Cisco IT@Work Case Study:
Firewall Services Module (FWSM)

Cisco Information Technology

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Overview

- **Challenge**

  Traditional stateless ACL firewalls bear significant weaknesses.

- **Solution**

  Migration to a stateful inspection firewall

  Migration: a three-stage process

- **Results**

  Dramatic increase in security of Network

  Dramatic increase in performance

- **Lessons learned**
- **Next Steps**

Challenge: Traditional stateless ACL firewalls bear significant weaknesses

- **Cisco needs to connect its intranets to the public Internet, without exposing the company to attacks.**

  The rising volume of denial of service (DoS) attacks and other threats has spurred organizations to investigate advanced firewall technology. The basic defense is a perimeter. In its best form the perimeter defense is a firewall.

- **People who design attacks mask their malicious traffic as legitimate traffic.**

  Non-stateful-inspection firewalls cannot accurately determine whether traffic is part of a legitimate session.

- **Traditional static firewalls remain vulnerable.**

  Non-stateful-inspection firewall routers with ACLs keep a large number of ports open, thus increasing vulnerability to attacks.

Solution: Migration to a stateful inspection firewall

- **Migration to FWSM: a stateful inspection firewalls solution.**

  FWSM was deployed at all Cisco sites for better security, manageability, and performance

- **FWSM allows the firewall to keep large numbers of ports closed.**

  FWSM keeps track of each application session, and dynamically adjusts the ports to be kept open based on the ports that are currently in use by legitimate application sessions.

- **Easy integration into the existing production network.**

  No complex design and operations changes were required.

Solution: A three-stage migration process

- **Preparation:**

  Conversion of ACLs from Cisco IOS® to FWSM and Cisco PIX formats. Took 8 hours per site, by 1 person. Plus 3 reviewers over each ACL

  Conversion of wildcard masks into appropriate subnet masks.

  Device configuration review and security audits for FWSM units.

- **Testing:**

  Creation of exact replica of Cisco production network, including all routers and switches surrounding the FWSM.

  Comprehensive testing included management, security, DoS attacks and failover. Main focus on Layer 2 transparency.

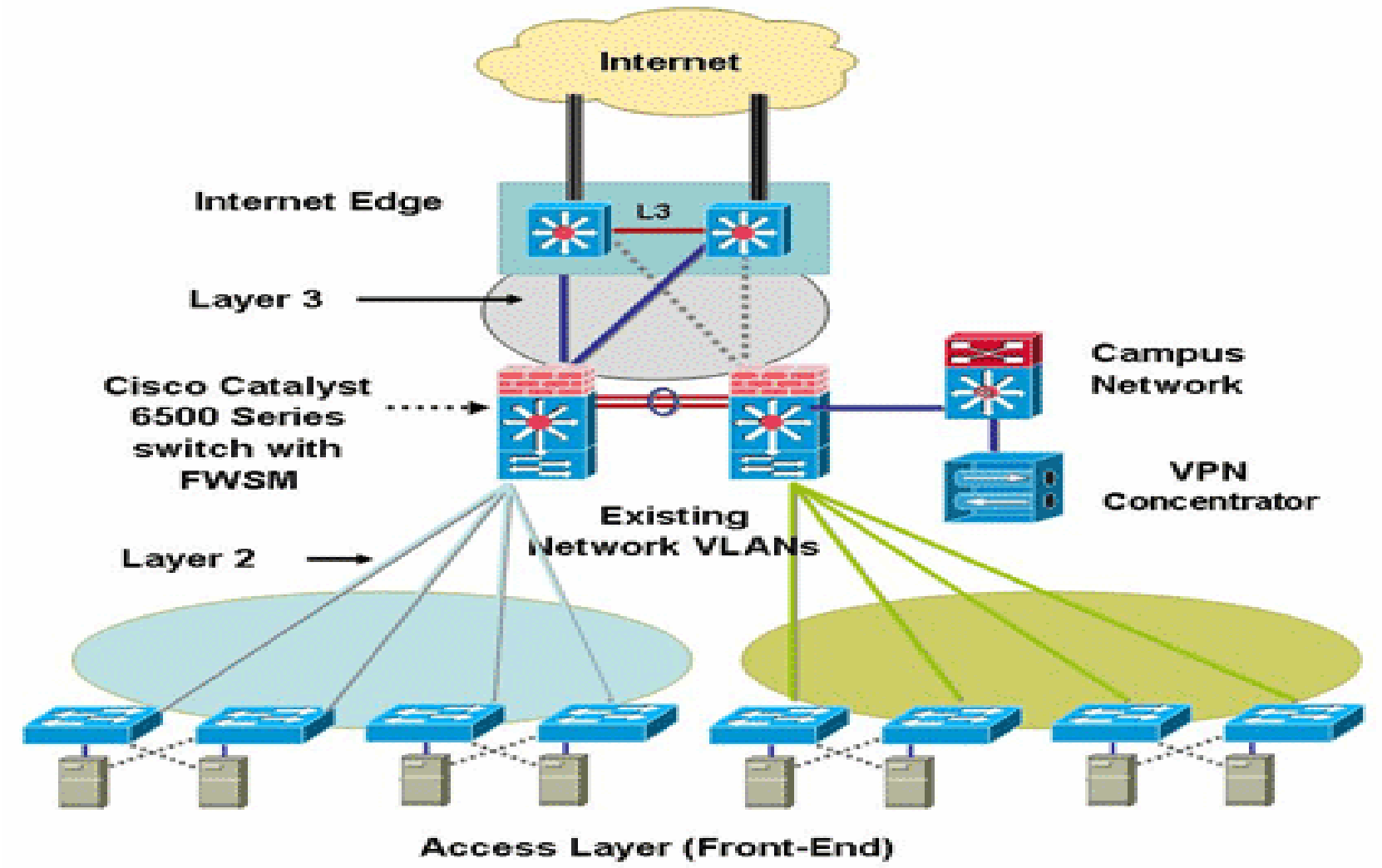
- **Deployment:**

  Preparation of network by converting point-to-point links to a bridged network

  Install and configuration of FWSMs

  Launch of FWSM security features

Solution: Cisco FWSM - Connecting the Internet edge to the existing topology



Results: Dramatic increase in security of Network

- **Greater security**
  - Mitigation of DoS attacks
  - Fewer holes in firewall
  - Reduction of network visibility from the outside
- **High availability**
  - Redundant deployment, with stateful failover, for an uninterrupted user experience
- **Easy integration thanks to Layer 2 transparency**

Results: Dramatic increase in performance

- **Ability to perform sophisticated traffic analysis**

  Cisco Catalyst 6500 and Catalyst 7600 accommodate also NAM-2. Combining NAM-2 and FWSM in the same switch enables traffic analysis both before and after firewall rules have been applied to inbound and outbound traffic.

- **High Performance**

  FWSM configuration in transparent mode provides a high performance, stateful inspection firewall that increases security posture without changing network infrastructure or topology.

Lessons learned

- **Careful planning and phased implementation**
- **Permanent communication with the application owners**
- **Activation of syslogs has little impact on CPU utilization.**

Next Steps

- **Definition of new policy changes to improve productivity**
  - **Allow outside voice and VideoConferencing through the firewall**
- **Object grouping to improve manageability**
  - **Decrease of ACLs size**
- **Introduction of FWSM's multiple-context feature into Cisco data center environment**
  - **Provide stateful inspection firewall capabilities for both inter- and intra-data center traffic**
  - **Virtualization feature will allow one physical FW to act like multiple virtual FWs**

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