



Case Study : Golden Gate Bi-directional Replication Implementation at MediSwitch

Wayne Botha
IT Manager
MediSwitch

Tracy Odendaal
Service Delivery Engineer
Oracle ACS

AGENDA



- **Introduction to Golden Gate**
- MediSwitch Overview
- Golden Gate Project at MediSwitch
- Golden Gate Configuration at MediSwitch
- Q&A



What is Oracle Golden Gate?

Oracle Golden Gate provides *low-impact* capture, routing, transformation, and delivery of transactional data across *heterogeneous* environments in *real time*

Key Differentiators:

Performance

Non-intrusive, low-impact, sub-second latency

Flexible and Extensible

Open, modular architecture - Supports heterogeneous sources and targets

Reliable

Maintains transactional integrity - Resilient against interruptions and failures



Support for Heterogeneous Databases / Platforms

| Databases | O/S and Platforms |
|---|---|
| <p>Oracle Golden Gate Capture:</p> <ul style="list-style-type: none"> ▪ Oracle ▪ DB2 ▪ Microsoft SQL Server ▪ Sybase ASE ▪ Teradata ▪ Enscribe ▪ SQL/MP ▪ SQL/MX ▪ MySQL ▪ JMS message queues <p>Oracle Golden Gate Delivery:</p> <ul style="list-style-type: none"> ▪ All listed above, plus: ▪ TimesTen, DB2 for IBM System i ▪ Netezza, Greenplum, and HP Neoview ▪ ETL products | <p>Linux</p> <p>Sun Solaris</p> <p>Windows 2000, 2003, XP</p> <p>HP NonStop</p> <p>HP-UX</p> <p>HP OpenVMS</p> <p>IBM AIX</p> <p>IBM z Series</p> <p>zLinux</p> |

How Golden Gate Works



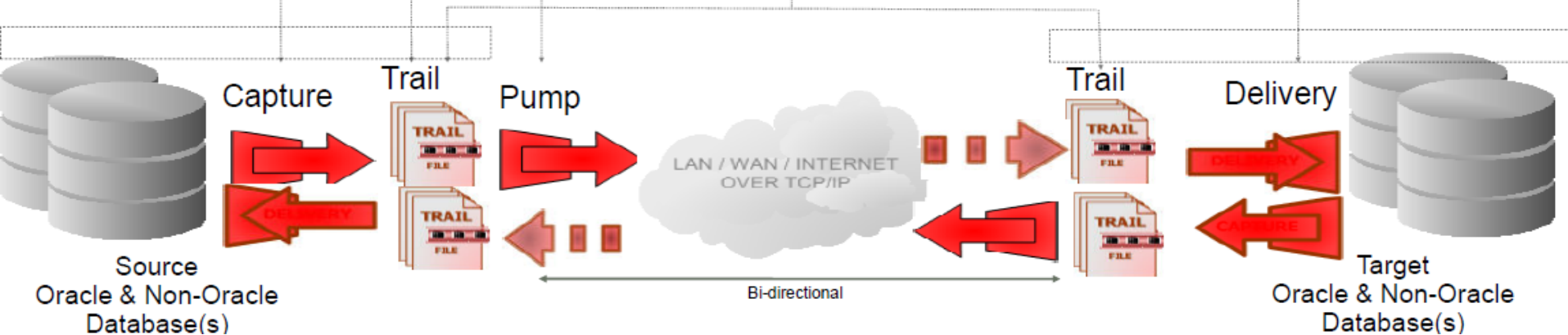
Capture: committed transactions are captured (and can be filtered) as they occur by reading the transaction logs.

Trail: stages and queues data for routing.

Pump: distributes data for routing to target(s).

Route: data is compressed, encrypted for routing to target(s).

Delivery: applies data with transaction integrity, transforming the data as required.





Golden Gate and Streams Roadmap

- Golden Gate is Oracle's strategic replication solution
 - Development focus will be on Golden Gate
- Streams continues to be a supported Database feature
 - Will not be enhanced beyond Oracle Database 11g Release 2
- Roadmap: best of both worlds
 - Best Streams technology will be integrated into Golden Gate

AGENDA



- Introduction to Golden Gate
- **MediSwitch Overview**
- Golden Gate Project at MediSwitch
- Golden Gate Configuration at MediSwitch
- Q&A

MediSwitch Overview



MediSwitch electronically interconnects ±25,000 healthcare professionals working from over 12,000 medical businesses to a secure and cost effective private communications network (VPHN) for the electronic interchange of medical data (EDI).



MediSwitch Overview



- In the private healthcare market:
 - MediSwitch is the largest Health Information Exchange in South Africa
 - MediSwitch has over 18 years experience in healthcare EDI
 - MediSwitch delivers claims to all South African medical aids
 - MediSwitch validates and delivers more than 2,8m in and out of hospital doctors claims, valued at more than R2,5bn each month
 - MediSwitch services are fully integrated into every retail pharmacy in South Africa and delivers over 5m pharmacy prescriptions worth R2,2bn each month
 - MediSwitch provides operational support to its customers 24x7x365
 - MediSwitch service availability is > 99.9% and are managed through SLA's

MediSwitch Overview



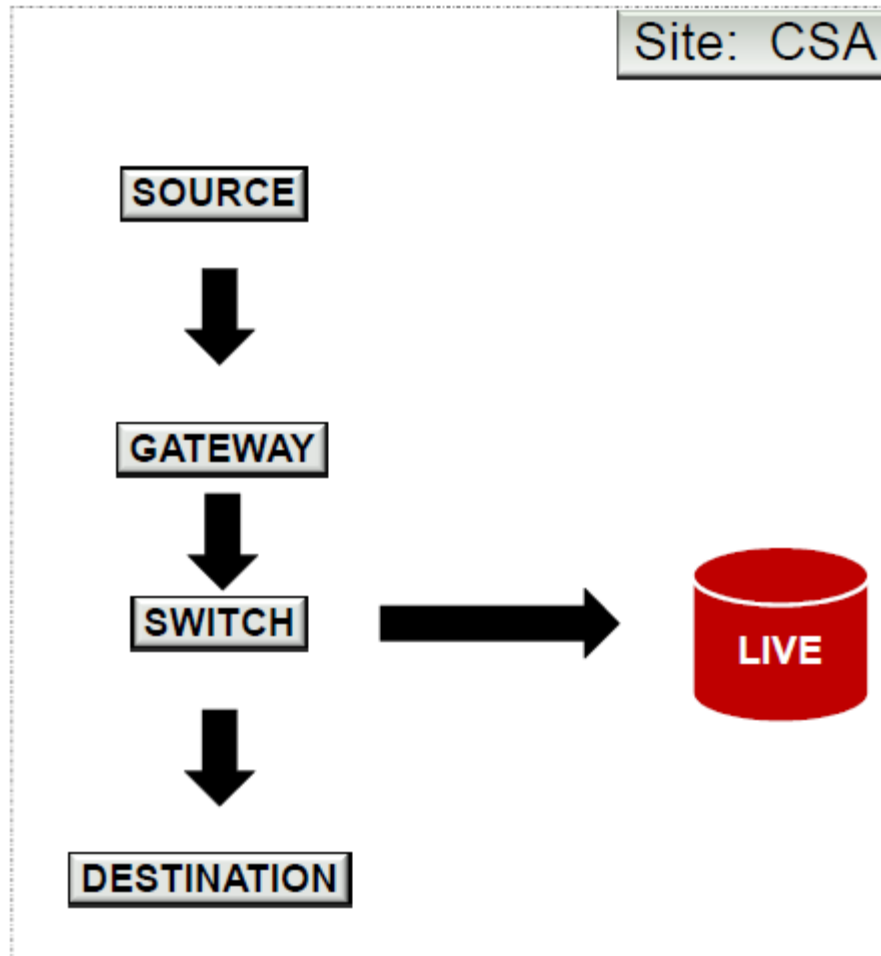
- In South Africa MediSwitch takes credit for:
 - pioneering EDI in healthcare in 1993
 - introducing real-time pharmacy claims in 1997
 - offering the first real-time claims service to doctors in 1999
 - operating the only true fault-tolerant Health Information Exchange in SA (from service provider to medical aid)
 - handling over 50% of all electronic transactions in SA's health industry

AGENDA

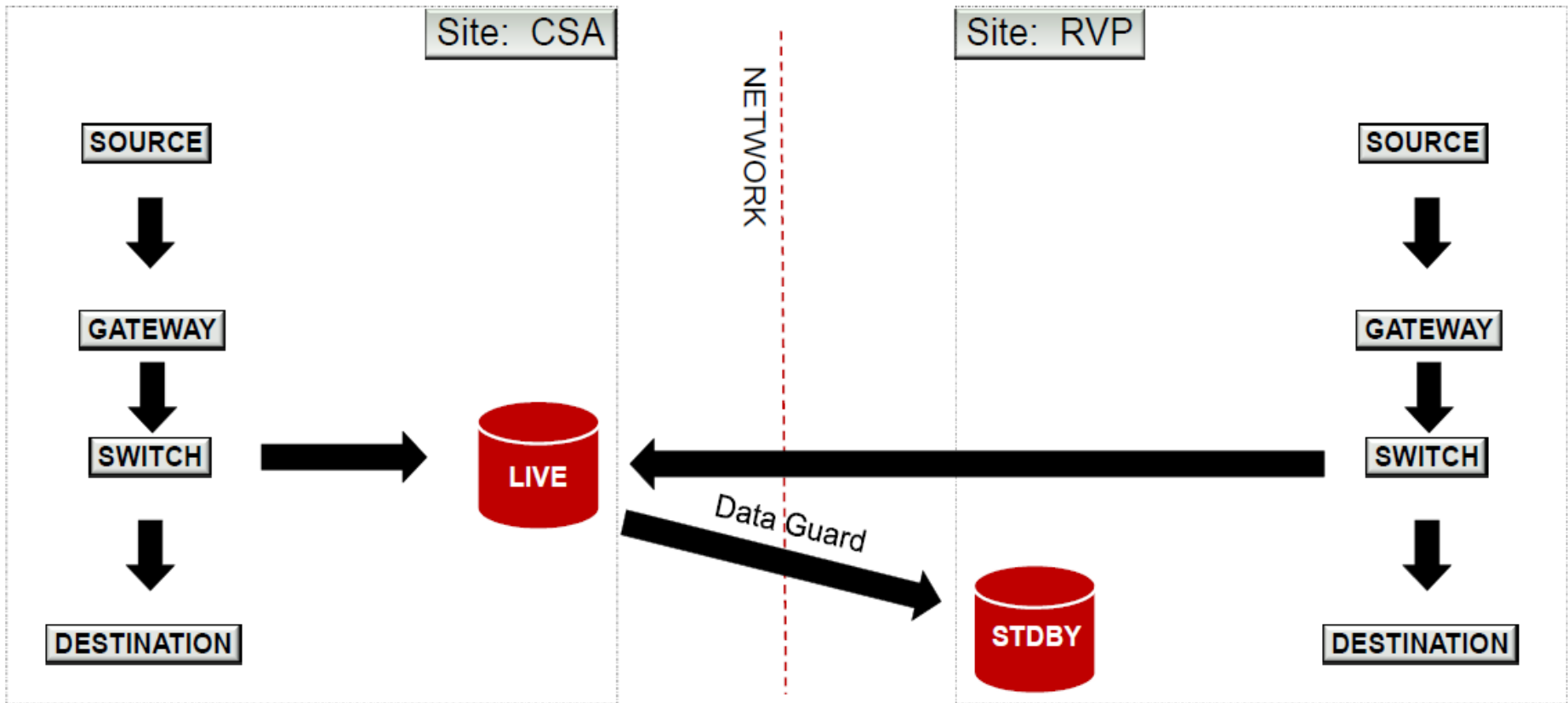


- Introduction to Golden Gate
- MediSwitch Overview
- **Golden Gate Project at MediSwitch**
- Golden Gate Configuration at MediSwitch
- Q&A

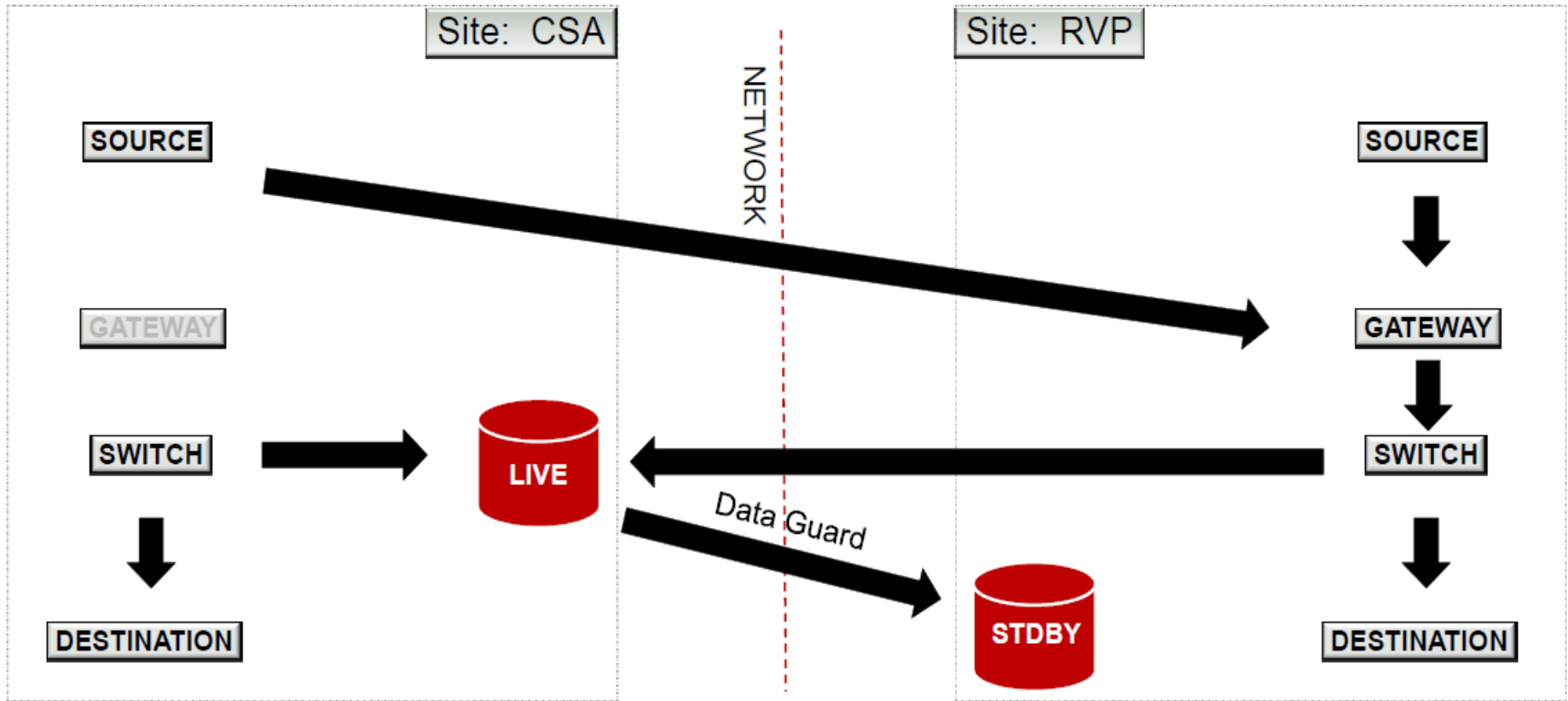
MediSwitch - Challenges



MediSwitch - Challenges



MediSwitch - Challenges



MediSwitch - Why Golden Gate?



Oracle Golden Gate provides *low-impact* capture, routing, transformation, and delivery of transactional data across *heterogeneous* environments in *real time*

Key Differentiators:

Streams not an option

Too complex, Oracle's statement of direction

RAC too expensive

Hardware and licensing

High latency WAN links

100Mbps link between sites

MediSwitch – Proof of Concept



- MediSwitch Application Readiness

- Designed for independent sites:

- ✓ Uses OCCI / Oracle Types
- ✓ Unique keys generated by application
- ✓ Implementation effort minimal

- Oracle Commitment

- **Golden Gate:** Installation and setup less than ½ day

- ✓ Specialist from France installed it in MediSwitch Environment
- ✓ Ran stress / volume tests for 3 days
- ✓ All issues resolved during POC

MediSwitch – Proof of Concept



- Problems experienced
 - No unique keys on some tables:
 - ✓ Defined unique keys in Golden Gate configuration
 - Sequences do not replicate:
 - ✓ Configuration applications using sequences only run on one DB
 - Synchronization would break under high load:
 - ✓ Known issue related to slow NFS storage
 - ✓ Resolved by moving trail files to local disks
 - ✓ Currently in process of upgrading NFS storage

MediSwitch – Implementation Challenges



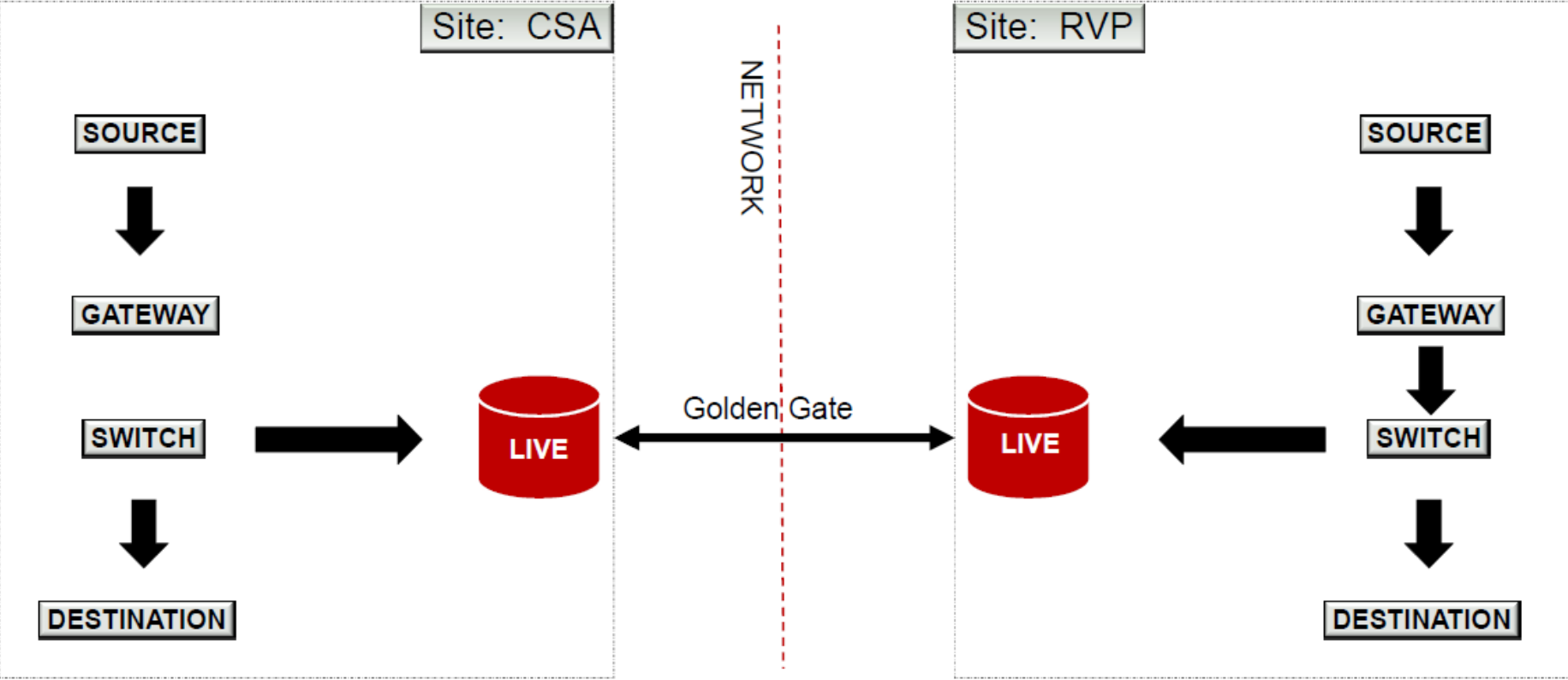
- Maintaining Data Integrity
 - Unique constraints caused by coding errors
 - Choose Parameters & Error handling strategies carefully
- Lag monitoring a necessity
 - Especially if reporting done from one of the databases
- Inherent performance problems not resolved
 - Replication happens too quickly

MediSwitch – Successes



- Removed single point-of-failure
- No additional system resources required for replication
- No downtime for go-live
- Moved from disaster recovery to high-availability
- Knowledge that both sites are fully operational at all times
- Operators able to address issues that previously required DBA involvement
- Time to implement (less than 2 weeks)

MediSwitch - Solution



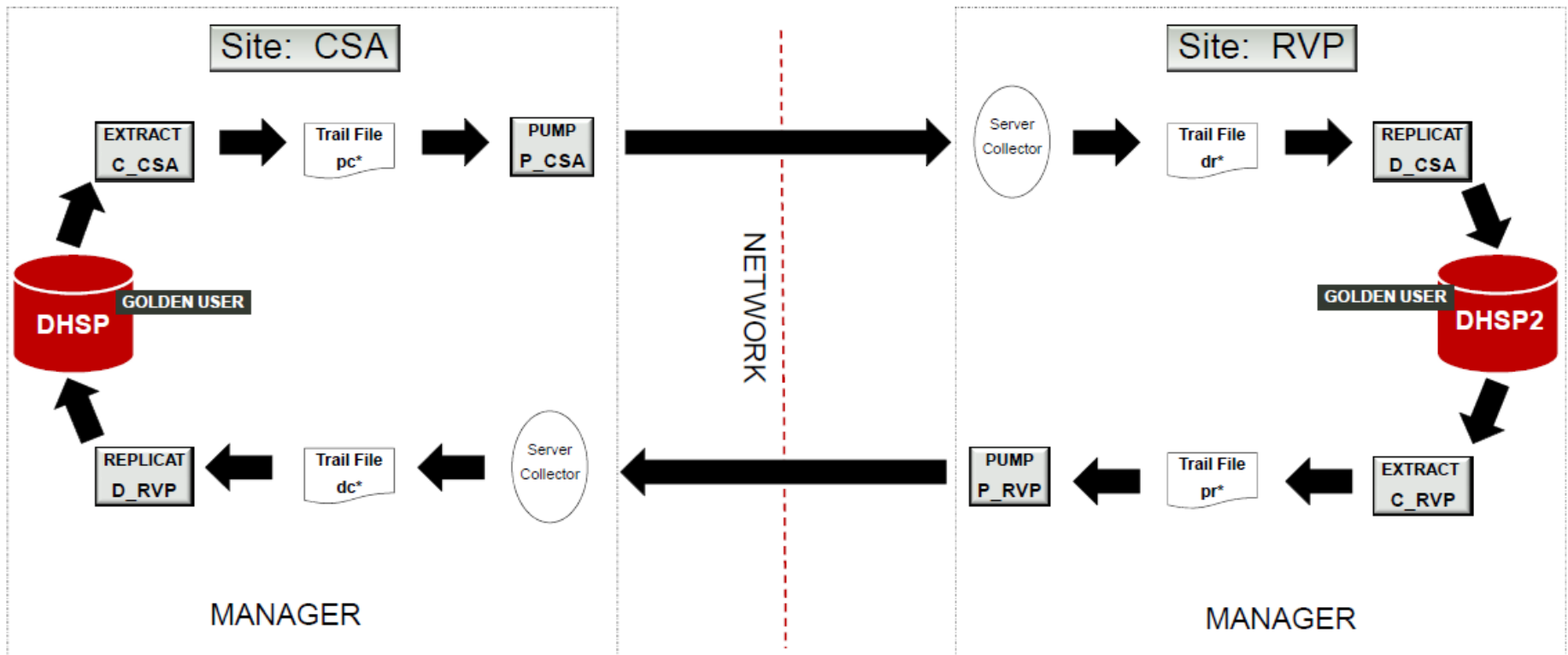
AGENDA



- Introduction to Golden Gate
- MediSwitch Overview
- Golden Gate Project at MediSwitch
- **Golden Gate Configuration at MediSwitch**
- Q&A



MediSwitch Golden Gate Configuration



MediSwitch Golden Gate Configuration Cont.



Extract Process

```
extract c_csa
setenv ( ORACLE_SID = "dhsp" )
setenv ( ORACLE_HOME =
/app/oracle/product/10.2.0)
setenv ( NLS_LANG =
"AMERICAN_AMERICA.AL32UTF8")

userid golden, password *****
tranlogoptions MAXWARNEOF 3600,
excludeuser golden
exttrail /goldengate/csa2rvp/pc
DBOPTIONS ALLOWUNUSEDCOLUMN
DDL INCLUDE MAPPED
DDLOPTIONS ADDTRANDATA, REPORT

tableexclude dhs.nappi6_published
tableexclude dhs.nappi9_published
table dhs.*;
table dw_switch.*;
```

**Trail
File**

Pump Process

```
extract p_csa
passthru
rmthost sems2.dhsolutions.co.za,
mgrport 7809
rmtrail /goldengate/csa2rvp/dr

table dhs.*;
table dw_switch.*;
```

SOURCE

MediSwitch Golden Gate Configuration Cont.



Replicat Process

```
replicat d_rvp
setenv ( ORACLE_SID = "dhsp" )
setenv ( ORACLE_HOME = /app/oracle/product/10.2.0)
setenv ( NLS_LANG = "AMERICAN_AMERICA.AL32UTF8")

userid golden, password *****
assumetargetdefs
discardfile ./dirout/d_rvp.dsc, append, megabytes 500
discardrollover at 09:45 ON tuesday
APPLYNOOPUPDATES
DDL INCLUDE MAPPED, EXCLUDE OBJNAME "DHS.SEMS_BILLING_TX"
DDLOPTIONS REPORT

map dhs.discovery_dup_check, target dhs.discovery_dup_check
REPEROR (1, DISCARD);
MAPEXCLUDE dhs.sems_billing_tx
map dhs.*, target dhs.*;
map dw_switch.*, target dw_switch.*;
```



Summary



- Data integrity
- Flexibility
- Real-time
- Low impact
- Short implementation time



Q&A

