PERCONA
Performance Consulting Experts

Xtrabackup

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Who is speaker ?

- Vadim Tkachenko
  - Co-Founder of Percona Inc
  - Co-Author MySQLPerformanceBlog.com
  - Co-Author “High Performance MySQL” 2nd edition book
  - Lead of R&D department
    - Percona patches, builds, XtraDB, xtrabackup

What is this talk about

- Backup solution for InnoDB tables
- Review of product
  - Why we started it
  - Features
  - Plans

Warning

- Backup is important!
- Reality check
  - Do you have backup ?
  - But more interesting – can you restore from it ?
    - Especially important as you do not do it on daily basics
    - “Our InnoDB hot backup license expired 2 months ago, nobody noticed”
- You may go out of business without backup
  - Or spend a lot of time and money restoring data

Current solutions

- Mysqldump
  - Not something you want in big production
- Mysqlhotcopy
  - Only MyISAM
- LVM snapshots
- ZFS snapshots
- R1Soft
  - Commercial
- InnoDB Hot Backup
  - Commercial, not extendible

LVM snapshots

- Widely used previously and currently
  - Only for linux boxes
  - Most important –bad performance
    - IO operations with active snapshot drops dramatically
  - http://www.mysqlperformanceblog.com/2009/02/05/disaster-lvm-performance-in-snapshot-mode/
  - Server in regular mode – 160 IO per sec
  - Server with active snapshot – 25 IO per sec
    - Point when we started to think about our backup

Why we started

- Idea with alternative of InnoDB hot backup is obvious and in air for long time
- We needed something to support our features in XtraDB
- Not so hard to do
  - Few weeks of development for basic functionality
  - Especially if Yasufumi Kinoshita works with us
- Interest from customers
- Got enough funds for initial development
- Fun

Basic features

- Repeat functionality of InnoDB hotbackup
- Hot-copy of InnoDB tables to another place
  - Non-blocking for server functionality
- With innobackup script (Perl, GPL) – full backup (InnoDB, MyISAM, frm, view, triggers, etc)

Interesting features

- Do backup only select databases / tables
  - Works, but tricky to restore
    - Only to the same server, some manipulations needed
- Do backup to remote server
  - --remote-host=backuphost
  - Copy files over ssh connections

Advanced functionality

- Something does not exist in InnoDB HotBackup, but we always wanted
- Stream backup
  - Backup as stream of files, copied to disk, compressed, stored on tape
- Incremental backup
  - Backup of 500GB takes hours
  - We want to copy pages really changed

Some internals

- Copy .ibd files and while copying, store log records in separated file.
- When copying done – apply stored log records to datafiles
  - Basically perform InnoDB recovery steps
- Incremental backup:
  - During full backup store LSN (log sequence number) of last checkpoint
  - For incremental – copy only pages changed since given LSN

Components

- xtrabackup
  - Binary file, very simple to build
    - Patch InnoDB source code, and compile
    - Can handle any InnoDB tables, no need to run special build of server
  - Handles only innodb datafiles
- Innobackupex
  - Enhanced version of innobackup perl script
  - Wrapper over xtrabackup to handle also MyISAM, frm, trg, etc

Examples

- 1. Xtrabackup –backup –target-dir=/data/backup
  - Copy files (read datadir from my.cnf) to target dir
- 2. xtrabackup –prepare –target-dir=/data/backup
  - Apply log

- Innobackupex-1.5.1 /data/backup
- Innobackupex-1.5.1 –apply-log /data/backup

- /data/backup contains data ready to start mysqld

stream

- Innobackupex-1.5.1 –stream=tar /data/backup | gzip - > backup.tar.gz
- | ssh BACKUPHOST “cat - > backup.tar”
- | nc

Incremental

- (full backup) #
  ./xtrabackup --backup --target-dir=/backup/base ...
- (incremental backup) #
  ./xtrabackup --backup -target-dir=/backup/delta --incremental-lsn=HIGHLSN:LOWLSN (can be taken from file)

- (prepare) #
  ./xtrabackup --prepare --target-dir=/backup/base
- (apply incremental backup) #
  ./xtrabackup --prepare --target-dir=/backup/base --incremental-dir=/backup/delta

Plans

- Stability
  - Still hunting bugs
  - You are welcome to test and report
- Performance
  - Did not look on performance in details
  - Challenge: InnoDB Recovery is slow by itself

Addresses

- http://www.percona.com/docs/wiki/percona-xtrabackup:start
- https://launchpad.net/percona-xtrabackup
- Report bugs:
  - https://launchpad.net/percona-xtrabackup/+filebug
- Discussion:
  - http://groups.google.com/group/percona-discussion

Thank you!

- Try it
  - We really depend on wide external testing
- Send us feedback
- Question ?