Disclaimer

This document is for informational purposes only and is subject to change at any time without notice. The information in this document is proprietary to Actian and no part of this document may be reproduced, copied, or transmitted in any form or for any purpose without the express prior written permission of Actian.

This document is not intended to be binding upon Actian to any particular course of business, pricing, product strategy, and/or development. Actian assumes no responsibility for errors or omissions in this document. Actian shall have no liability for damages of any kind including without limitation direct, special, indirect, or consequential damages that may result from the use of these materials. Actian does not warrant the accuracy or completeness of the information, text, graphics, links, or other items contained within this material. This document is provided without a warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose, or non-infringement.
Disaster Recovery

Pete Lydon

Principal Consultant, Actian Services, EMEA
Overview
Disaster Recovery

- What do you backup?

- What plans do you have in place?
  - What events are they good for?

- How are you doing it?
  - Who can invoke it?
  - Who do you need to carry it out?

- How often do you test it?
  - Do you really (honestly) test?

- Ingres, Vector & Vector-H, Backup and Recovery options for DR
A few thoughts.....
DR.. It’s a big ‘thing’
(and there’s no thanks for getting it working)

- Some people just hate the thought of it all. Some just don’t get it
- It’s more than backing up files, databases, applications....
- What’s your Recovery Time Objective (RTO)?

- Are you planning to operate as normal?
  - What does ‘the Business’ want?
    - Business as usual...

- It’s all part of a bigger plan
  - Business Continuity Plan
    - It goes hand in hand with your DR plan
Planning

- We need to ensure that we understand what kind of disaster we are planning for.
  - Hardware failure
  - Human error
  - Software corruption
  - Computer viruses
  - Equipment theft
  - Hardware destruction
  - World War Z
  - We’ll have bigger things to think of if this occurs!

- What is our Business Continuity Plan?
We want BAU

• Our systems are mission critical
  • We want them all back
  • 24/7 uptime no matter what

• Be prepared to write some very hefty cheques
  (‘checks’)
Whatever the outcome as to what the plan is...

- Make sure there aren’t any single points of failure
  - The 1 DBA or SysAdmin person who knows/deals with it
    - You’re only ok to have a disaster when they are NOT on holiday
    - Hopefully your plan at the least identifies these giving you the chance to do something

- Make sure the plan is actually feasible
  - Are there some difficult (or when you drill down) unrealistic steps?

- Finally - You test it.
  - Oh and when I say test...
...I have a robust solution..(now I will prove it works)....
Ingres & Vector Tools/Utilities
Our options

These depend on how close to real time we want to be

If we just want a copy of our data....

Out side of Ingres
   OS Backup

Ingres utilities
   copydb
   unloaddb

So we have a copy, how do we get it restored?
We have some tools, do they help us?

Can we get or systems back using this copy?

Maybe one of these tools meet your requirements now, but will they continue to do so?

We’ve got a copy of our data, but with some of the utilities we’ve still got a lot to do to get that copy back to being a database.

Shouldn’t we have the copy of our database ‘handy’ to ensure we can restore to it?
Better tools for this job

We can’t take our system offline or have it read-only.

What options do we have?

‘Outside’ of Ingres

**HVR**
- Completely understands everything at the transactional level

**SAN replication**
- Outside the control of your DBAs, & who’s monitoring/managing it.
HVR

We can’t take our system offline or have it read-only
SAN replication

It happens all real-time, ‘write’??

Ensure that you are using the correct ‘remote mirroring’ mode
- Asynchronous remote mirroring
  - Store and forward
  - Means remote writes fall behind local ones
    - Could mean a delay or seconds/minutes or longer
    - Used when a remote site is a long way away
- Synchronous
  - Now we write to our remote SAN straight away.

It’s not cheap but if RTO is everything....

Note it doesn’t prevent a rolling disaster!
- If you get a data corruption on your source, it will just want to replicate that to your target.
Actian tools

We can’t take our system offline (part 2)

Ingres utilities

- ckpdb
  - Comes with Ingres/ActianX/Vector(-H) technologies
  - ‘IngresSync’ (services tool)
  - Uses checkpoint and log-shipping.

Actian DataCloud Backup

- Ensures you have your backups are secure and safe off-site for restoration back to your Production Server or elsewhere

movedb

- Gives us the ability to copy the database to another instance/server

clonedb

- Similar to movedb, gives us more flexibility to copy to a similar instance
ckpdb & rollforwarddb

(1) ckpdb (Source - Prod ServerDB)
• Checkpoint your journaled database as normal

(3) rollforwarddb (Target – DR Server)
• Use your backup files from your Production system as your restore files
The glue in the middle..

So we’ve taken our checkpoint (1) and we have ability to restore that on DR (3)
We still need to get from 1 to 3.

(2) So that’s as simple as copying the files across from your Production system to your DR Server
   • SFTP
   • RSYNC

Note – Though there is still some other activities we’ll need to do from time to time.
   • Users?
   • Applications?
   • Files outside of App and DB
DR & Rollforwarddb

ROLLFORWARDDB

- **-incremental_start** (‘the set-up’)
  - The checkpoint is restored and rollforwarddb marks the database INCONSISTENT with inconsistency code INCR_RFP.
  - You can still connect and perform read only operations

- **-incremental_continue** (‘Normal operations’)
  - Discovers and applies new journals.
  - When combined with the –c + j flags, rollfowarddb applies all new journals that have been moved into the checkpoint directory, such that no transactions are left open.

- **-incremental_finish** (‘When switching over’)
  - When –incremental_finish –c +j is specified
  - rollforwarddb applies all new journals, rolls back any open transactions and marks the database available
IngresSync (Services Tool)

Automates the whole rollforward process and copies your files for you.

Primary designed to keep 1 or more targets synchronized with the Source DB (Prod)

All the scripting and maintenance of those scripts as and when changes are required is managed by us.
movedb

- Puts the *SourceDB* into ‘readonly’ mode whilst the copy takes place
- Will either copy the database with checkpoint or alternatively leave that alone
- Works from Ingres 10.2
- It’s a like for like copy to your target instance
clonedb

- It gives you added flexibility

- Initially developed for a customer using Vector-H that wanted to replicate their DB on another Hadoop Cluster
  - Is in both Vector and Vector-H
  - It can clone a vector-h database to a different topology
  - Included in ActianX
  - Is making it’s way out to Ingres 10.2 (patch 15095 on Linux too)

- Provides additional functionality to ‘copy’ your database to change:
  - Instance Id
  - Database Owner e.g. from ‘Proddb’ to ‘testdba’
  - Database name e.g. from ‘ProdDB’ to ‘UATDB’
Clonedb: Version 0.8

usage:

```bash
clonedb -source_dbname <source_dbname> -source <source_machine>
  -source_ii_system <source_II_SYSTEM>
 -target_dbname <target_dbname> -target <target_machine>
 -target_ii_system <target_II_SYSTEM>
 [-key keyfile] [-trial]
 [-source_user <source_installation_owner>]
 [-target_user <target_installation_owner>]
```

where:

- `-source_dbname` - Source database name
- `-source` - Source machine name
- `-source_ii_system` - Source II_SYSTEM
- `-target_dbname` - Target database name
- `-target` - Target machine name
- `-target_ii_system` - Target II_SYSTEM
- `-key` - rsa key file for ssh authentication
- `-trial` - Target database will be created, NO files copied
- `-source_user` - Source installation owner (override current user)
- `-target_user` - Target installation owner (override current user)
clonedb (example)

Here we are cloning the database "testdb" from an instance in the ‘trainingvm’ machine to our testmachine2 and renaming it, so it’s called “test2db”

```
ingres:gl> clonedb -source_dbname testdb -source trainingvm -source_iisystem /rdbms/group1 -target_dbname test2db -target_iisystem /rdbms/group1 -target testmachine2 -key /home/ingres/.ssh/id_rsa
```

- It creates the target database
- Put the source system into ‘readonly’ mode
- Copies the database across
- On completion marks source and read/writeable

NOTE
- It doesn’t move your checkpoints over
clonedb - output

```
INFO: Create test2db for user ingres on testmachine2 ...
INFO: Generating list of locations ...
INFO: Validate source and target data locations ...
INFO: Locking testdb on trainingvm ...
INFO: Locking test2db on testmachine2 ...
INFO: Terminate testdb on trainingvm ...
INFO: Terminate test2db on testmachine2 ...
INFO: Copying /rdbms/group1/ingres/data/default/testdb
INFO: Copying /rdbms/group1/ingres/data/vectorwise/testdb
INFO: Making testdb on trainingvm READWRITE.
INFO: Making test2db on testmachine2 READWRITE.
INFO: Unlocking testdb on trainingvm ...
INFO: Unlocking test2db on testmachine2 ...
INFO: Leaving target instance 'g1' on 'testmachine2' running.
  - Cloned Database 'test2db' is now available.
  - It is recommended that you checkpoint 'test2db' before opening to users.
  - New users may need to be added to the target installation to access the schema.
INFO: clonedb successful.
```
Actian DataCloud Backup - Key features

- Easy setup and integration with existing deployments
- Fully managed service
- Scalable service
- Durable storage
- Highly secure
- Highly available
Actian DataCloud Backup - How it works

Step 1: Setup an agent on each of your Ingres/Actian X instances

Step 2: Agent monitors instance for checkpoint/journal activity

Step 3: Agent encrypts and uploads checkpoints/journals to the Cloud

Step 4: You can monitor backup activity from a hosted web console

DataCloud Backup Console

DataCloud Backup Service

Corporate Firewall

DataCloud Backup Agent

Ingres/Actian X

DataCloud Backup Agent

Ingres/Actian X

DataCloud Backup Agent

Ingres/Actian X
## Actian DataCloud Backup - Is it right for me?

<table>
<thead>
<tr>
<th>Do any of these explain your situation?</th>
<th>Is DataCloud Backup a good fit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Looking for a solution for offsite backups to aid in disaster recovery</td>
<td>✓</td>
</tr>
<tr>
<td>Currently using an expensive tape vaulting solution and looking for something modern and cost-effective</td>
<td>✓</td>
</tr>
<tr>
<td>Want an offsite backup solution that is able to copy checkpoints and journals as they are generated to ensure an up to date offsite copy</td>
<td>✓</td>
</tr>
<tr>
<td>Want transparency and visibility into ongoing offsite backups as well as previously stored ones</td>
<td>✓</td>
</tr>
<tr>
<td>Looking for a single solution that serves as offsite backup as well as a historical backup archive</td>
<td>✓</td>
</tr>
<tr>
<td>Looking for a solution that just works and does not require new hardware or involve learning new software/tools</td>
<td>✓</td>
</tr>
</tbody>
</table>
Free trial!
- We are making a free trial offer available to conference attendees!
- We only have 15 trial accounts available so it's on a first come first serve basis only
- Trial for 3 months
- The trial offers full functionality but limits certain aspects such as the number of times you can do certain operations or the number of instances that you can register etc.

Some requirements for the trial
- Must be an Ingres/Actian X customer with an active support contract
- Ingres 10.2 (Linux 64-bit or Windows 64-bit) OR
- Actian X (Linux 64-bit or Windows 64-bit)

How do I sign up?
- Visit www.actian.com/lp/backup (That’s an “lp” for “landing page” in case you’re wondering!)
- Fill out the form and await further instructions on your email!
Putting that all together....

<table>
<thead>
<tr>
<th></th>
<th>Static DB Backups</th>
<th>Near / Real time Ingres Replication</th>
<th>Vector/Vector-H Replication</th>
<th>Windows OS</th>
<th>Linux</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS Backup</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CopyDB/UnloadDB/RelocateDB</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Checkpoint/Rollforward (with log shipping e.g. IngresSync)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SAN Replication</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MoveDB</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CloneDB</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HVR</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Actian DataCloud</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Finally...

Whatever solution you choose, ultimately, there should be no surprises.

Test it. Test it properly. Test it regularly.
Questions?
Thank you!