

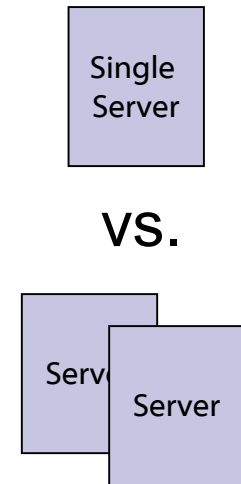


# High Available SIP Servers Using External State Replication

- 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

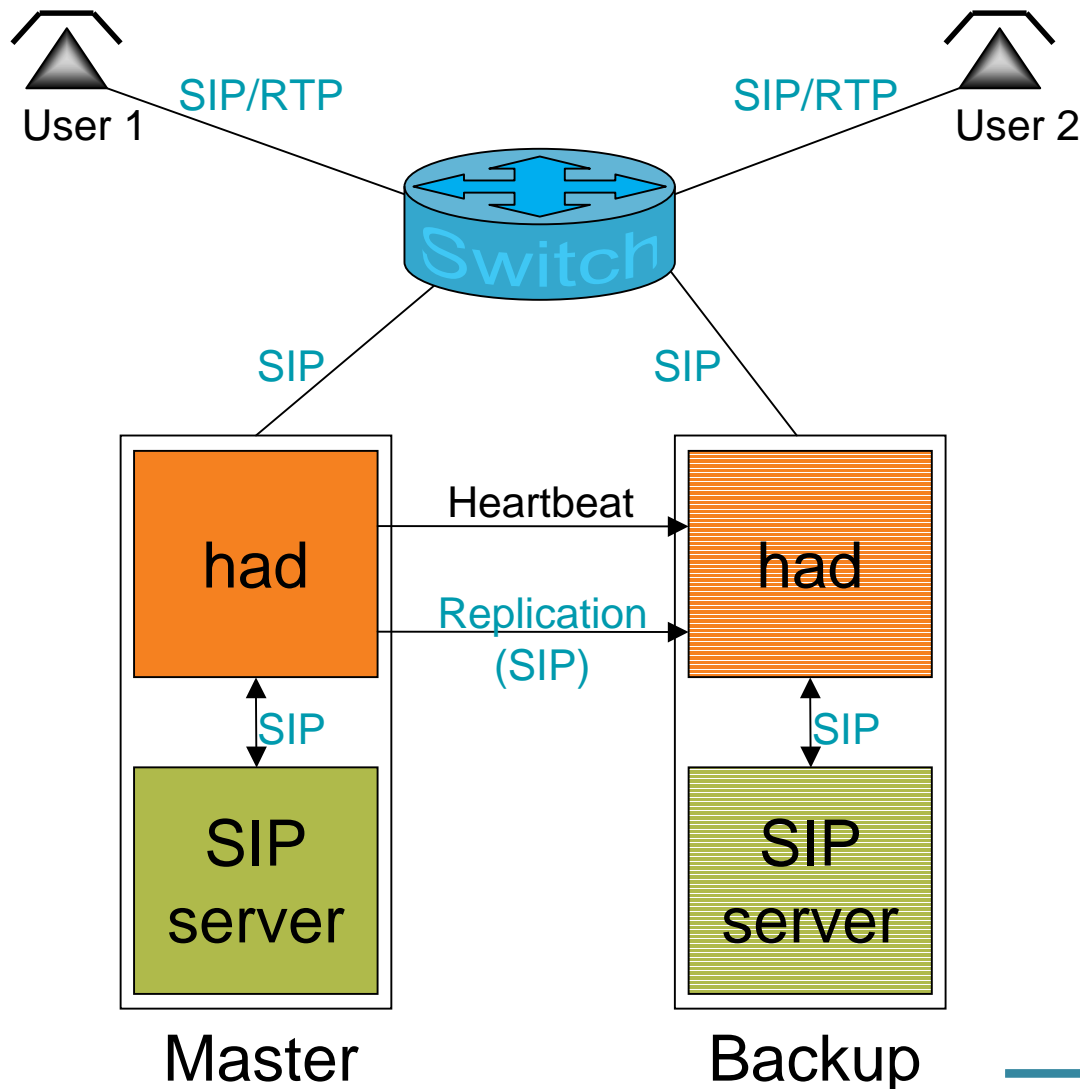


# SIP & HA Integration

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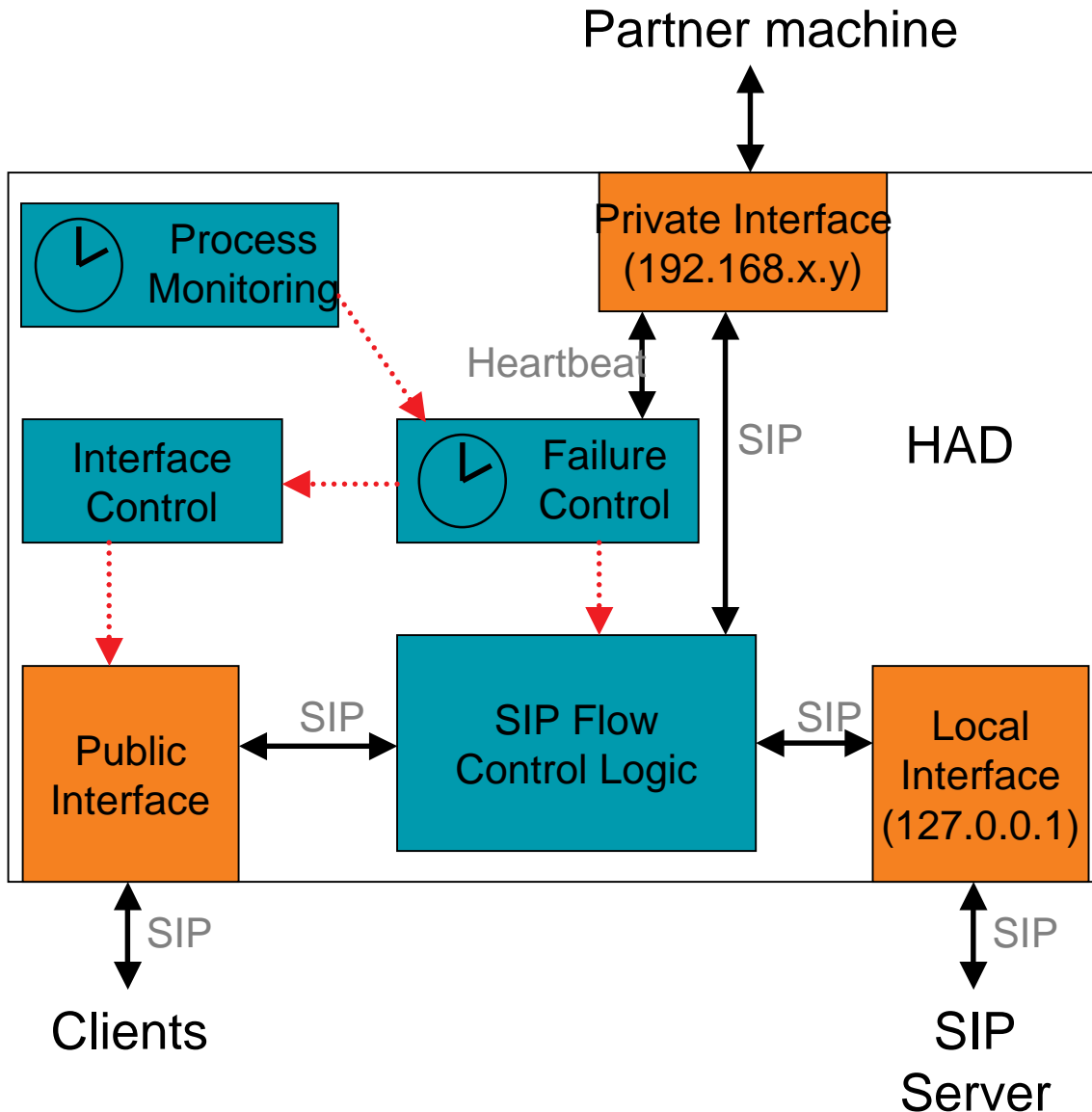
- SIP itself lacks Failover Functionality
- External Tools for Takeover (e.g. VRRP)
- No State Replication
  
- Tie HA Mechanism to SIP Mechanism
- Replicate Incoming SIP Messages to achieve Synchronized Server State

# SIP & HA Integration



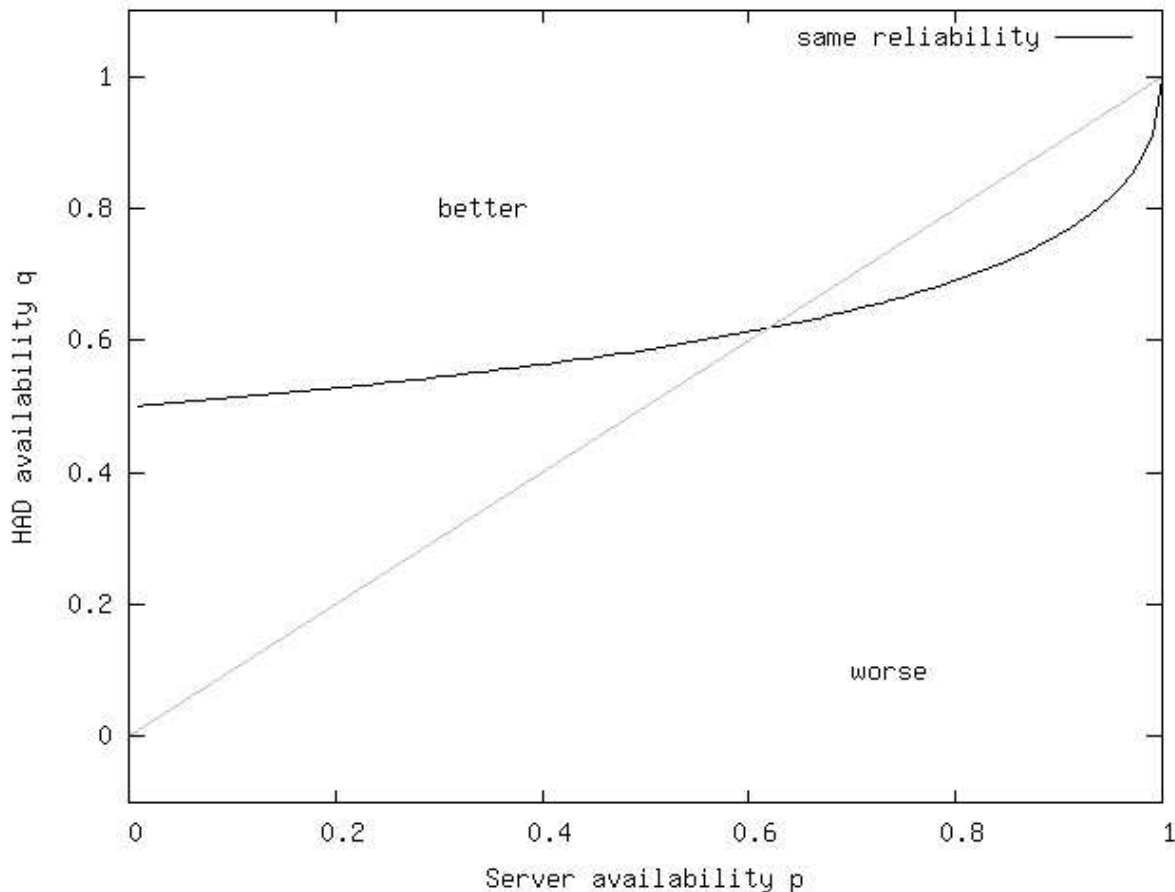
- Put a small SIP Proxy in front of the SIP Server, which does Message Replication and Failover Control.
- Resides on the same Machine as the Main SIP Server.
- Exchanges Heartbeats with its Partner Machine

# 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.

# HAD Impact



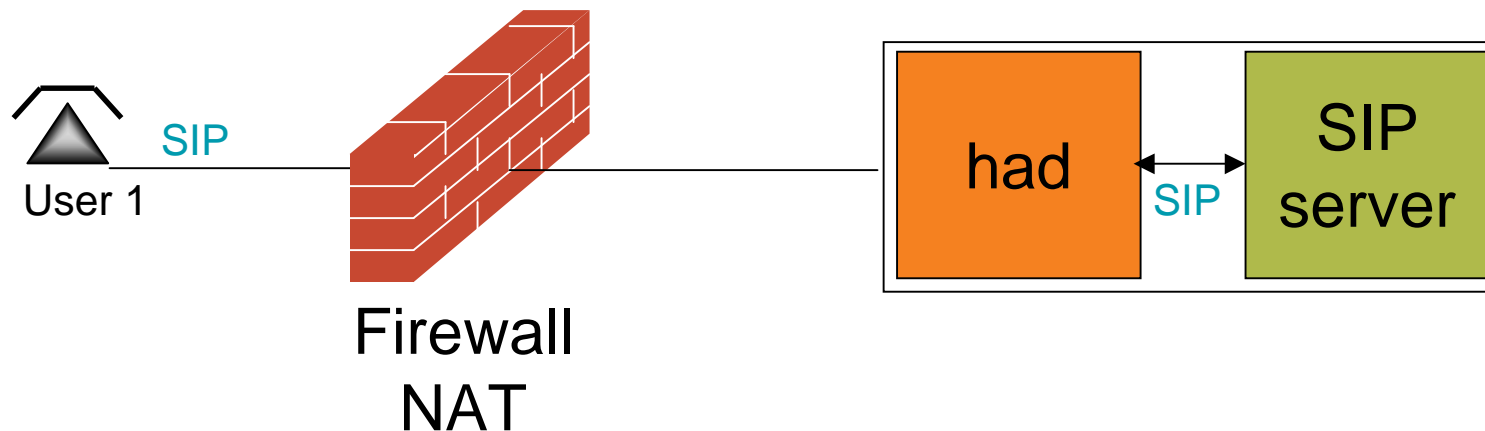
- Instead of One Component Two must work properly to provide Service: The SIP Server and the HAD.
- Realistic Values are above 90%
- A 99% SIP Server can still cope with a 91% HAD.

## 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

## 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

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- 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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