

Citi Architecture & Technology Engineering
L4-L7 Edge Services, Citi use-cases

Citi Proprietary

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- Firewall
 - Perimeter FWs enforcing centralized policies to protect Citi from the external attacks
 - Distributed FWs (future) for function such as multi-tenancy and cross-tenant policy enforcement
- Load-balancer
 - External facing load-balancers for external access to Citi web services
 - Internal facing load-balancers supporting internal application communications
- WAN Acceleration
 - Traffic optimization across WAN links to branches
- Traffic Monitoring
 - Monitoring of WAN traffic
- SPAN / TAP
 - On-demand traffic collection for detailed analysis . Traffic is SPANed or TAPed at required switch ports and sent to different analyzers.

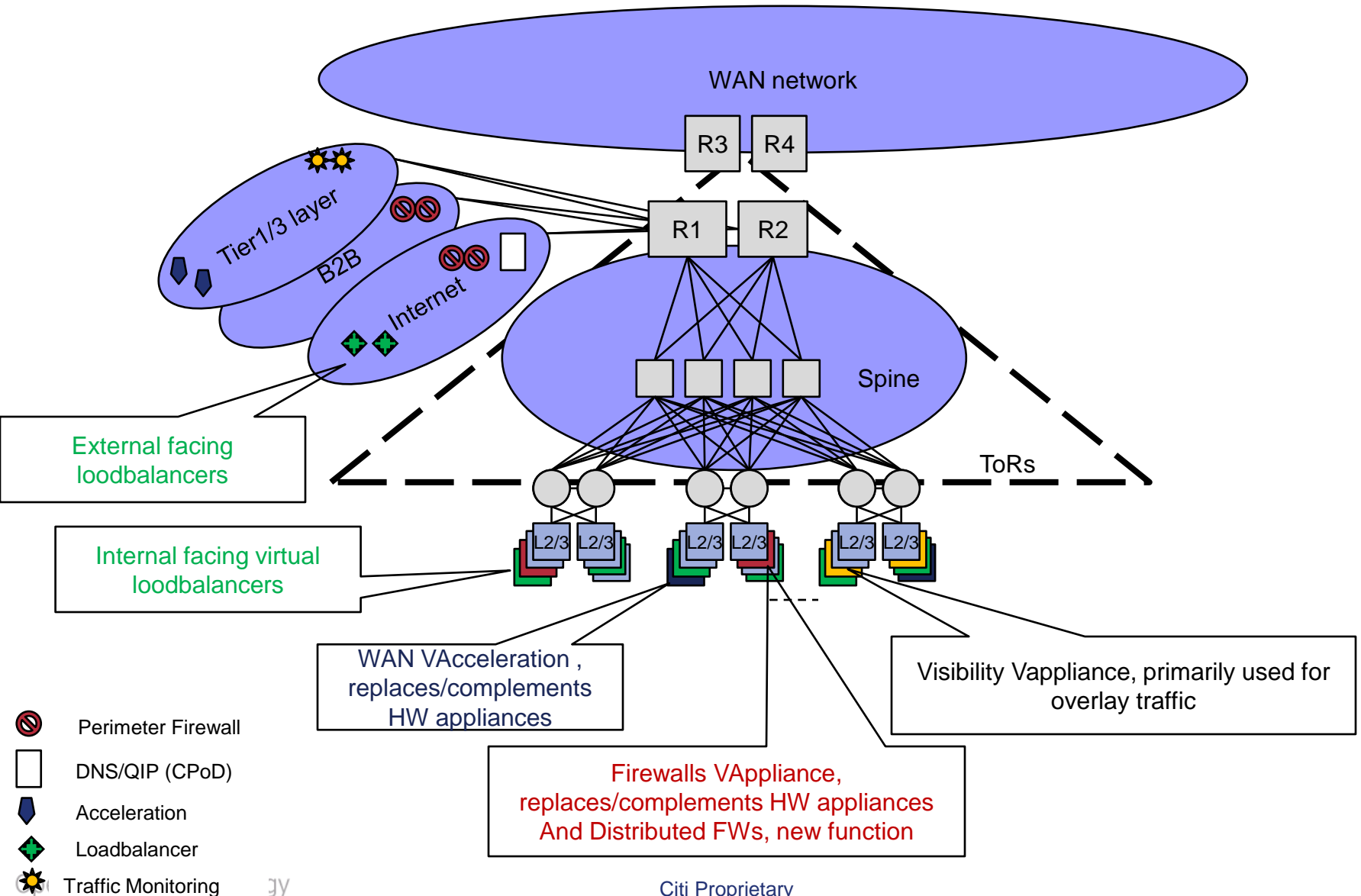
Today all Edge functions are implemented in HW appliances. It has its set of challenges such as Service mapping and location is static and leads to asset sub-optimal utilization.

Citi is adopting Software Defined Data Center (SDDC) technologies which will help virtualize and centrally orchestrate all infrastructure (services, network, compute and storage) resources.

We anticipate that HW and VAppliances will co-exist serving varying needs of features and scale requirements. However, they will be orchestrated by the same CMS. This helps not only address current challenges (long provisioning process, not flexible, sub-optimal asset utilization etc), but also opens up new opportunities.

Next slide shows near-future Citi data center and (implementation of) edge services

Edge Services in Citi Data Center



Optimized Edge Services – our business goals



- Asset Optimization
 - Scale out services with virtualized appliances
 - Optimize the asset utilization among available instances of appliances (virtual and hardware) using dynamic service chaining
- Static to Flexible Service Enablement:
 - Today appliances offer static set of features (in most case too many)
 - Goal is leverage the features as needed and where needed in order optimize the service enablement scale and feature density. This will also help many applications for security and troubleshooting etc..
- Complexity to Simplicity:
 - Multiple instances of vappliances, service-chaining can now map Edge services with features that application needs (easier migration and mobility managements, better resource utilization)
 - Enables having smaller failure domains and simplify performing operational task (upgrades, bug fixes etc)
- On technology side, multi-vendor interoperability is key for us.
 - Requires standard based approaches for service chaining