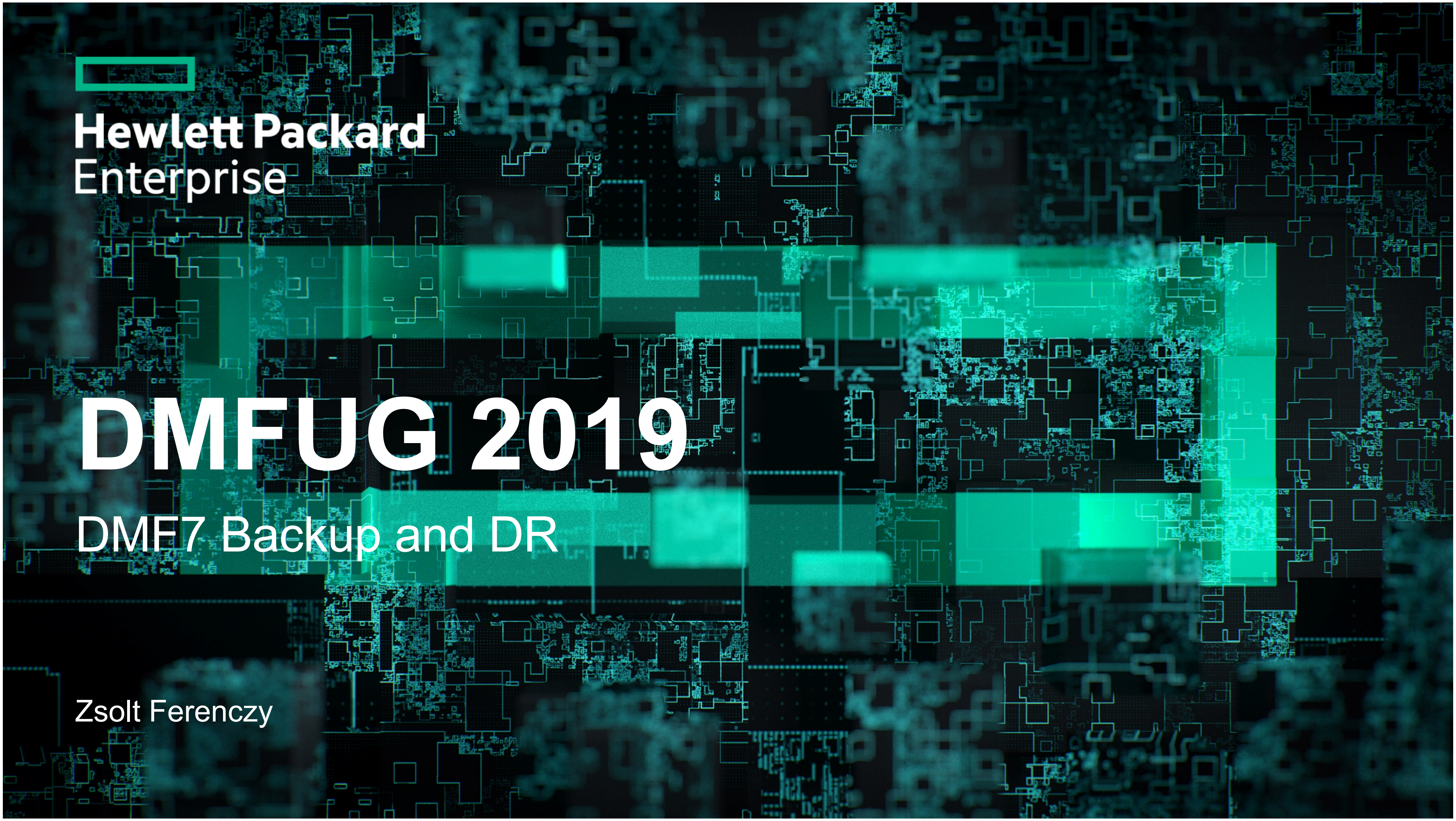

DMFUG 2019

DMF7 Backup and DR

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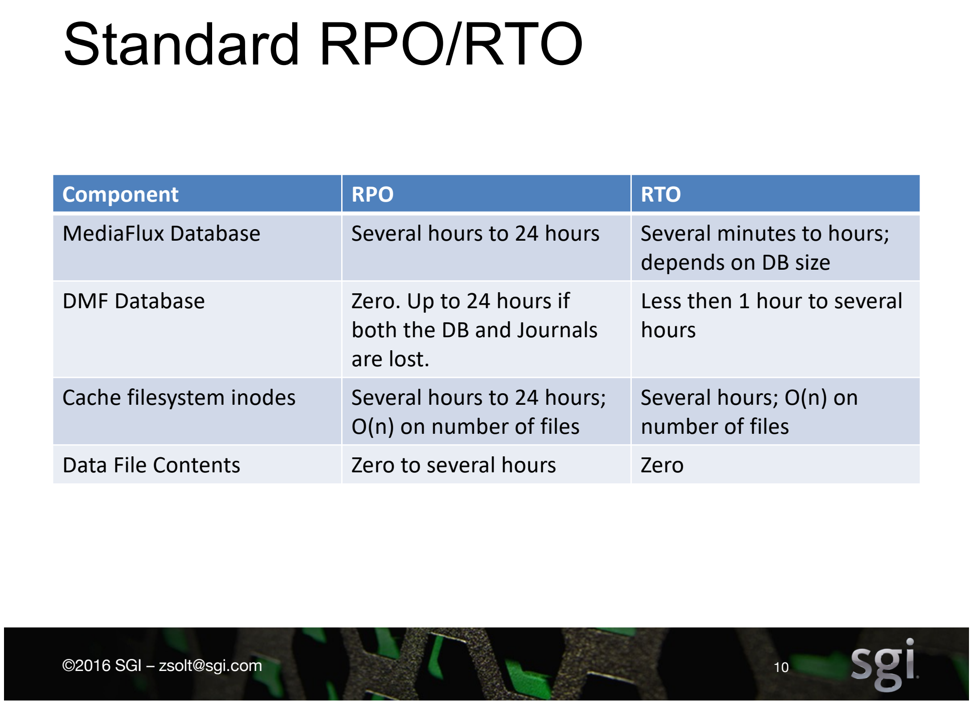
A While Ago ….



Standard RPO/RTO

Component	RPO	RTO
MediaFlux Database	Several hours to 24 hours	Several minutes to hours; depends on DB size
DMF Database	Zero. Up to 24 hours if both the DB and Journals are lost.	Less then 1 hour to several hours
Cache filesystem inodes	Several hours to 24 hours; O(n) on number of files	Several hours; O(n) on number of files
Data File Contents	Zero to several hours	Zero

DMF7 has Improved Upon This

- DMF7 DB is distributed, replicated, and inherently fault-tolerant
- DMF7 does not rely on the filesystem to maintain the namespace
- A DMF7 object is complete and secure at the time the PUT completes
- Full file metadata is carried all the way to the back end media
- Can deploy fault tolerant multi-dc configuration
- Will be able to deploy fully federated multi-site configuration

- However, we still need to provide DR capability

DMF7 | Backup Manager

- DMF-7 backup solution centers around Cassandra as metadata repo
- Cassandra itself provides redundancy and fault tolerance
- Still, backup is needed to protect against:
  - Database corruption
  - Datacenter disaster (loss of metadata and current system state)
- In addition to Metadata, need to backup configuration (DMF7 Registry)

DMF7 | Backup Manager

- Implementation relies on Cassandra snapshots and commit log archiving:
  - Initial full snapshot
  - Subsequent incremental snapshots
  - Commit log archiving for point-in-time restore
- Snapshots are saved to / restored from an S3 repo (configured in Registry)
- DMF7 automates most of the backup workflow, with the exception of manual commit log replay
- Backups and restores are managed by DMF7 Backup Manager

Data Management Framework | **DMF 7** List Backups in CLI

```
> dmf backup list --help
Usage: dmf  backup list [OPTIONS]

  List full Cassandra snapshots, incremental snapshots and commitlog
  archives

  Example usage:

      dmf backup list --start-time 20180211101010 --end-time 20180211202020

Options:
  --start-time YYYYmmddHHMMSS  List backups starting at timestamp
  --end-time YYYYmmddHHMMSS    List backups ending at timestamp
  -a, --async                  Do not wait for job completion. Exit after the
                               job is queued.  [default: False]
  -h, --help                   Show this message and exit.  [default: False]
```

Data Management Framework | **DMF 7** Perfom Backups in CLI

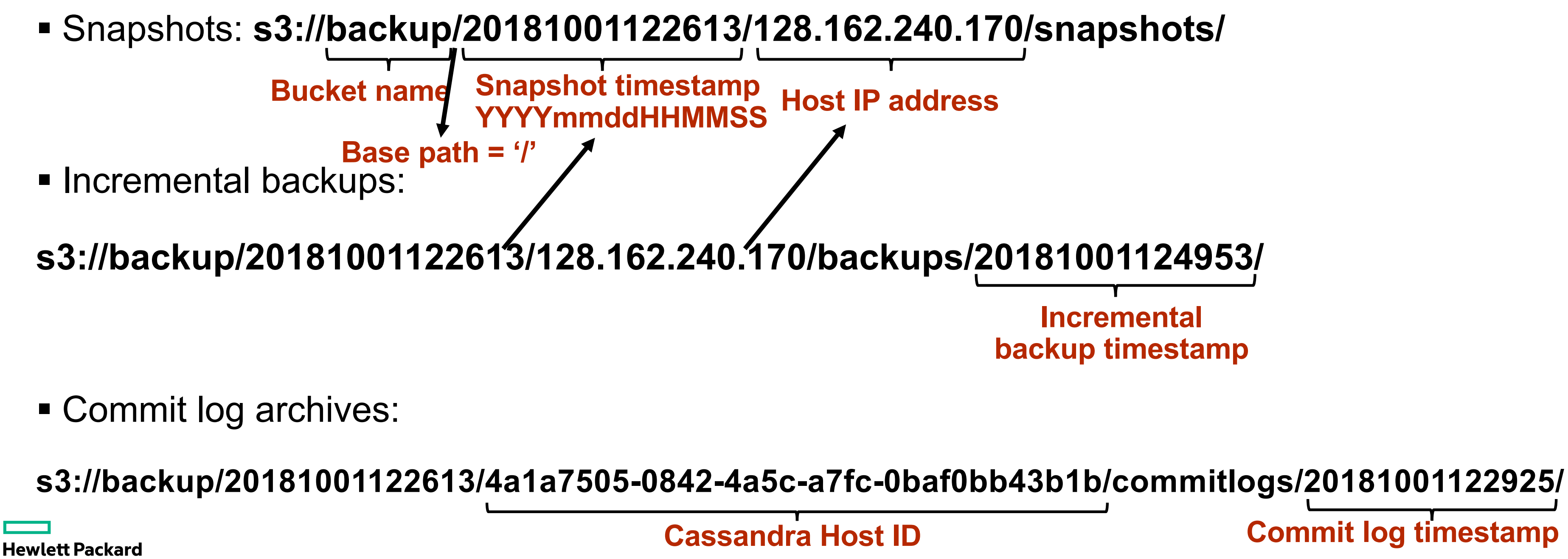
```
> dmf backup snapshot --help
Usage: dmf  backup snapshot [OPTIONS] HOSTS

  Collect Cassandra snapshots from specified hosts and uploads to S3

  HOSTS   Comma-separated hostnames or IP addresses to restore into

  NOTE: An incremental snapshot is taken if --new is not specified  and if
  previous full snapshot keyspace, table and hosts are found.

  Example usage:

      dmf backup snapshot 192.168.200.14,192.168.200.15,192.168.200.16

Options:
  --backup-schema             Backup schema  [default: False]
  --new                       Take a new snapshot  [default: False]
  --db-target keyspace.table  Full Cassandra table name
  -a, --async                 Do not wait for job completion. Exit after the
                              job is queued.  [default: False]
  -h, --help                  Show this message and exit.  [default: False]
```

Data Management Framework | **DMF 7** Restore Snapshots in CLI

```
> dmf restore snapshot --help
Usage: dmf  restore snapshot [OPTIONS] HOSTS PATH DB_TARGET

  Restore Cassandra snapshots

  HOSTS       Comma-separated hostnames or IP addresses to restore into
  PATH        Directory used to store the snapshot files retrieved from S3
  DB_TARGET   Cassandra keyspace or table in the keyspace[.table_name] format

  Example usage:

      dmf restore snapshot host1,host2,host3 /tmp keyspace.table_name

Options:
  --schema                Restore schema  [default: False]
  --time YYYYmmddHHMMSS   Restore all snapshots found up until this time
  --get-commitlogs        Retrieve all commitlogs found up until this time since
                          the last snapshot to be restored. The commitlogs are
                          placed under TMP_DATA_DIR/cassandra_commitlogs
                          directory.
  -a, --async             Do not wait for job completion. Exit after the job is
                          queued.  [default: False]
  -h, --help              Show this message and exit.  [default: False]
```

Backup Manager Design

- Backup manager relies upon S3 object keys to retrieve a history of snapshots, incremental backups or commit logs. E.g.:



- Snapshots: **s3://backup/20181001122613/128.162.240.170/snapshots/**

Bucket name

Snapshot timestamp
YYYYmmddHHMMSS

Host IP address

Base path = ‘/’

- Incremental backups:

s3://backup/20181001122613/128.162.240.170/backups/20181001124953/

Incremental
backup timestamp

- Commit log archives:

s3://backup/20181001122613/4a1a7505-0842-4a5c-a7fc-0baf0bb43b1b/commitlogs/20181001122925/

Cassandra Host ID

Commit log timestamp

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DMF
Users Group

Thank You