High Available SIP Servers
Using External State Replication
Motivation

- PSTN Availability around 99.99%
- VoIP Availability around 98%
- Results in 8.64s vs. 1728s Outage/Day

- How to increase Service Availability
Motivation

- High Availability by Redundancy
- Hot vs. Cold Standby
- SIP Servers can be Stateful
- Replicate Incoming SIP Messages to achieve Synchronized Server State
SIP & HA Integration

- SIP itself lacks Failover Functionality
- External Tools for Takeover (e.g. VRRP)
- No State Replication

- Tie HA Mechanism to SIP Mechanism
- Replicate Incoming SIP Messages to achieve Synchronized Server State
SIP & HA Integration

- Put a small SIP Proxy in front of the SIP Server, which does Message Replication and Failover Control.
- Resides on the same Machine as the Main SIP Server.
- Exchanges Heartbeats with its Partner Machine.
HAD Components

- Process Monitoring scans for a local SIP server process, triggers a Failure if it is not present.
- Failure Control checks for Heartbeats.
- Interface Control configures IP and HW Addresses.
- SIP Flow Control manages Replication and basic SIP Functionality.
Instead of One Component, Two must work properly to provide Service: The SIP Server and the HAD.

- Realistic Values are above 90%
- A 99% SIP Server can still cope with a 91% HAD.
Double Failure

1. Master crashes.
2. Backup takes over.
3. Master re-starts, gains state from replication.
4. Backup crashes.
5. Master starts service with incomplete state

- Impact on Contacts: None
- Impact on Transactions:
  - “old” Transactions are broken.
  - Two Failures must appear during a single Transaction
- Scenario is very close to a complete Failure
HAD Issues

NAT traversal

- “NAT-Ping” must be done by the “First” SIP proxy.
- STUN or Client originated keep-alive of Pinhole.
Database Load

- Database is queried by two Instances.
- Use scalable Database.
Conclusions

- Resulting Availability is at least as good as a VRRP based System.
- Method for faster State Recovery (e.g. Caching for Burst) required.
- Higher SIP/HA Integration
  - Allow Access to Server State Data for more effective Replication
  - Solves (new) NAT Trouble
  - Backup mode awareness.
Thanks !  Questions ?

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