# Running virtualized Galera instances for fun and profit

## Linux Conf Au 2014 - Sysadmin Miniconf

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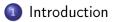
Percona

January 6th, 2013

PERCONA
Performance Consulting Experts

# Outline

# Overview

- Synchronous replication
- Galera and PXC
- Virtualization
- High Availability
- Commonality

# Galera/PXC

- What are they
- How do they work
- MySQL Compatibility
- Synchronous replication
  - Others
    - Google F1/Spanner
    - MySQL NDB
  - Sharding?

# Virtualization

- Popular solutions
  - Xen, KVM, OpenStack
  - Containers - LXC, Docker, ZeroVM
    - Application-isolated virt
- Application
- Constraints
- Advantages
- Data-centers
  - WSCs and clusters

# Warehouse-scale

- Clusters
  - Hadoop, Manta et.al.
- Different from normal data-centers
  - Why?
  - Homogenity of hardware and stacks
  - Demands and constraints

# Current scenario

- Popular Solutions
  - GlusterFS: FUSE
  - Sheepdog: QEMU
- Application level clustering
  - How is this different
    - Can work with them
  - Galera and others
    - Hadoop
    - {No,New,}SQL
    - Mapreduce/Compute

# Scenarios

- Necessity

  - Hardware of today

    - Saturation
    - WSC

  - High Availability

    - Migration
    - WANs

  - Isolation

    - Hosting

# Deployment I

- Initialisation

  - Bootstrapping

  - Cloning
    - QCOW zero-copy: I/O
    - Reduced memory footprint: KSM
    - Thin-provisioning: Ballooning
      Upgrades!
    - Load-balancing galera

# Deployment II

- Operation

  - Migration
    - Live Migration: Streaming

  - Guest Agent
    - FTWRL: Xtrabackup

  - Shared storage
    - COW or COR
      LAN v/s WAN

# Deployment III

- Storage

    - Single host

        - VirtFS: share the root!
          Works well with QCOW

- Network

    - Latency

      Synchronous replication!

      Affects pre-commit stage

    - virtio-net/vhost-net

# Deployment IV

- Misc

  - Backups

    - Dirty bitmaps

  - Roles

    - Throttling
    - Reader - Writer
      Upgrades, maintenance
      Non-homogenous hardware
      Async replication support

# Thoughts?

- Questions

- Usage and Experience

# Me

- Raghavendra Prabhu

- `http://wnohang.net/about`

- Software Engineer at Percona and Product Lead of PXC

    - `https://launchpad.net/percona-xtradb-cluster`