The Future of Application Delivery

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The Future of Application Delivery

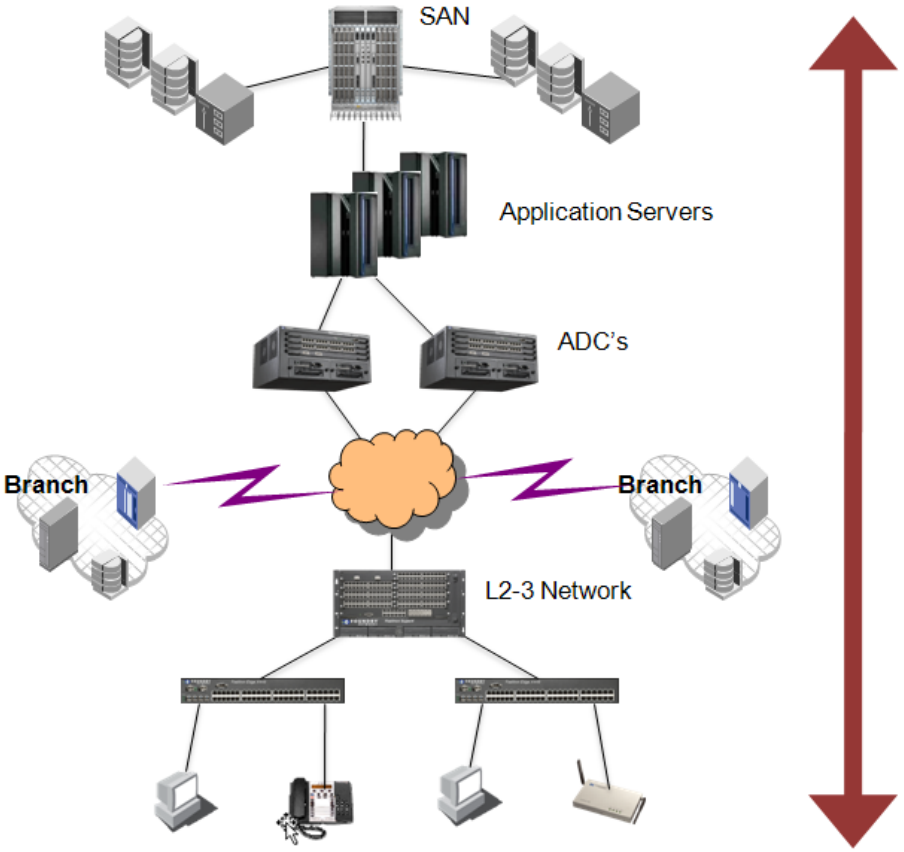
- Virtualization in the ADC space
- Application Quality of Service
- Scalability for ADC's
- Next Generation Security Services
- Highly Scalable WAN Optimization Services
- ADC's & Storage Area Networks

Virtualization in the ADC Space

- First wave virtualized the back end servers via ADC's
- Second wave virtualized the servers (ie VMWare, HyperV, Xensource) and portions of the network (datacenter)
- Third wave is to fully virtualize the ADC and provide Virtual Service support for the virtual server
- Virtualized ADC's will make a single ADC look like multiple ADC's
  - Each VI (Virtual Instance) will appear as a stand-alone ADC
  - Each VI will have some defined share of resources (hardware vs. software virtualization)
  - Global and Local VI role based management will be required
- Support for dynamic virtual server binding in ADC server pool
  - Automatically insert/delete virtual server instance into appropriate pool
  - Might want to provide this from mgmt system rather than directly on ADC

Application Quality of Service

- Network (L2-3) infrastructure has gotten a lot better at providing QoS support (a la VoIP)
- Net Neutrality issue
- Applications are going to be more network aware in the future
- Backend storage systems (SAN switches) are getting better at providing QoS support
- In the future ADC's should provide both L2-3 and L4-7 QoS support for both normal and virtualized services
- End to End QoS is the goal



Scalability for ADC's

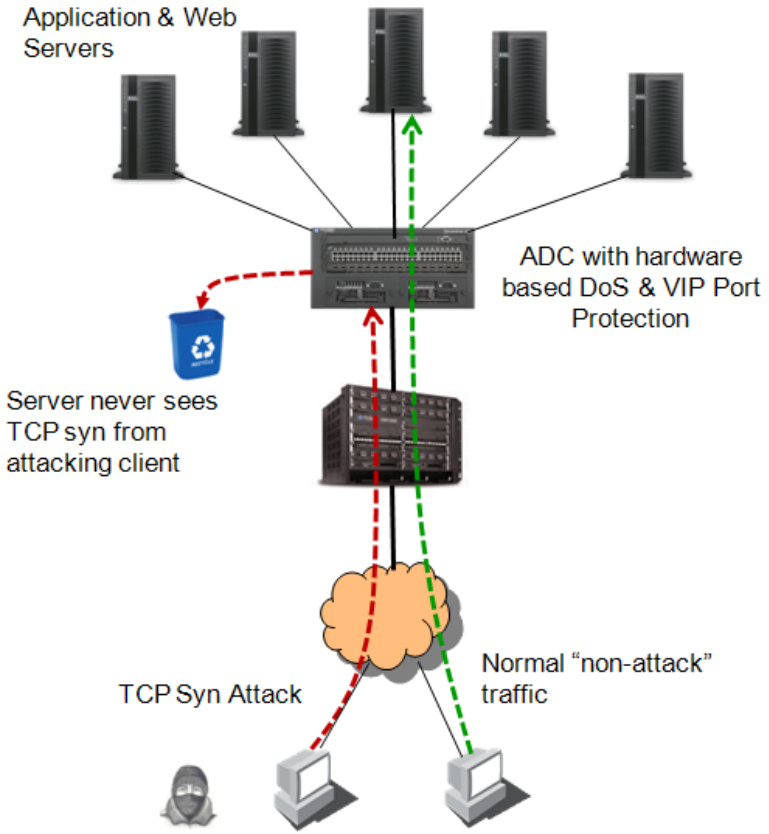
- Fixed configuration, PC based ADC's have been used heavily in the enterprise
- Service Providers focus on more modular solutions for reliability, high throughput applications (streaming media), and higher density Gig and 10Gig capabilities
- Just like in the L2-3 space, where SP functionality was eventually demanded in the enterprise space – the same thing is likely to happen in the ADC space
- Look for increased numbers of cores to be used in both fixed and configuration ADC platforms
- Larger numbers of cores could be used to support hardware based virtualization (allocating cores & memory to a specific function)
- Most ADC's come with 2-4GBytes of memory per core. Look for support up to 16GB in the late 2009, early 2010 timeframe as memory prices fall
- Internal disks may be replaced with Fibrechannel (SAN) capability in the future
- Symmetric Multiprocessing is complex; Asymmetric has linearity issues

Next Generation Security Services

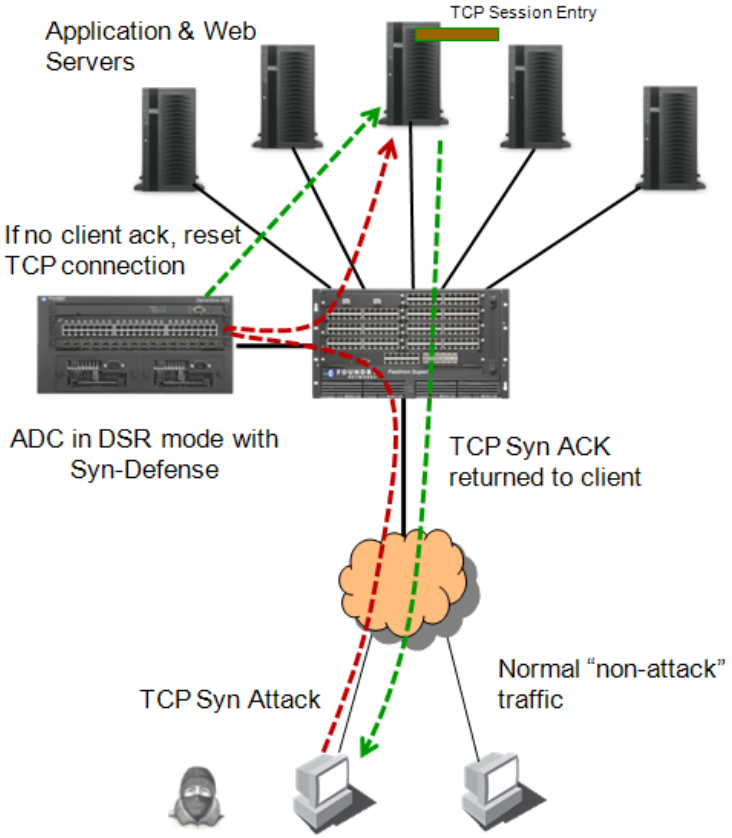
- Hardware support for DoS Attack (syn-cookie) & VIP port protection is now required
  - Protection at up to 30M syn/sec will be the datacenter requirement by next year
- Some basic security filters should be provided by the system (for well-known L2-3 and L4-7 attack vectors)
- Should RegEx processing (Snort) & Zero Day protection be in an ADC?
- URL and SPAM filtering are a good add on, but can add complexity to the ADC (need even more memory)
- What about IPSEC termination for end-to-end encryption?
- For inline ADC support, L2-3 ACL's and Rate Limiting should be provided

DoS Attack Protection Modes

Inline Syn-cookie vs. DSR mode



Inline non-DSR mode protection

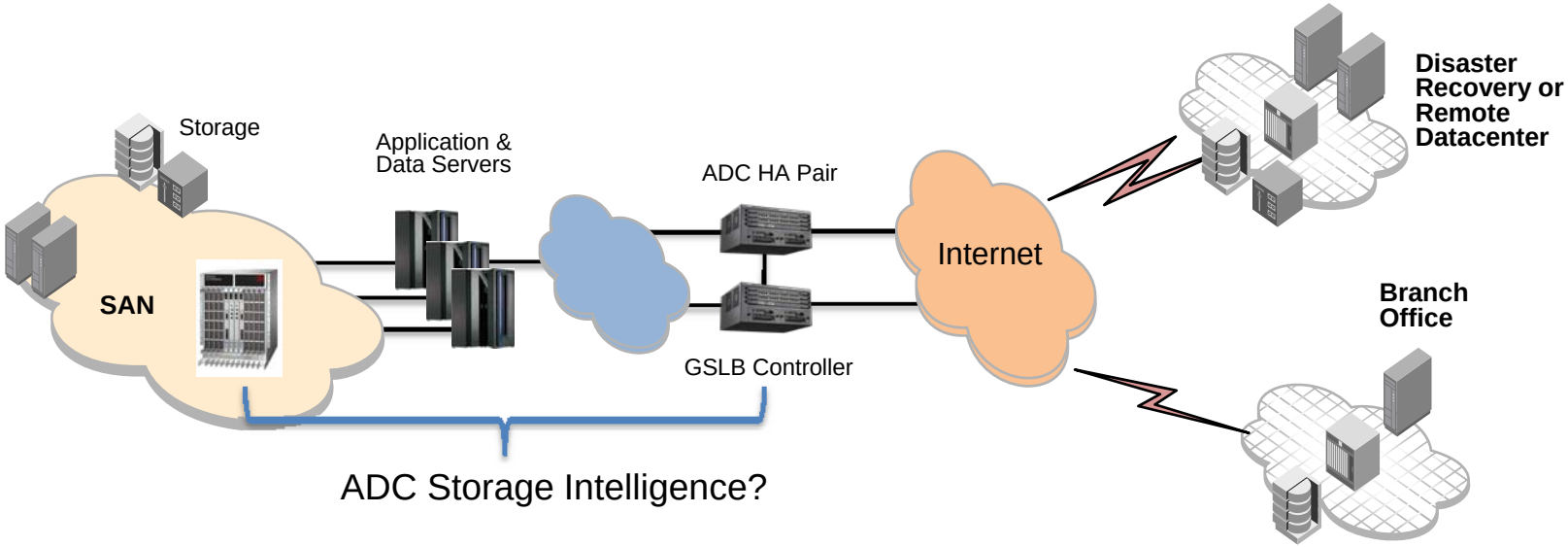


DSR mode protection (more tricky)

Highly Scalable WAN Optimization Services

- ADC and Wan Optimization Controller (WOC) markets are separate right now (Gartner has separate MQ's for ADC and WOC)
- Will WOC functionality integrate with ADC's or with WAN routers?
- Our view is that WOC functionality probably makes more sense ultimately integrating with WAN routers, but there may be some functionality that integrates with ADC's in the future
- While WAN prices were depressed after the "Great Optic Buildout," prices are starting to be more stable and a problem for the enterprise & SP
- Clearly some HTTP and application compression capability is already integrated into the ADC products
- We see the need for compression at up to 40G in some high-end environments (SP mainly)
- Compression at up 5-10G in a mid-range ADC will be needed by 2009

ADC's and Storage Area Networks



- End-to-End, Unified QoS policies could be applied to the network, application, and storage services
- Unified Global datacenter redundancy & disaster recovery for applications & data
- ADC might learn SAN information to provide optimal server selection based on file location, health, speed, or other attributes
- What about SAN security? Could an ADC help with SAN redundancy?
- Foundry may be in a strong position to answer some of these questions