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

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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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