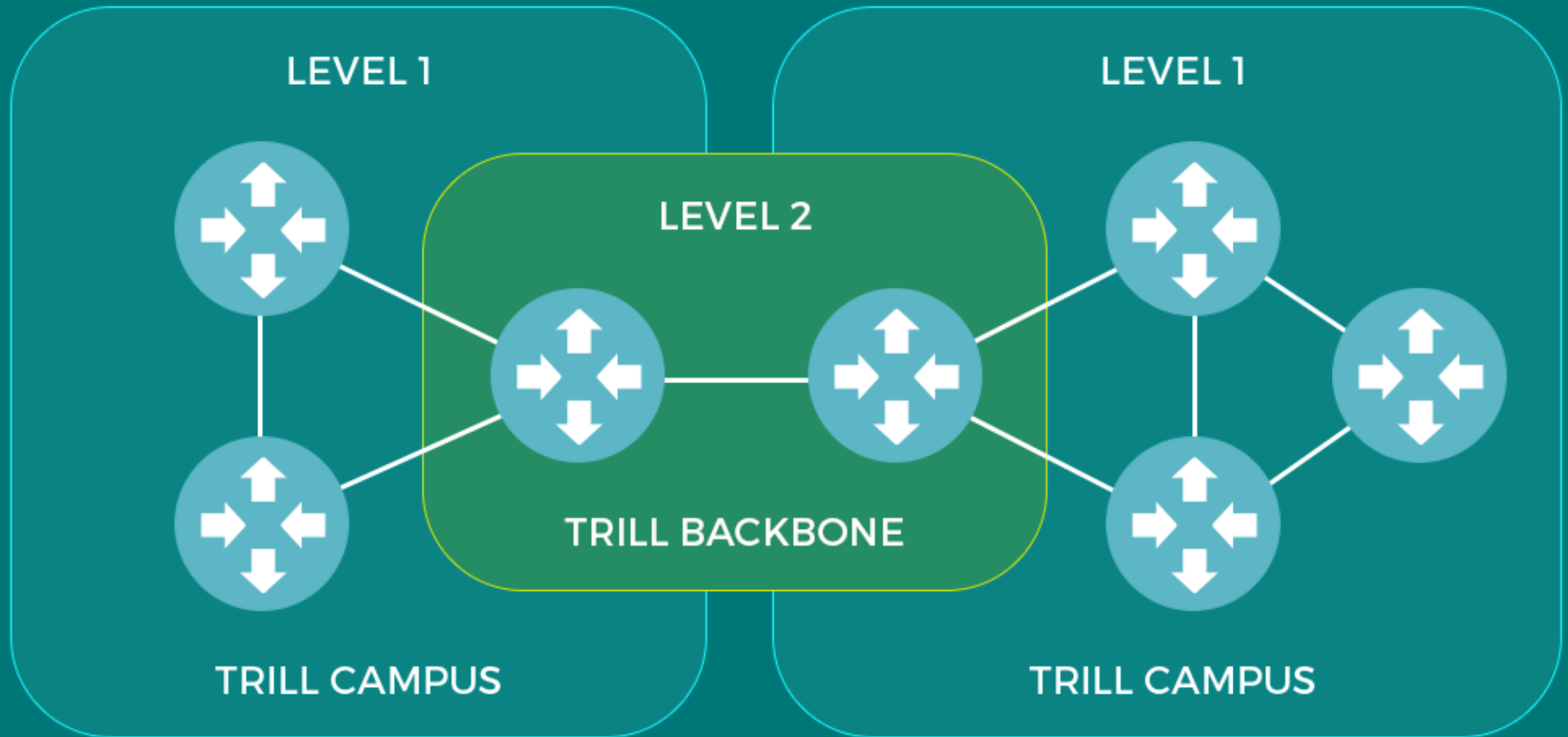
TRILL - ZONE EXTENSION?

- merge zone within trill:
 - topology calculation slow down
 - unique huge area to manage
 - all nicknames must be unique
 - multicast traffic non sense

MERGING ISSUES



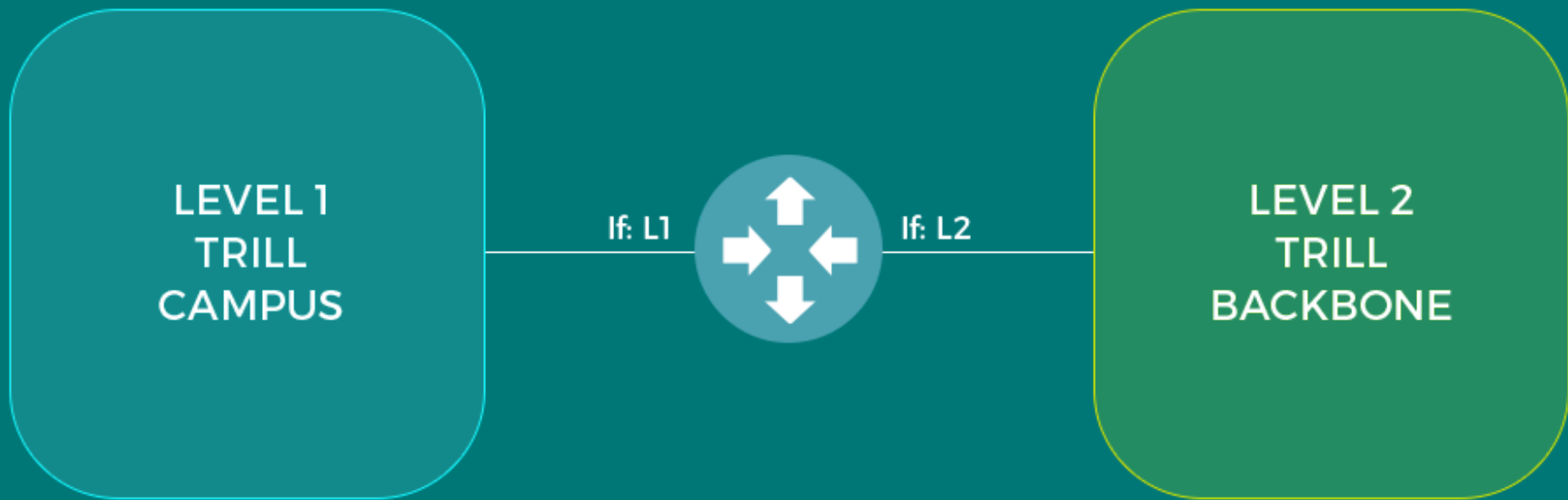
MULTI LEVEL TRILL PROTOCOL (MLTP)



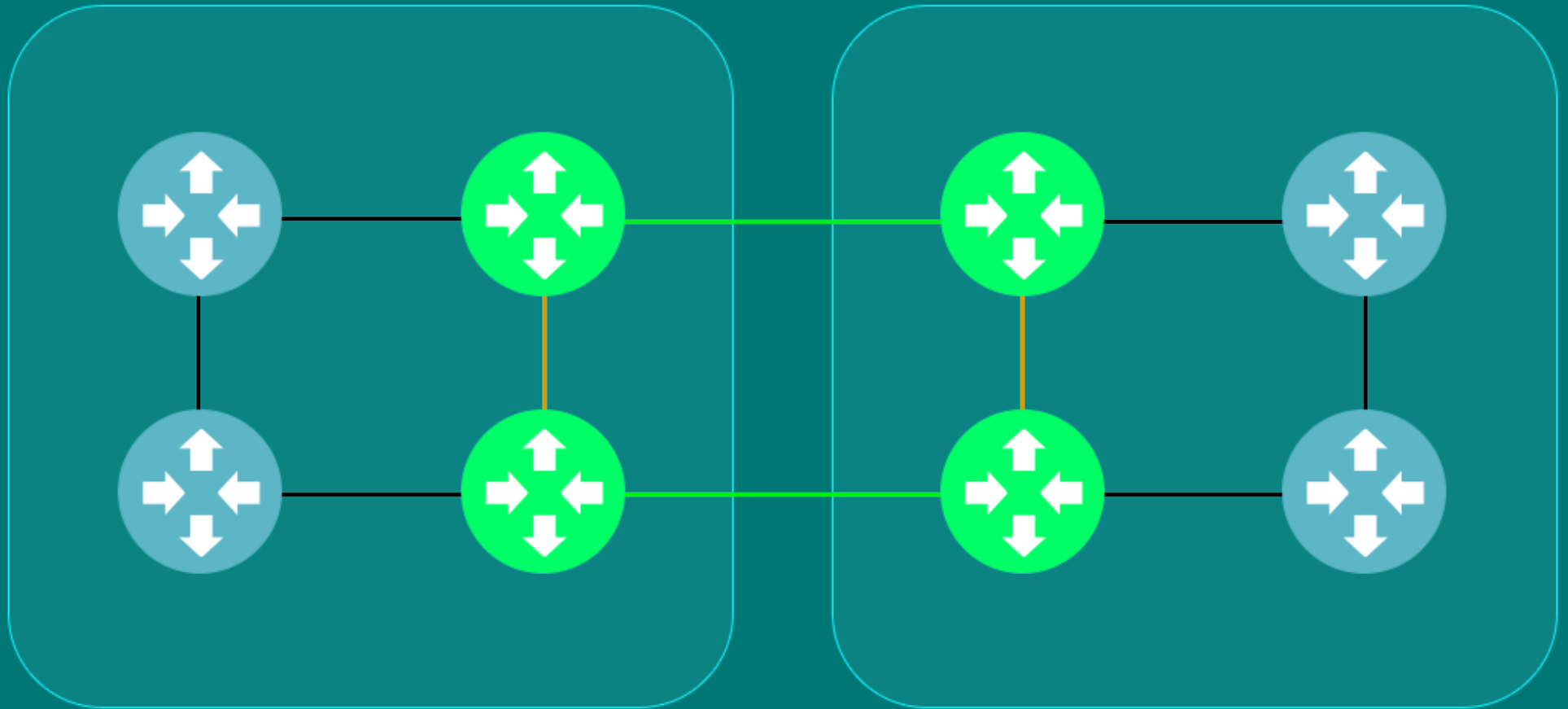
MLTP LEVELS

- level 1: campus
- level 2:
backbone

BORDER RBRIDGE



CONTROL PLANE: LINK LEVEL

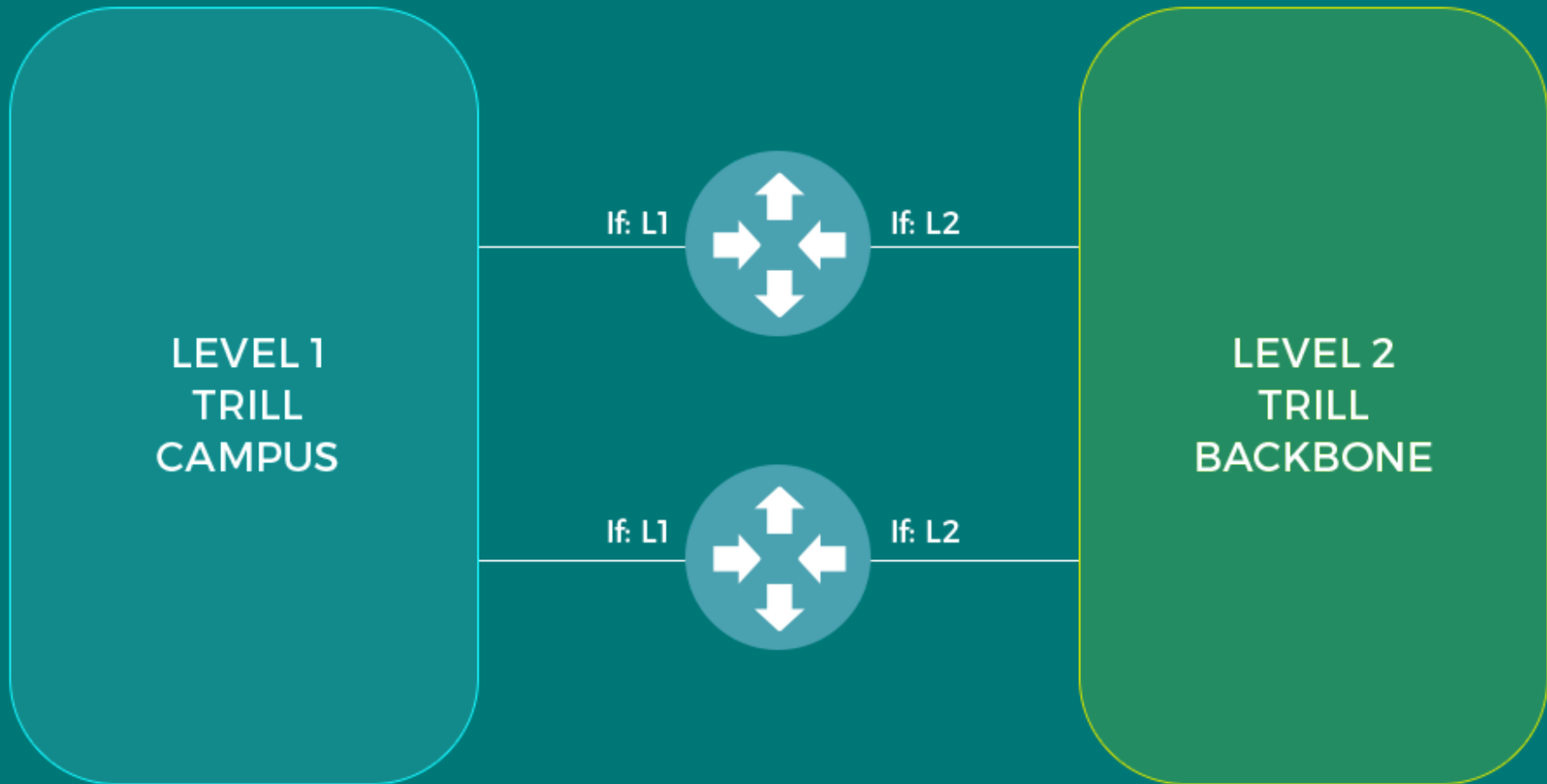


— L1 link

— L2 link

— L1/L2 link

GATEWAY REDUNDANCY

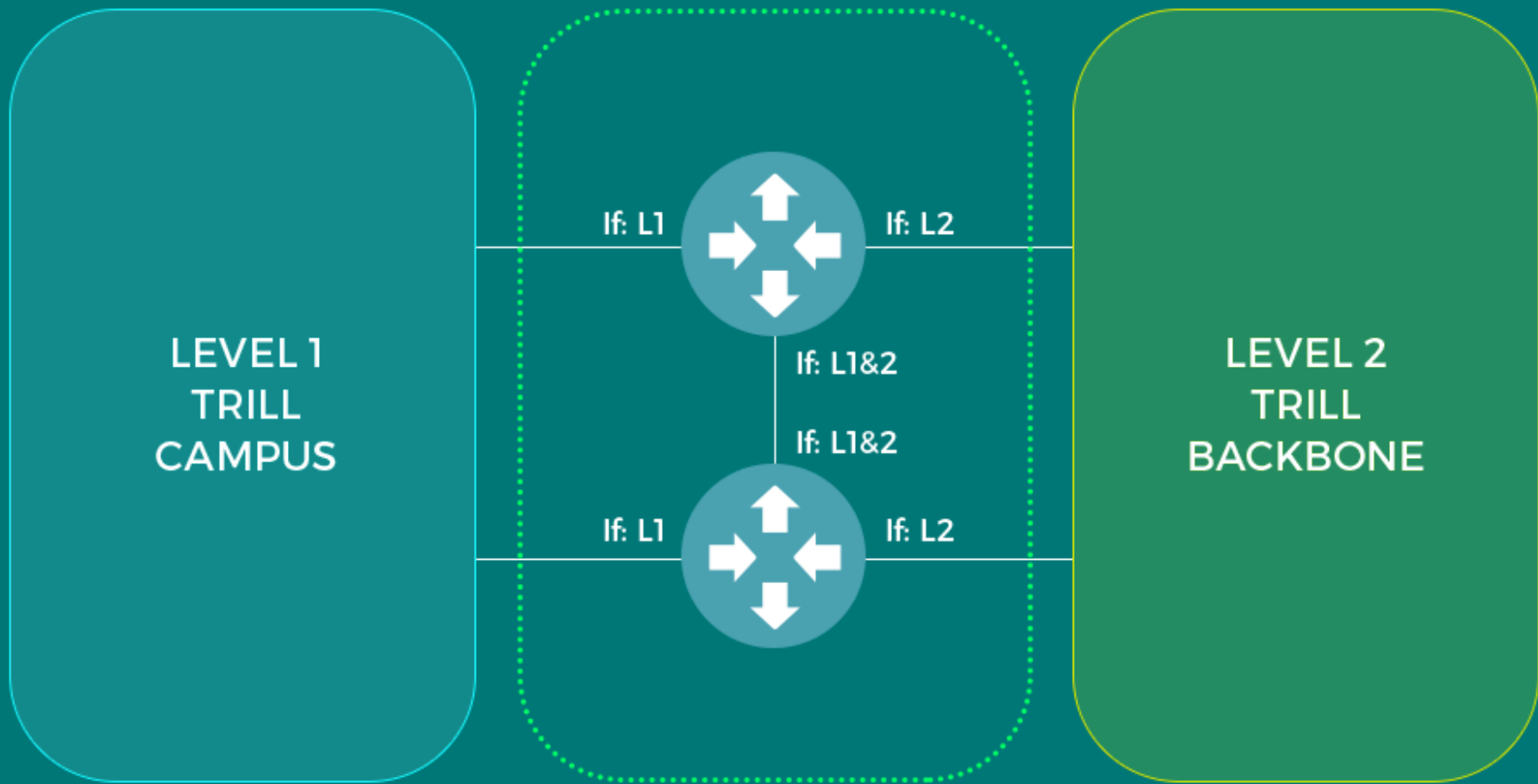


HAVING MANY GATEWAYS?

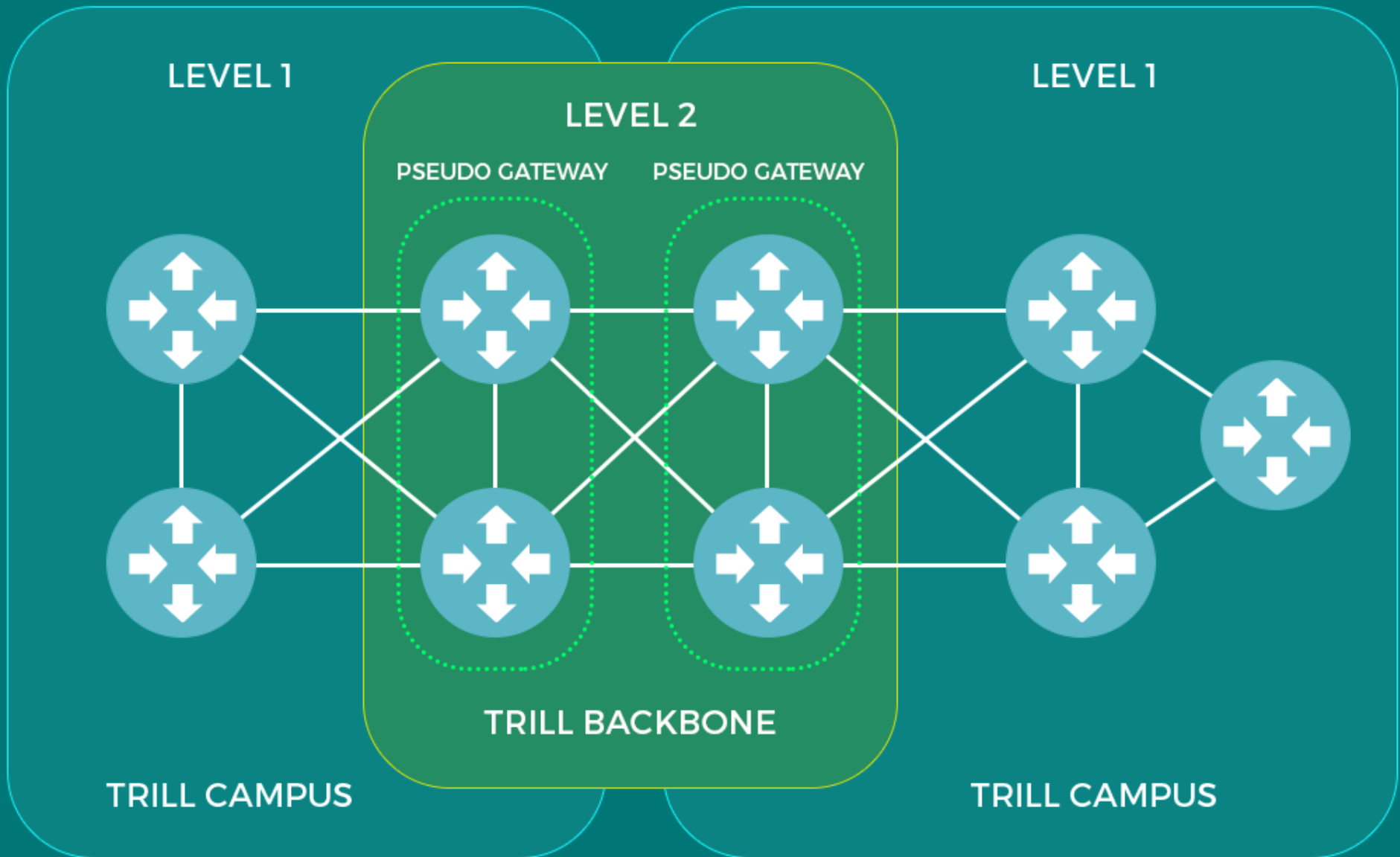
- choose the closest RBridge?
 - What if it fails?
 - What if the return path is different?

PSEUDO GATEWAY

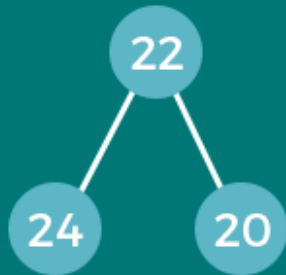
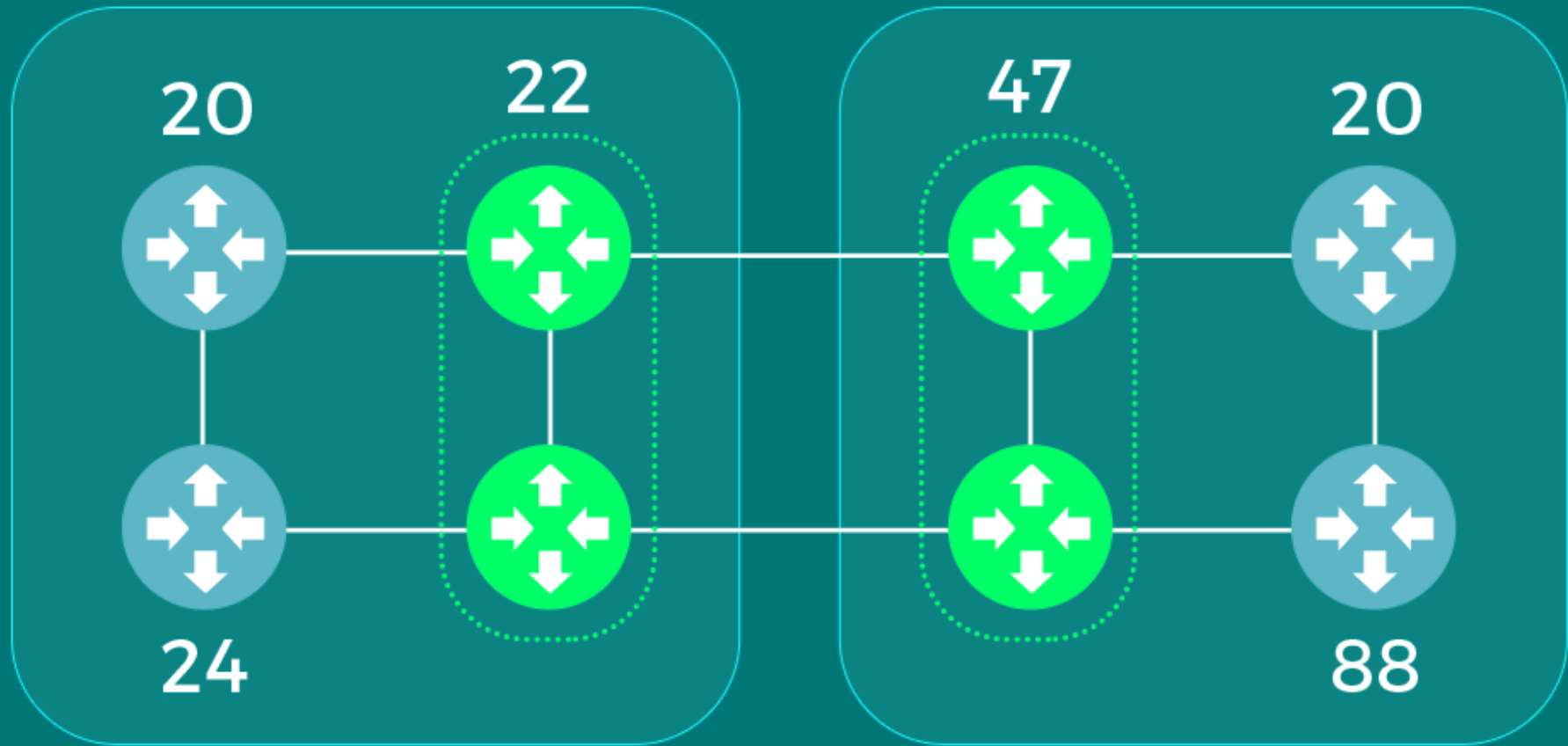
- Uniform way to go outside the campus
- Manage redundancy themselves



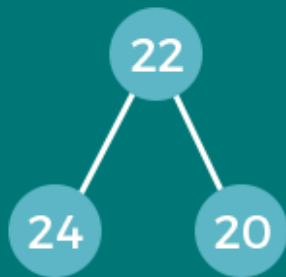
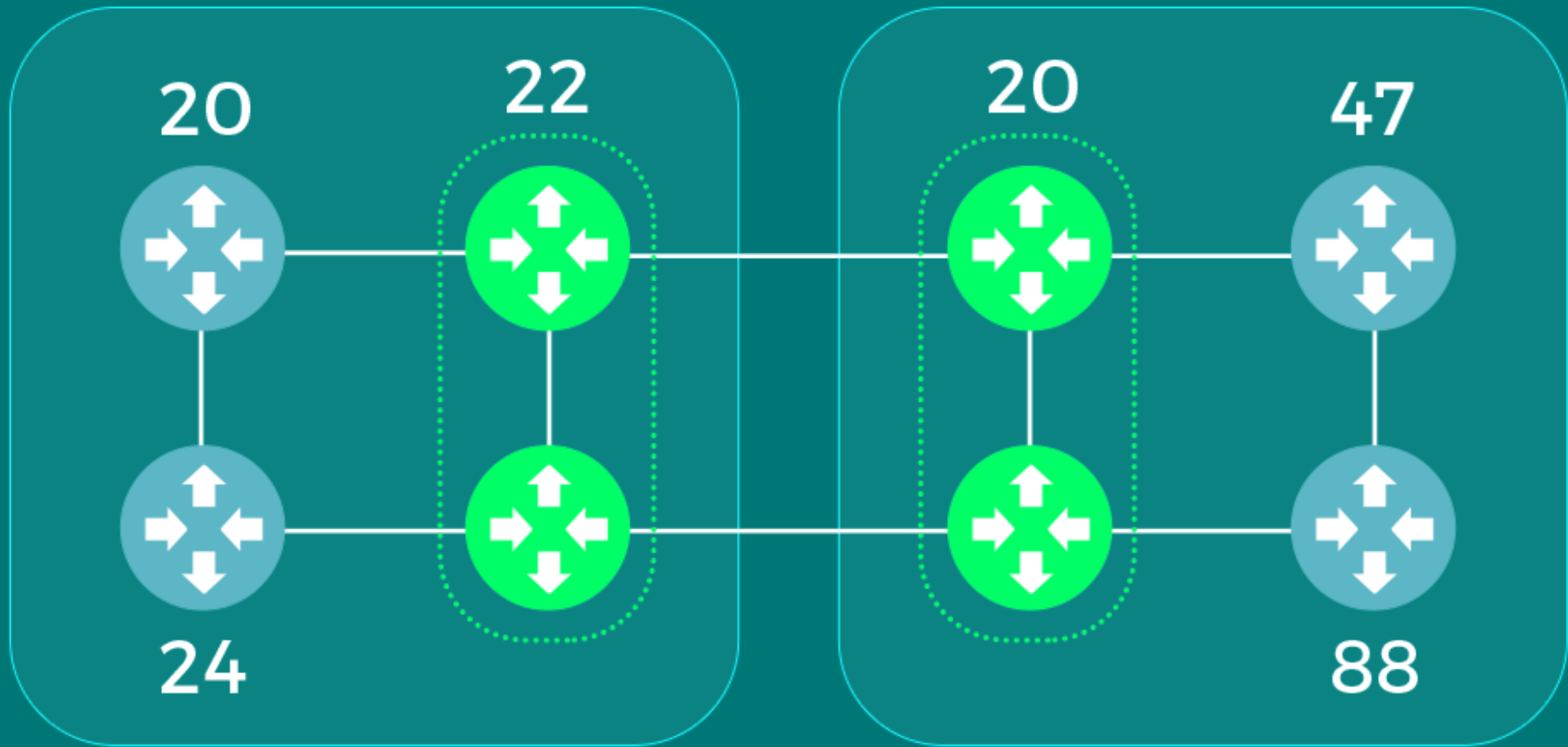
MULTI LEVEL TRILL PROTOCOL (MLTP)



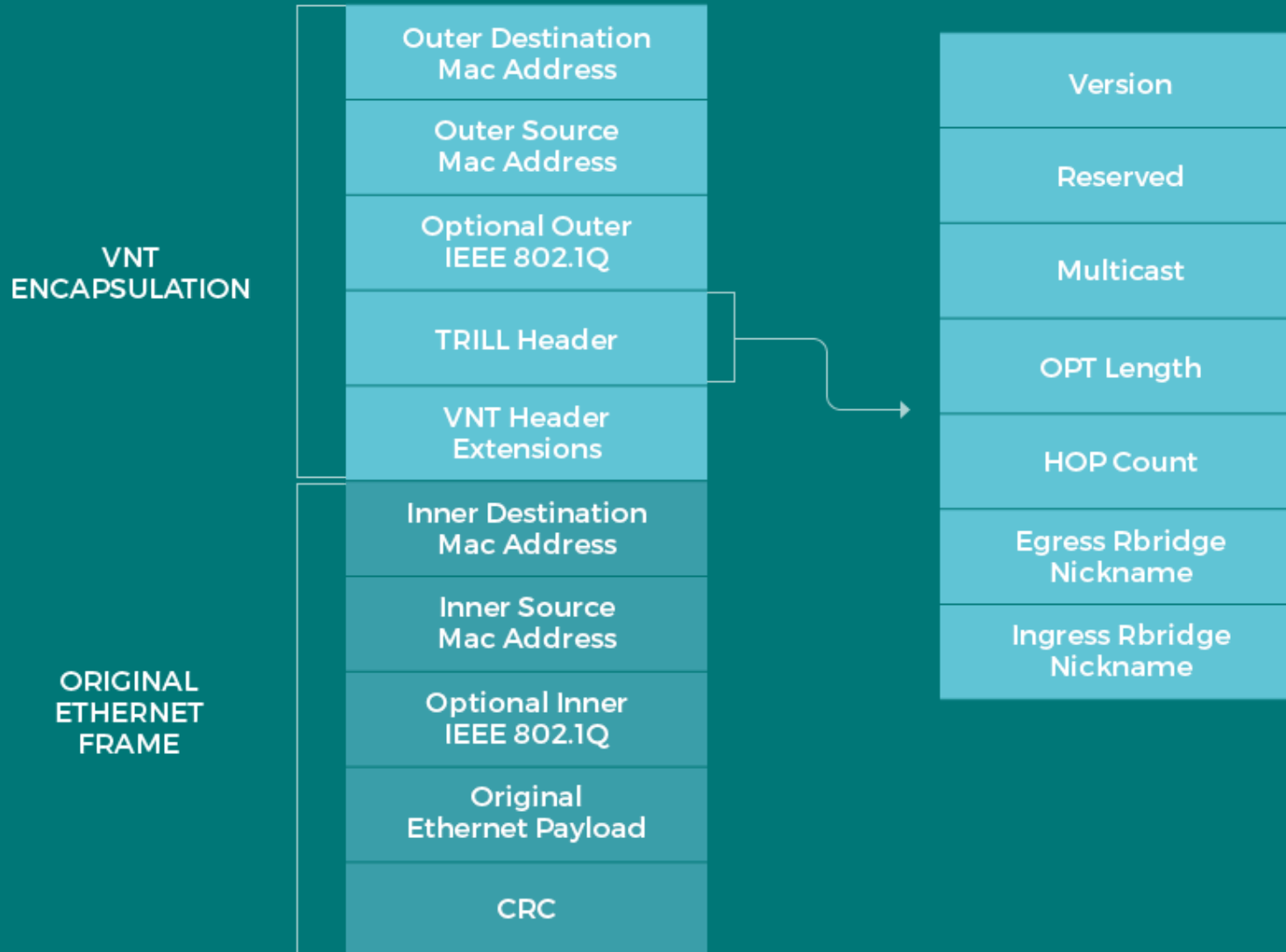
MULTI-LEVEL TOPOLOGY BUILDING



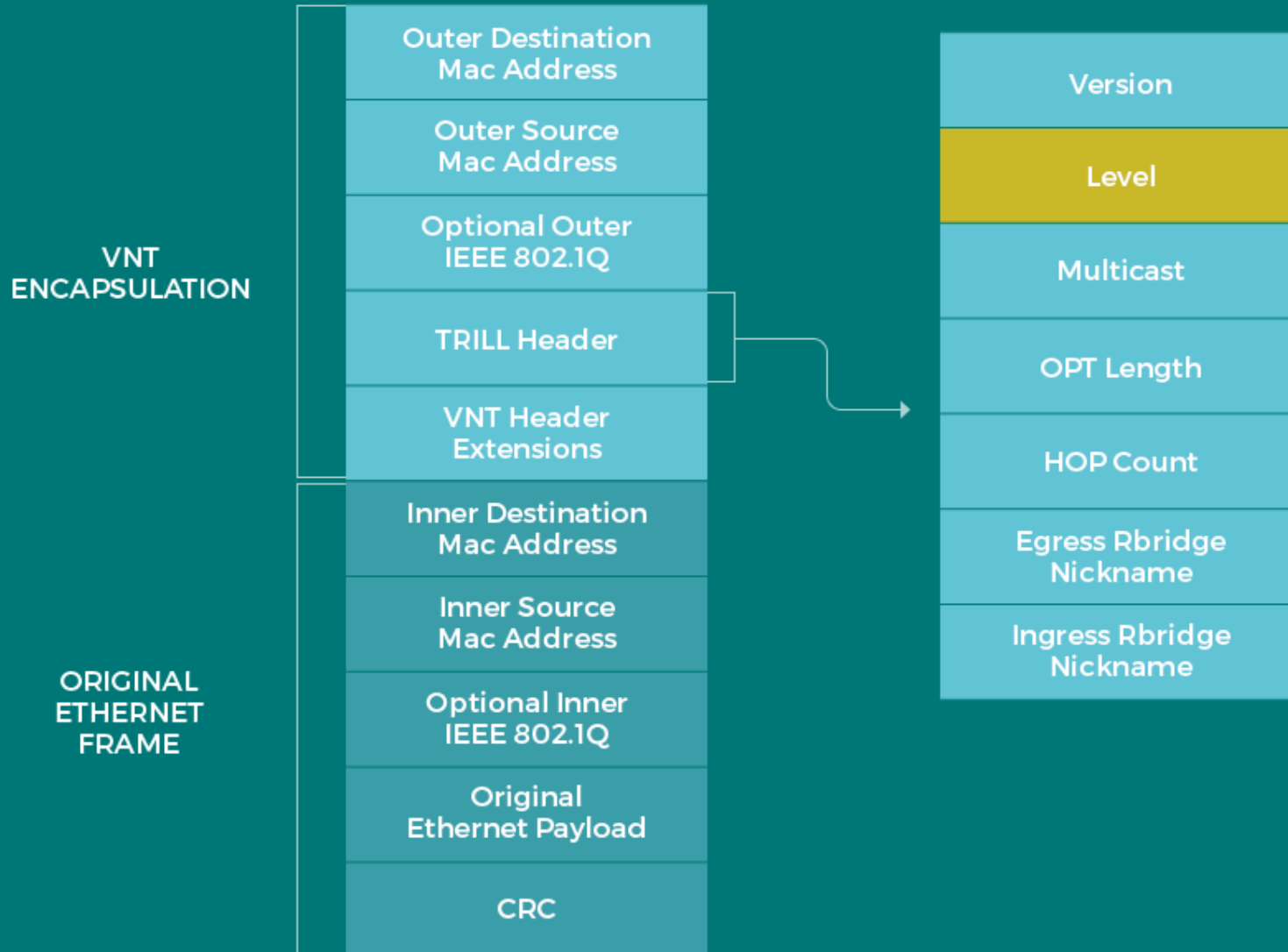
RESOLVING NICKNAME COLLISION



TRILL HEADER



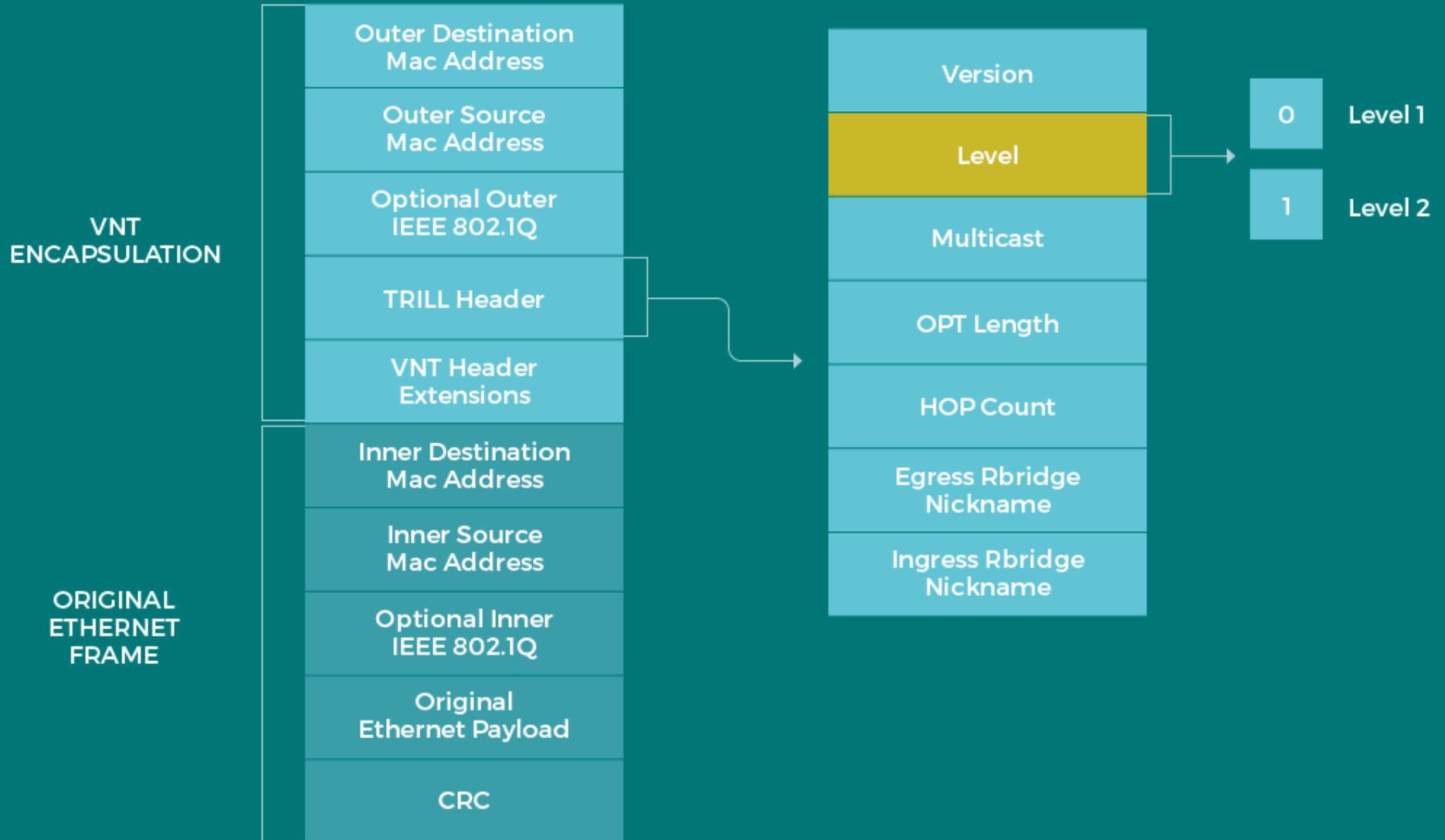
MLTP HEADER



- Datacenter PoP DNS
- Gandi Backbone 10G
- Gandi Backbone 1G
- Peering exchange
- Peering Connectivity
- Transit Connectivity



MLTP LEVEL VALUES



TRILL BASE CODE EVOLUTION

- first implementation in Linux Bridge
 - version evolution in production (v3.4 - v3.10 - v3.14 - v4.1)
- testing public network using TRILL

FUTURE DEVELOPMENT?

- Control plane: OpenVSwitch
 - more attractive nowadays
 - central view
- Data plane: programmable network cards
 - move the dataplane closer to the network to reduce latency

IEEE CLOUDNET 2015

Valentin Del Piccolo (Ph.d student), William Dauchy

"Multi-Tenant Isolation in a TRILL Based Multi-Campus Network"

Gandi SAS - University Pierre & Marie Curie

TRILL + VNT sources: github.com/Gandi/ktrill

GANDI.NET

Gandi Hosting - gandi.net/hosting

William Dauchy - william@gandi.net

slides pres.gandi.net/kr2015