Towards Effective SIP load Balancing

Georgios Kambourakis, Dimitris Geneiatakis, Tasos Dagiuklas, Costas Lambrinoudakis and Stefanos Gritzalis

Third Annual VoIP Security Workshop

This work was partially funded by the European Commission in the horizontal research activities involving SMEs -Co-Operative Research in the project SNOCER
Outline

- Load Balancing Schemes
- The proposed Load Balancing solution
- Load Balancing within SNOCER
- Future Work
Load Balancing Schemes

- Web Server Balancing
  - Non-Adaptive
    - Round Robin
  - Adaptive
    - Asynchronous Alarms
    - lbnamed
    - TENBIN
    - etc

- Known open source SIP Balancer implementation
  - Vovida (www.vovida.org)
Proposed Load Balancer Architecture

- “Discover” available SIP Servers
- Request workload metrics from the SIP Server
- Select the most appropriate SIP Server to process an incoming request
Proposed Heartbeat Communication Protocol

Balancer

Heartbeat

Request (workload metrics)
Start_of_Transaction

{Msg_Sequence_Number: (Small_Integer)
CPU_Usage: (percent)
Memory_Consumption: (percent)
Concurrent_SIP_Transactions: (Integer)}

ACK
Enc_of_Transaction

SIP Proxy

Heartbeat
SIP Load Balancing Architecture

- **SIP Domain with redundant SIP Servers**
- **DNS**
- **SIP Proxies**
- **SIP Proxy A**
- **SIP proxy with workload-balancing capabilities**
- **Balancer**
- **SIP Client**

- **Workload data**
- **Communication when Balancer is offline**
Load Balancer & Possible Transparency Problems

- SIP Proxies insert a VIA header in all the incoming SIP requests
  - So…
    - In case the LB is implemented as another proxy
    - all SIP responses will pass through that proxy
- Request that belong to a specific dialog should not pass through LB
Possible Solutions in Transparency Problem

- Transparency for responses
  - Prevent Load Balancer from inserting a VIA header
    - E.g. in SER utilizing the SEND core command
  - Modify the SIP’s Proxy core to ignore the VIA-header added by the Load Balancer

- Transparency for request belonging to the same dialog
  - Serving SIP Proxies insert a Record-Route header
SNOCER Architecture

- SNOCER=Low Cost Tools for Secure and Highly Available VoIP Communication Services
- Basic Components
  - Bastion Host
  - Enhanced SIP Proxy
  - High Availability Network
  - Operator’s Console
- Details www.snocer.org
SNOCER Architecture

Diagram showing the architecture with components such as Malicious Users, Regular Users, Bastion Host, Snort IDS Firewall, DNS – STUN – RTPProxy, High Availability Overlay, SIP Proxy, Operator Console, and SIP Proxy Security Enhancements.
Load Balancing in SNOCER Architecture
Future Work

- Load balancer algorithm definition
- Performance Evaluation
  - CPU
  - Memory Consumption
  - Delay
- Enhance Load Balancer’s Robustness
Comments-Questions
Contact Information

- Email: dgen@aegean.gr
- Tel: +30-22730-82247

Thank You