

TSMcluster[®]

Version 7.3

**High availability for
TSM servers on UNIX**

October 2021

“We do not need. It's just a backup.”

- TSM must be seen as a 24x7 application.
- Databases save their logs continuously to TSM.
- Restore individual files from the home directories.
- Compliance with SLAs.
- Compliance with government regulations (Basel-II, GDPR).

“Cluster for TSM? We made it ourselves.”

- That was very easy for TSM version 5 and 6?
- Do the scripts also work with 6.2 / 6.3 / 6.4 / 7.1 / 8.1 ??
- Validation and test? Errors are only recognized when they occur.
- Continuous further development necessary.
- Dependency on one or two developers (vacation? sick?)
- Do you have Db2 knowledge?
- What are "log pinning", semaphores, "IPC sockets" in Db2?

“We have an OS cluster from manufacturer XY.”

- OS clusters are very OS-heavy. Strong penetration desired.
- Each OS has its own cluster (PowerHA, Veritas, ..)
- New OS / new patch = new cluster.
- OS update = cluster update = downtime.
- OS cluster should cover as much as possible.
- Very training intensive / very complex. Usually little know-how.
- Monitoring of classic resources.
- The application-specific part must be programmed by yourself.
- OS Personal <> TSM Personal (in case of problems / updates?)
- The costs depend on the machine.

“Is too expensive for us.”

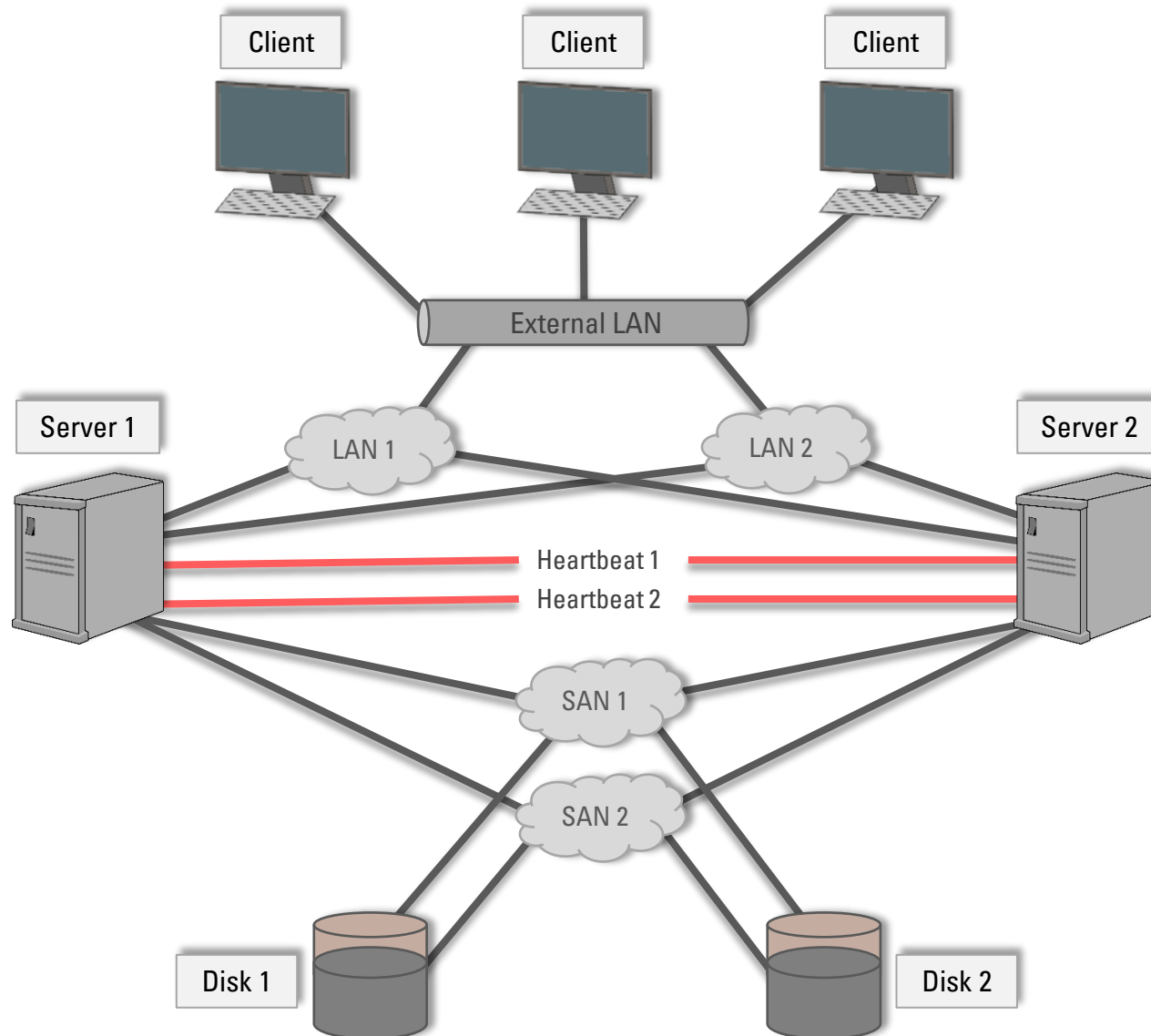


TSM service has to be available 24x7 !!!

- Oracle/SAP/Db2/SQL archive logs
- Windows restores around the clock
- National law's such as Basel-II, DSGVO...

And **you** have to handle things like...

- Changes, fixes, updates
- Hardware problems (failing host, adapter errors..)
- LAN / SAN errors
- Container / Tape inconsistencies
- Driver errors
- Human errors
- Instable OS / applications
- ...



Info

- TSMCluster® extends the standard TSM server and build a high availability solution for it
- There is no need for additional cluster software
- Supported operating systems: AIX & Linux (Redhat & Suse)
- Supported TSM versions: 5 to 8 all IBM supported releases
- TSMCluster is part of the IBM Value Advantage Plus program, IBM Global Solution Directory and an IBM certified solution.

Accredited for



Specialty

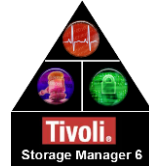
Certified for



software



Certified for



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INNOVATIONSPREIS-IT

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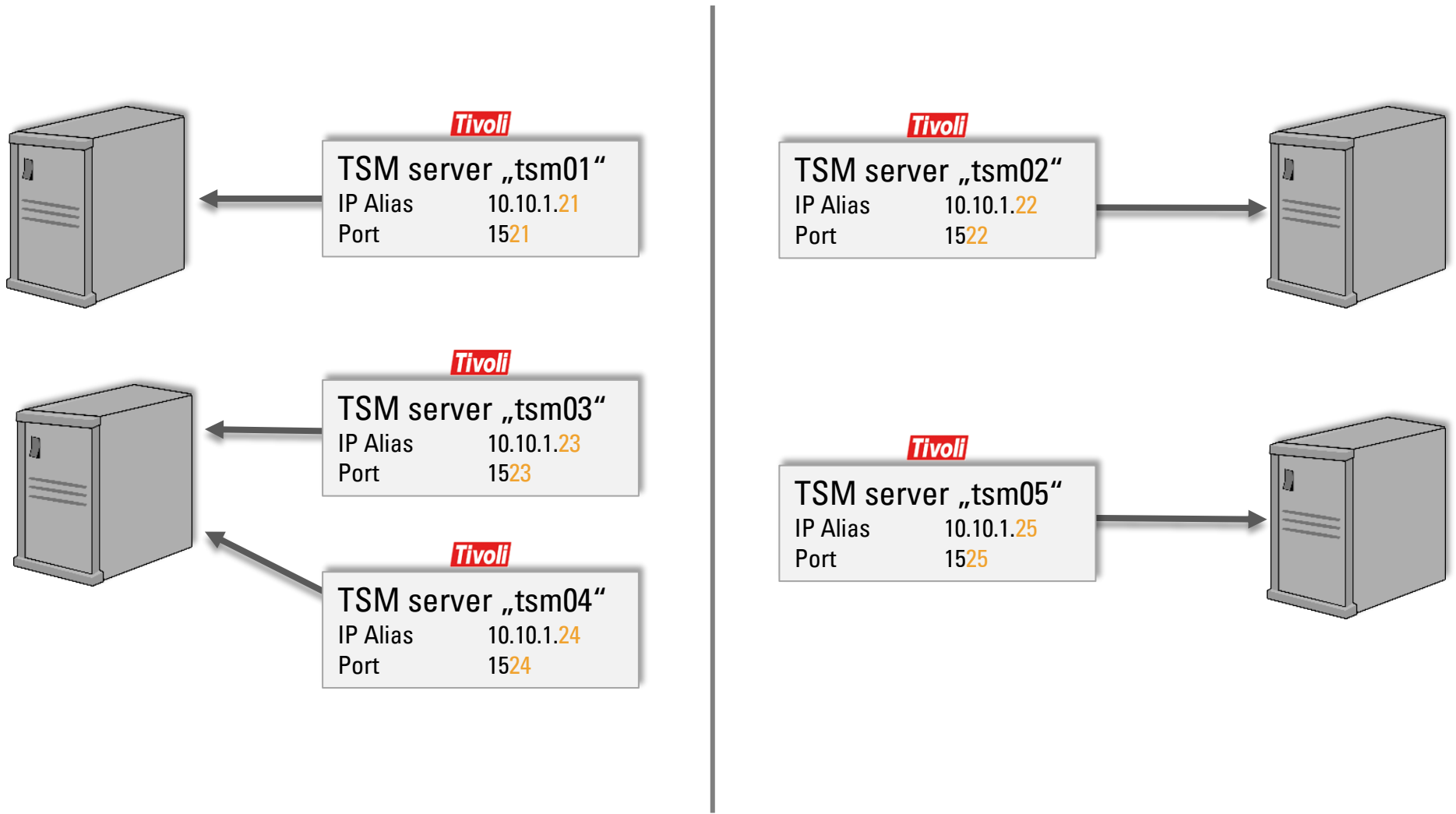
Business
Partner



Red Hat

Business Partner

A cluster can handle multiple TSM servers (instances) on multiple machines (nodes)



- Worldwide protected name: **TSMcluster®**
- Solution in "IBM global solution directory" (GSD)
- Webinterface and CLI

TSMcluster®
▲ 1920
☰
👤 exsm

Cluster ▾

Overview

ClusterDB

Config

Health Check

Nodes ▾

Instances ▾

Sensors ▾

Apps ▾

● exrlin09

rlin91

● exrlin10

rlin90

time	node	instance	app	message
11:46:15	exrlin10		Sensor.Tomcat	tc_running - rc is 0, value is 'Tomcat NOT running'
11:46:16	exrlin10		Sensor.Opoenter	oo_running - rc is 0, value is '
11:46:23	exrlin09			keep-alive message (every 180 seconds)
11:46:24	exrlin10	rlin90	NodeMgr	wrote spec file /opt/tsmcluster/var/specs/rlin90.spec
11:46:24	exrlin10	rlin90	Resources	ip_rlin90 - 192.168.1.1/255.255.255.0 ping successful
11:46:24	exrlin10	rlin90	Resources	ip_rlin90 - 192.168.1.1/24 set on ens3
11:46:24	exrlin10	rlin90	Resources	ip_rlin90 - status OK
11:46:24	exrlin10	rlin90	Resources	db2_rlin90 - DB2 alive check OK for rlin90
11:46:24	exrlin10	rlin90	Resources	TSM - 'rlin90': port 1990 OPEN on host 192.168.1.1
11:46:26	exrlin10	rlin90	Utils	instance rlin90 is sound
11:46:34	exrlin09	rlin91	NodeMgr	wrote spec file /opt/tsmcluster/var/specs/rlin91.spec
11:46:34	exrlin09	rlin91	Resources	ip_rlin91 - 192.168.1.2/255.255.255.0 ping successful
11:46:34	exrlin09	rlin91	Resources	ip_rlin91 - 192.168.1.2/24 set on ens3
11:46:34	exrlin09	rlin91	Resources	ip_rlin91 - status OK
11:46:34	exrlin09	rlin91	Resources	db2_rlin91 - DB2 alive check OK for rlin91
11:46:34	exrlin09	rlin91	Resources	TSM - 'rlin91': port 1991 OPEN on host 127.0.0.1
11:46:36	exrlin09	rlin91	Utils	instance rlin91 is sound
11:46:41	exrlin09		Utils	TSMCluster Version: 7.1.0.0-r2574 [branches/release_v7.1]
11:47:04	exrlin10	rlin90	NodeMgr	wrote spec file /opt/tsmcluster/var/specs/rlin90.spec
11:47:04	exrlin10	rlin90	Resources	ip_rlin90 - 192.168.1.1/255.255.255.0 ping successful
11:47:04	exrlin10	rlin90	Resources	ip_rlin90 - 192.168.1.1/24 set on ens3
11:47:04	exrlin10	rlin90	Resources	ip_rlin90 - status OK
11:47:04	exrlin10	rlin90	Resources	db2_rlin90 - DB2 alive check OK for rlin90
11:47:04	exrlin10	rlin90	Resources	TSM - 'rlin90': port 1990 OPEN on host 192.168.1.1
11:47:06	exrlin10	rlin90	Utils	instance rlin90 is sound
11:47:14	exrlin09	rlin91	NodeMgr	wrote spec file /opt/tsmcluster/var/specs/rlin91.spec
11:47:14	exrlin09	rlin91	Resources	ip_rlin91 - 192.168.1.2/255.255.255.0 ping successful
11:47:14	exrlin09	rlin91	Resources	ip_rlin91 - 192.168.1.2/24 set on ens3
11:47:14	exrlin09	rlin91	Resources	ip_rlin91 - status OK
11:47:14	exrlin09	rlin91	Resources	db2_rlin91 - DB2 alive check OK for rlin91
11:47:14	exrlin09	rlin91	Resources	TSM - 'rlin91': port 1991 OPEN on host 127.0.0.1
11:47:16	exrlin09	rlin91	Utils	instance rlin91 is sound
11:47:21	exrlin10		Utils	TSMCluster Version: 7.1.0.0-r2574 [branches/release_v7.1]
11:47:44	exrlin10	rlin90	NodeMgr	wrote spec file /opt/tsmcluster/var/specs/rlin90.spec
11:47:45	exrlin10	rlin90	Resources	ip_rlin90 - 192.168.1.1/255.255.255.0 ping successful
11:47:45	exrlin10	rlin90	Resources	ip_rlin90 - 192.168.1.1/24 set on ens3
11:47:45	exrlin10	rlin90	Resources	ip_rlin90 - status OK
11:47:46	exrlin10	rlin90	Resources	db2_rlin90 - DB2 alive check OK for rlin90
11:47:46	exrlin10	rlin90	Resources	TSM - 'rlin90': port 1990 OPEN on host 192.168.1.1
11:47:48	exrlin10		Sensor.Tomcat	tc_running - rc is 0, value is 'Tomcat NOT running'
11:47:54	exrlin09	rlin91	NodeMgr	wrote spec file /opt/tsmcluster/var/specs/rlin91.spec
11:47:54	exrlin09	rlin91	Resources	ip_rlin91 - 192.168.1.2/255.255.255.0 ping successful
11:47:54	exrlin09	rlin91	Resources	ip_rlin91 - 192.168.1.2/24 set on ens3
11:47:54	exrlin09	rlin91	Resources	ip_rlin91 - status OK
11:47:54	exrlin09	rlin91	Resources	db2_rlin91 - DB2 alive check OK for rlin91
11:47:55	exrlin09	rlin91	Resources	TSM - 'rlin91': port 1991 OPEN on host 127.0.0.1

📘
⚖️

⬆️ instance starting ⬇️ instance terminating

● node/instance ok ● node/instance failed

🔒 cluster lock holder ⚙️ instance takeover disabled

🔧 instance maintenance ○ instance not available

🛑 instance stopped

👤 instance no spare node

Overview

Instances / Nodes	● exrlin06	● exrlin07	● exrlin08	● exrlin09 ⚓
● rlin90		✖		
● rlin91		⊘		✔
● rlin92				✔
● rlin93 ⚙	✔	⊘	⊘	⊘

Status

- ⚓ cluster lock holder
- node/instance failed
- node/instance ok
- instance stop
- ⊕ instance starting
- ⊖ instance terminating
- ✖ instance maintenance
- ⦿ instance not available
- ✖ instance takeover disabled
- ⚙ instance no spare node
- ⊘ instance disabled
- ✔ instance running on this node

TSMCluster Overview for one cluster

Timeline

Timeline events:

- 12.02: Start (Green up arrow)
- 14.02: Failover (Red exclamation mark)
- 27.11: Stop (Yellow down arrow)
- 2021: Maint (Grey crossed circle)
- 16.01: Move (Yellow double arrows)

Legend: Start, Stop, Maint, Failover, Move

Instance Timeline

Version History

Date / Software	OS	TSM Server	TSM Client	Tape	Cluster	Db2
12.02.2020	7.7	7.1.5	7.1.5	3.0.21	7.2.0.0	9.7.3
09.07.2020		7.1.7	7.1.7	3.0.22		9.7.4
12.07.2020	7.8					
21.04.2020		7.1.9	7.1.9		7.2.0.1	9.7.5
16.08.2020		7.1.11	7.1.11	3.0.24		9.7.8

Node Version History

Errors

Line chart showing error counts over time (from -24h to now). The Y-axis represents the number of errors (0 to 20). The X-axis represents time.

- Red line: cluster.log
- Yellow line: system.log
- Green line: OS messages

TSMCluster and OS Errors (AIX errpt or Linux messages)

Libman
rlin91
☰

TS3500 ⚠

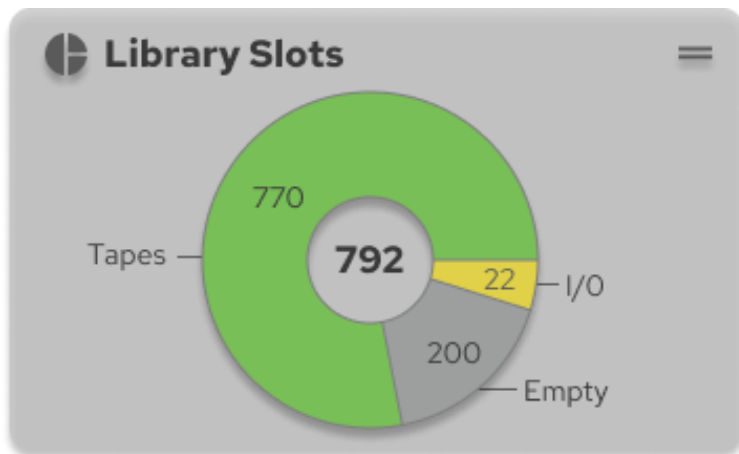
Typ : 3584-L53 Running on : exrlin09
 SIN : 3805517 Up Since : 12.12.2020 12:24
 Firmware: C91
 Tapes : 770
 Drives : 12 LTO-6

Libman Infos

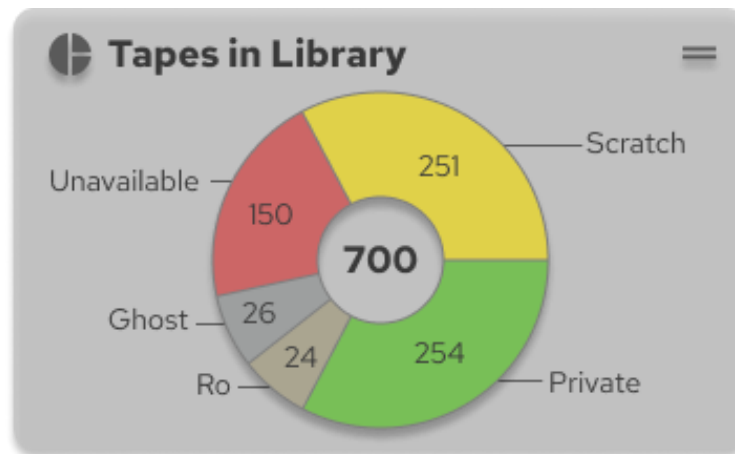
rlin91
active | started | exrlin09
☰

Last Action : ⬇ → ⬆
 Automatic Takeover : ✓
 Autostart : ✓
 Failover : 3 ⚠
 Home Node : exrlin09
 Spare Nodes : exrlin06, exrlin07, exrlin08

Instance Infos



Libman Library Slots



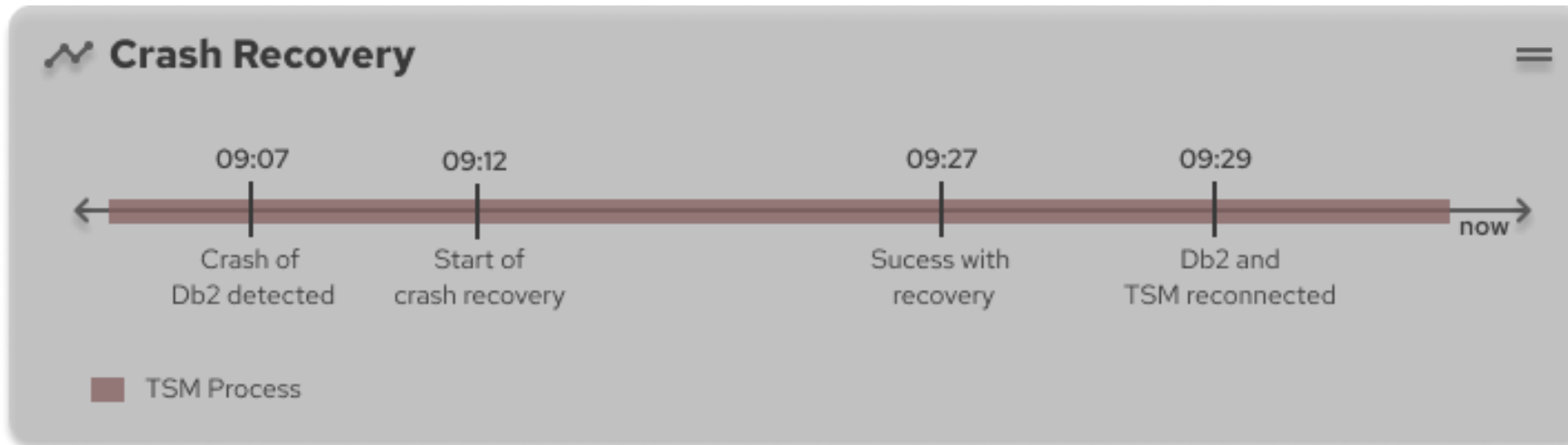
Libman Tapes in Library

Available October 2021

- Db2 crash recovery
 - recognition and management
 - detailed report
- Detailed health check via email
- New addons for tsmcltool instance
 - relocate
 - backup / restore
- New libman scripts
- New Spectrum Scale (GPFS) sensors
- Support for new OS and TSM server levels

Db2 crash recovery

- Can happen any time (or via db2kill)
- If a crash of the database happens, TSM process can continue
- TSMCluster will recognize the crash, tries to failover and performs a controlled crash recovery
- There is no time limitation for the recovery
- After a successful recovery the instance is able to start again
- If the TSM process is still running, the Db2 process will reconnect
- TSMCluster will give a detailed report about each step



About

Besides the already established health, security and snap tools, we will have a lot of instance tools:

instance commands:

- `tsmcltool instance create [-f | force] [-q | quiet]`
- `tsmcltool instance relocate`
 - `actlog`
 - `archlog`
 - `db`
 - `home *`
- `tsmcltool instance backup | restore *`
- `tsmcltool instance update *`
- `tsmcltool instance delete *`

With the option `-q` you can use it with Ansible or any other tool
Automatic relocation of parts or all TSM components

Controlled backup/restore of one TSM instance
Complete update managed via this script
Deletion of one instance (total or partial)

* Planned for 1Q22

About

- Libman tool is in the base product since TSMCluster 7.2.1.
- A collection of tape commands to help for an easier administration
- Most of the commands needs at least one library and one library manager (or single instance)
- Most of the commands can be issued anywhere in the cluster
- The library manager function is one additional option in the clusterconfig
- All commands work on Linux and AIX
- Some of them are not finished yet (marked with *). Plan is 1Q22.

library commands:

- libman library list <library_name> -wwn -sn -name
- libman library define <library_name>
- libman library delete <library_name>
- libman library redefine <library_name>
- libman library audit <library_name> online=yes|no *
- libman library move <library_name> to <inst_name> *
- libman library report <library_name> *

Additional commands:

- libman check clients <instance_name>
- libman path watch on | off *

drive commands:

- libman drive list <library_name> -wwn -sn -name
- libman drive set <drive_name> online=yes|no
- libman drive change <drive_name> <oldwwn=wwn> <newwwn=wwn>
- libman drive change <drive_name> <oldserial=serial> <newserial=serial>
- libman drive clean <drive_name> *
- libman drive rename <drive_name> <new_drive_name> *
- libman drive report <drive_name> *
- libman drive delete <drive_name> *

* Planned for 1Q22

TSM

- All TSM versions: TSM version 5 to 7
- Spectrum Protect 8.1.x
- Mixed operation is possible if enough nodes are available

OS

- IBM AIX 6.1 / 7.x, JFS2 / GPFS
- RHEL 6 to 8 with GPFS or LVM
- SLES 11, 12 and 15 with GPFS or LVM
- Mixed operation is possible



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