Real-Time Clustering with OpenSIPS

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Outline

- Introduction
- OpenSIPS cluster features
- Distributed SIP user location
- Conclusions
Introduction
OpenSIPS Cluster

- What is a cluster?
  - Multiple nodes with the same config that behave as a whole

- Why cluster OpenSIPS instances?
  - High availability
  - Scalability
  - Geographic distribution

- All nodes need to share data between them

- How to share data in a cluster?
  - Using a shared database
  - Directly between nodes using a custom communication channel
Efficient Communication

- Built on top of `proto_bin`
  - Efficient binary protocol
  - Built over TCP
  - Asynchronous

- Uses heartbeat packages
  - Maintain a valid view of the cluster
  - Packets sent by the application layer
  - Uses a “link-state” algorithm to ensure the global consistency of the entire cluster

- Simple
  - A node needs only one link to any of the nodes within the cluster
OpenSIPS Cluster Features
Diverse Topologies
Link Redundancy
High Availability Failover
Anycast
Platform-wide CPS limiting
Self-Discovering Cluster
Inserting a new node in the cluster

- Find out network topology
  - fetch the topology from DB
  - connect to any node and exchange topology information

- The new node connects to all known nodes
  - fetched from DB or learned from the joining node

- The new node queries the cluster for a fully sync’ed node

- One of the fully sync’ed nodes start sending the entire data snapshot to the new node
Distributed SIP User Location
**Requirements**

- Geo distribution
- Horizontally scalable
- Highly available
- NAT traversal
- NAT keepalives
“User facing” model
“User facing” model

- metadata-driven
- on-the-fly platform resizing
- optimal for multiple locations
- trivial OpenSIPS scripting (save() / lookup())

opensips.org/Development/Design-Distributed-User-Location
NAT traversal
NAT keepalives
“DB-driven” model
“DB-driven” model

- DB cluster holds all user location data
- on-the-fly platform resizing (OpenSIPS / DB)
- optimal for single sites / high subscriber populations
- trivial OpenSIPS scripting (save() / lookup())

opensips.org/Development/Design-Distributed-User-Location
NAT traversal

INVITE

SBC

INVITE

OpenSIPS Cluster

DB
NAT keepalives

Răzvan Crainea and Liviu Chircu - OpenSIPS Project - FOSDEM '18 -

SBC

OPTIONS

OPTIONS

OpenSIPS Cluster

DB
Conclusions
OpenSIPS 2.4 - “clustering”

- distributed user location
- usrloc node sync on startup
- self-discovering cluster
- dialog sync on startup
Influence Development!

- IRC: #opensips on FreeNode
- Slack: #opensips
- Mailing list: users@opensips.org

opensips.org/Development/Design-Distributed-User-Location
Take-Away Message

OpenSIPS clustering
- a community-driven design -

- Răzvan Crainea and Liviu Chircu
  - OpenSIPS Project: www.opensips.org
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Master node

- It's not an entry point in the cluster
  - Any node can be an entry point

- Acts as an arbiter when multiple clusters merge
  - Sorts the split-brain problem