



Backup and
Recovery
@
MutSocMut

Overview

About us

Backup

Recovery

Future...



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Recovery

Future

Our Business

Our Infrastructure

Our Applications

Our Business

Health insurance and social services



Our Business: Details



- **Socialistische Mutualiteiten**

- 1 union (Landsbond)
- 11 regional federations
- 600 branches
- Socio-cultural organizations (non-profits)

- **UNMS / NVSM**

- Nationaal Verbond der Socialistische Mutualiteiten
- Union Nationale des Mutualités Socialistes
- 644 employees - 176 in IT - 8 zSystem engineers

- **Centralized Services and Administration**

- For most of the federations
- Single point of contact for other social security organizations

- **Market share: 28,17% (2011)**

- **3.049.245** members (2011)

Our Infrastructure

- **Hardware**

- Dual site: Active / Passive
- 2 x zBC12 (194 MSU)
- 2 x DS8870 (PPRC)
- 2 x 3584 Tape Library
- Interconnecting DWDM

- **Application software**

- PL/1 V4.3
- IBM Datastudio V4.1.2
- Rational Developer for System z V14.0
- COGNOS BI V10

- **System software**

- z/OS V2.2 (soon™)
- CICS TS V5.2
- DB2 z/OS **V10**
- DB2 Connect 10.1
- IBM DB2 Cloning Tool

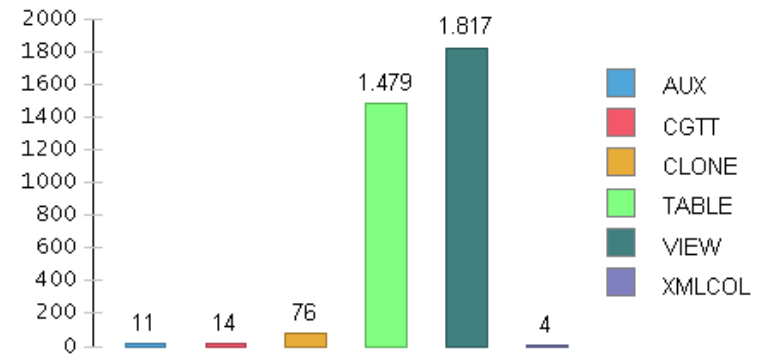
- **Management software**

- RMF
- CA Insight DB2
- CA Sysview
- CA RC/Migrator
- IBM Tivoli Decision Support

Our Application Environment

- **2 Sysplexes (SocMut / LibMut)**
- **2 LPARs per Sysplex**
- **Each Sysplex**
 - 2-way data-sharing (1 subsystem / LPAR) for each environment
 - 1 system sandbox environment ('I')
 - 3 user environments
 - Prod
 - Accp
 - Test (mirrors accp/prod, but also contains developer sandboxes)
- **Applications**
 - Online
 - CICS WebServices (PL/1)
 - CICS Transactions (PL/1)
 - Stored Procedures (PL/1 and SQL/PL)
 - Batch (PL/1)
- **DB2 Production**
 - 66 databases / schemas
 - 1722GB compressed

Tables, per category



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DRP vs Backup

Image Copy Strategy

SYSCOPY Maintenance

DRP vs Backup

DRP

- Hardware Failure
- Site failure

- PPRC
- FlashCopy dumps
 - DB2 BSDS
 - DB2 Logs

Backup

- Data Corruption
- User / Application errors

- DFSMSHsm backups
- FlashCopy dumps

- DB2 IC of DB2 User Data



Image Copy Strategy



Monday - Friday

7 PM

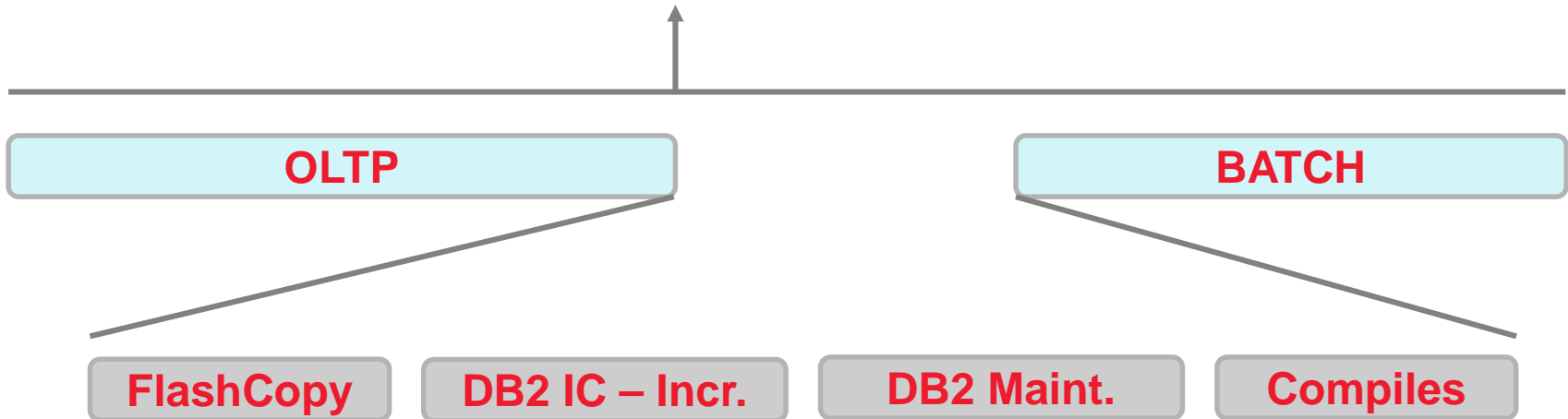


Image Copy Strategy



Sunday

7 AM



BATCH

DB2 IC - FULL

Image Copy Strategy

```
//SYSIN DD *  
OPTIONS EVENT(ITEMERROR, SKIP)  
COPY LIST XPDBGP01  
FULL NO  
PARALLEL(5)  
SHRLEVEL CHANGE  
COPYDDN(SYSCOPY1)  
QUIESCE LIST XPDBGP01  
/*
```

```
//SYSIN DD *  
OPTIONS EVENT(ITEMERROR, SKIP)  
COPY LIST XPDBGP01  
FULL YES  
PARALLEL(5)  
SHRLEVEL CHANGE  
COPYDDN(SYSCOPY0)  
QUIESCE LIST XPDBGP01 WRITE YES  
/*
```

Image Copy Strategy - Storage

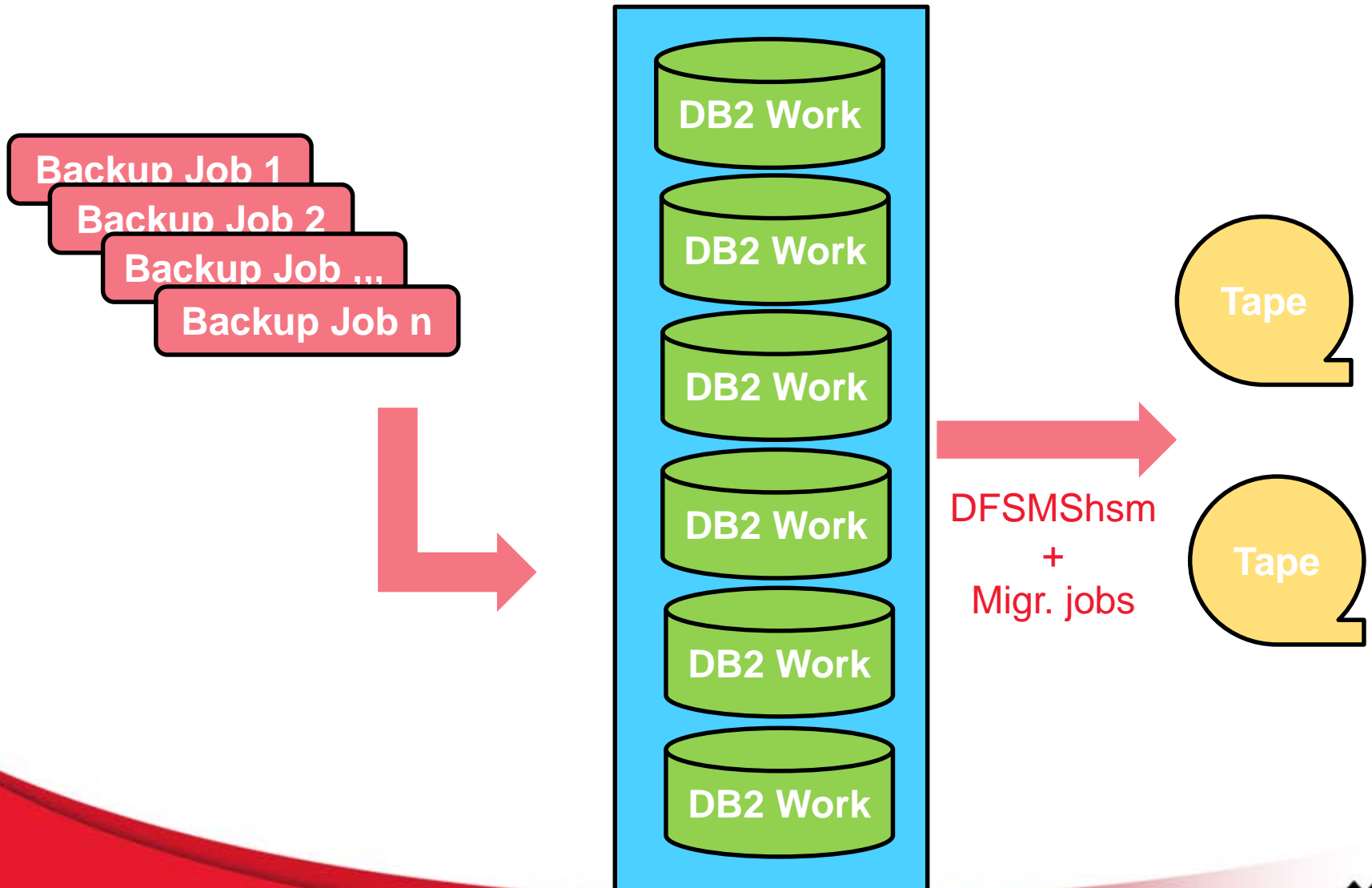


Image Copy Strategy - Storage

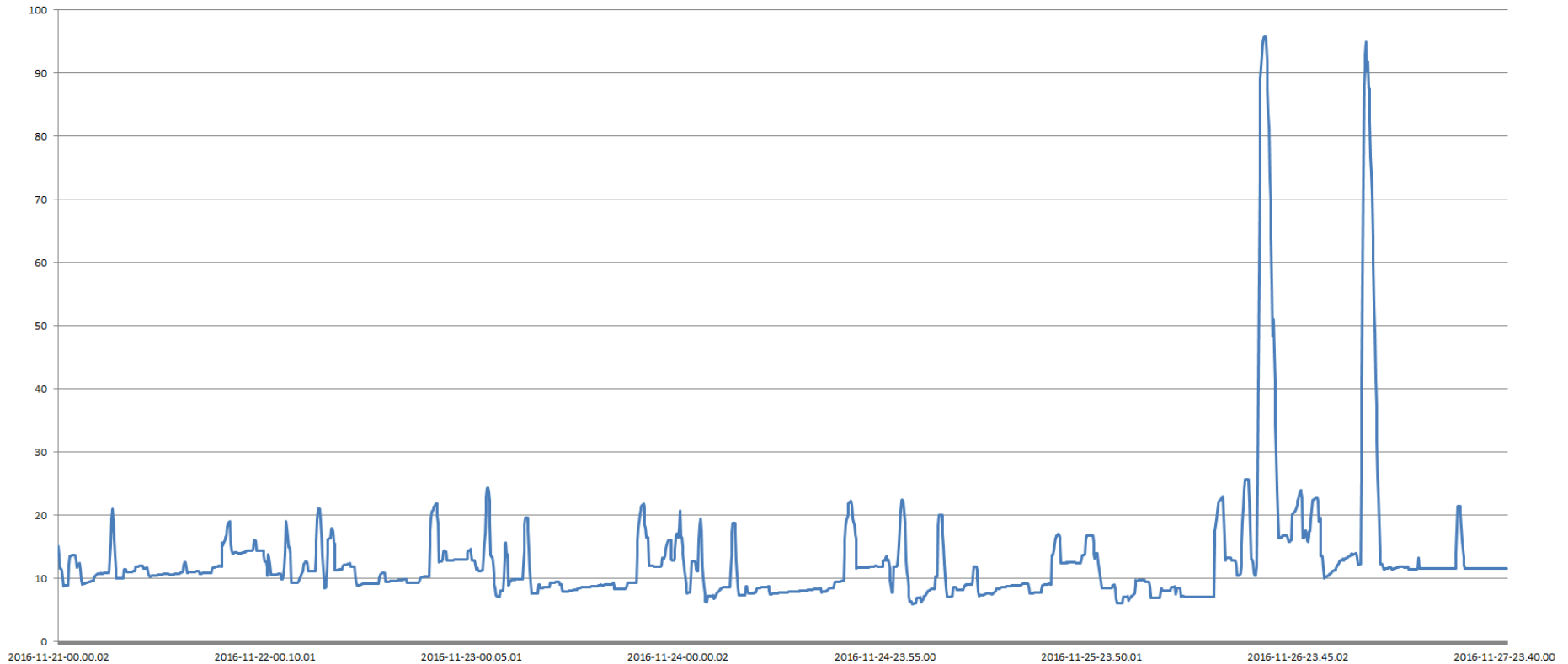


Image Copy Strategy - Remarks

- Data Warehouse is not backed up (~17% of all our data)
 - Tablespaces are RO
 - Recovery = Reload Data
 - Scheduled to become business critical (IDAA)
- No more IC during the day → Quiesce or Inline Copy
- Daily checks
 - Is every TS recoverable?
 - Is every TS covered by a LISTDEF?
 - At least 1 Full IC of every TS in the last 8 days?
 - Enough space available to take backups?
- Archive logs retained on disk for 4 days
 - Migrated to tape afterwards
 - Avoid recall during Log/Switch phase for REORGs

SYSCOPY Maintenance

- Retention period of 38 days
- MODIFY RECOVERY performed every weekday at 6PM to honor this

```
//SYSIN      DD *  
              OPTIONS EVENT(ITEMERROR, SKIP)  
              MODIFY RECOVERY LIST LIST01  
              DSNUM ALL DELETE AGE(38)  
/*
```


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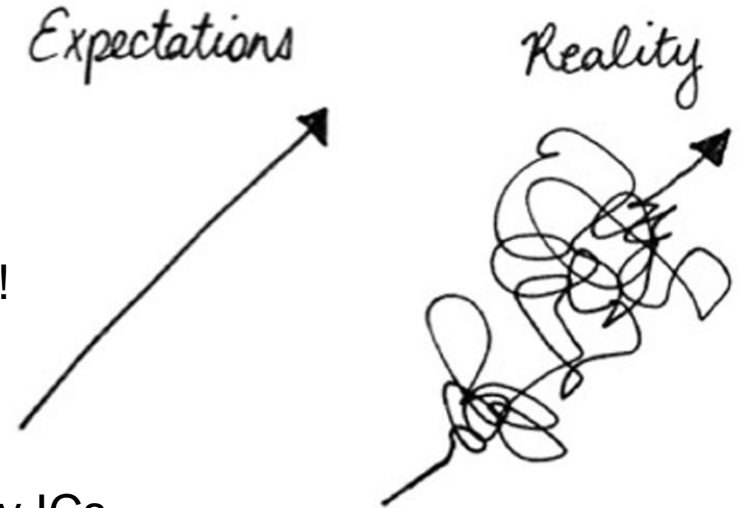
Backup

Recovery

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Recovery Strategy

- There is none.
- Ad hoc, catered to the particular case
 - Communication with developers is key!
- PIT recovery
- Some batch jobs are preceded/succeeded by ICs
- Unload from Image Copy (application problem determination)
- CA Log Analyzer
 - UNDO operations
 - REDO operations



AGENDA

About us

Stored
Procedures

Programming

Future...

FlashCopy

Dynamic JCL building

System Level Backup

Future plans

- Develop proper recovery procedures
 - And test them regularly
- Use FlashCopy for Image Copies
 - + Better control over usage of disk pool
 - - CopyToCopy before we can unload from FC IC
- Dynamically generate LISTDEFs and Image Copy jobcards
 - Estimate each job's volume, divide equally
- Can System Level Backup help us?
- Data Warehouse backups
 - FlashCopy?

Many thanks!

**Questions?
Suggestions?**

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