

# Experiences with Oracle Solaris 11.4

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SOUG Day Online  
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16:30 – 17:00

**CEO / Enterprise Consultant**  
**JomaSoft GmbH**



# Agenda

- About JomaSoft
- State of Solaris 10 / Solaris 11.3
- Solaris 11.4 (available since 08/2018)
- New Features introduced in the last months
- Experiences and Challenges

# About JomaSoft

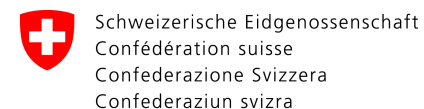
- Engineering company founded in July 2000
- specialized in **Solaris/SPARC** and software development, operations and consulting
- Product **VDCF** (Virtual Datacenter Cloud Framework)  
Installation, Management, Operations, Monitoring, Patching, Security/Compliance, Hardening and DR for Solaris 10/11, Virtualize using LDoms and Solaris Zones
- VDCF is used in production since 2006



Specialized  
Oracle Solaris 11



Specialized  
SPARC T-Series Servers



Eidgenössisches Finanzdepartement EFD  
**Bundesamt für Informatik  
und Telekommunikation BIT**

# Marcel Hofstetter

Working in IT since 25+ years

Solaris since 23 years

CEO at JomaSoft GmbH since 21 years

International Speaker:

Oracle OpenWorld, DOAG, UKOUG, SOUG, AOUG



SOUG (Swiss Oracle User Group) – Speaker of the Year 2016

Hobbies: Family, Travel, Wine & Dine, Movies

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# Solaris 10/11.3: Extended Support

- Extended Support
  - Must be ordered to gain access to new patches
  - Cost: Additional 20%
  - Only a few patches each quarter
- Ends 31.01.2024
  - Support yes, but no new patches
- It is about time to migrate to Solaris 11.4

# Solaris 11.4

- Available since 08/2018
- What's new
  - Solaris (Web) Dashboard
  - Admin History
  - ZFS: Asynchronous Destroy
  - ZFS: Compressed & Resumable Replication
  - ZFS: ZPOOL Disk Remove
  - Zones: Flexible Boot using SMF
  - Zones: Online ZPOOL Dataset add/remove

# Solaris 11.4 / Solaris (Web) Dashboard

- Solaris Dashboard contains the Overview
- Solaris Analytics for Analysis
- Statistics and Events for easier diagnose
- Statistics store (sstore / DB / CLI)
- RAM, CPU, Disk, Network, SMF, ...
- Realtime and historical data
- Various Views (Components, Partitions, Time frames)

# Solaris 11.4 / Solaris (Web) Dashboard

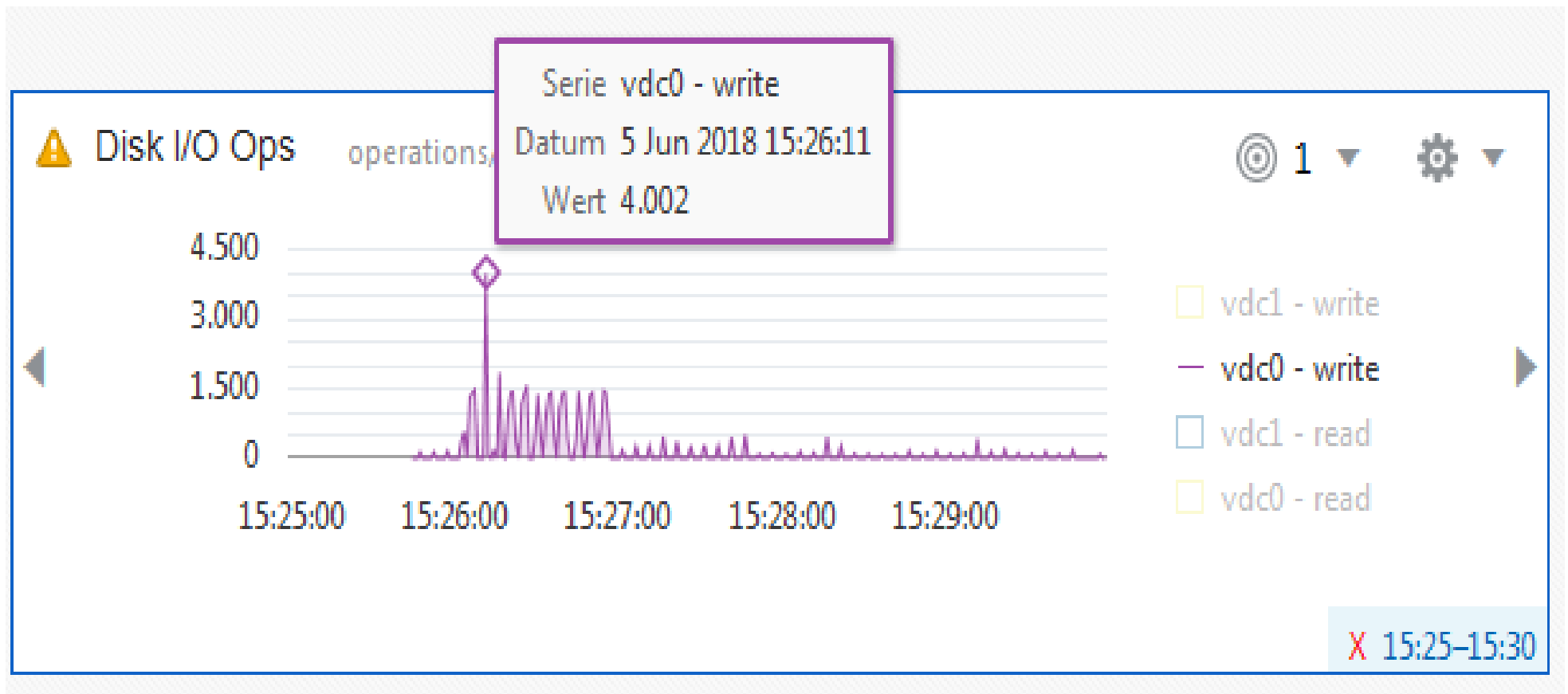
The screenshot displays the Solaris (Web) Dashboard interface. At the top, there is a navigation bar with the Oracle logo and 'Solaris Analytics'. The main content area is titled 'Marcel Overview' and shows a 'g0069 Nutzung' section. This section contains several performance charts:

- CPU Utilization:** A line chart showing 'cpu time (percentage)' over the last 12 hours. The y-axis ranges from 0 to 80. The chart shows three series: 'user' (yellow), 'kernel' (green), and 'intr' (red). The 'user' series shows significant activity, peaking around 80%.
- Physical Link Utilization:** A line chart showing 'percentage' over the last 12 hours. The y-axis ranges from 0 to 80. The chart shows two series: 'bytes sent' (green) and 'bytes received' (orange). Both series show very low utilization.
- Disk I/O Bytes:** A line chart showing 'bytes/seconds' over the last 12 hours. The y-axis ranges from 0 to 24 MB. The chart shows two series: 'written' (red) and 'read' (blue). There are several sharp peaks in the 'written' series.
- Memory Usage:** A stacked area chart showing 'Physical memory usage (percentage)' over the last 12 hours. The y-axis ranges from 0 to 80. The chart shows four series: 'zfs' (pink), 'user' (green), 'unknown' (yellow), and 'kernelzones' (blue). The 'zfs' series is the largest, occupying about 60% of memory.
- Virtual Memory Utilization:** A line chart showing 'Virtual memory usage (percentage)' over the last 12 hours. The y-axis ranges from 0 to 80. The chart shows two series: 'reserved' (blue) and 'allocated' (red). The 'reserved' series is around 60% and the 'allocated' series is around 30%.
- Statistics Store CPU time and Memory consumption:** A line chart showing 'percentage' over the last 12 hours. The y-axis ranges from 0 to 80. The chart shows two series: 'stored/22776/r...' (blue) and 'stored/22776/r...' (red). Both series are very low.
- ZFS Pool Capacity:** A stacked area chart showing 'percentage' over the last 12 hours. The y-axis ranges from 0 to 80. The chart shows five series: 'name/g0069\_data' (pink), 'name/g0069\_repo' (green), 'name/omplus1\_root' (yellow), 'name/rpool' (blue), and 'name/v0162\_root' (purple). The 'name/rpool' series is the largest, occupying about 60% of capacity.
- Disk-Based Swap Utilization:** A line chart showing 'Disk-based swap utilization (percentage)' over the last 12 hours. The y-axis ranges from 0 to 80. The chart shows two series: 'reserved' (blue) and 'allocated' (yellow). The 'reserved' series is around 60% and the 'allocated' series is around 20%.

At the bottom of the dashboard, there is a search bar with the text 'locator' and a list of search results. The Windows taskbar is visible at the very bottom, showing the time as 16:35 on 31.10.2019.



# Solaris 11.4 / Solaris (Web) Dashboard



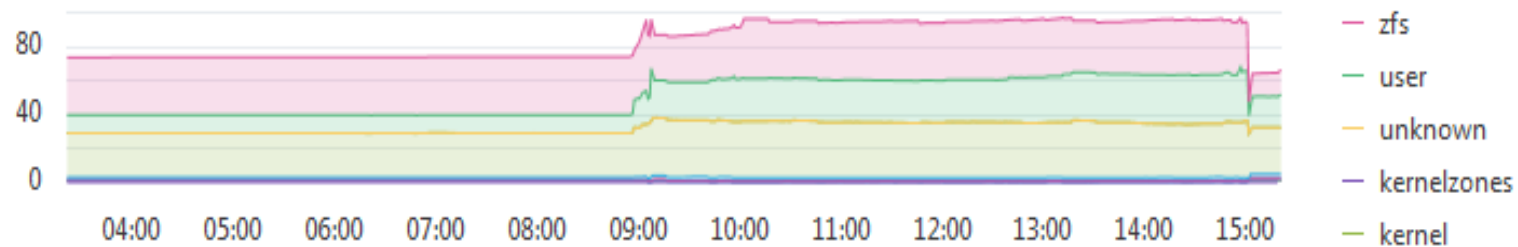
# Solaris 11.4 / Solaris (Web) Dashboard

## RAM Usage

Physical memory usage. RAM utilization is partitioned by different uses; the user processes with the highest resident set sizes are shown.

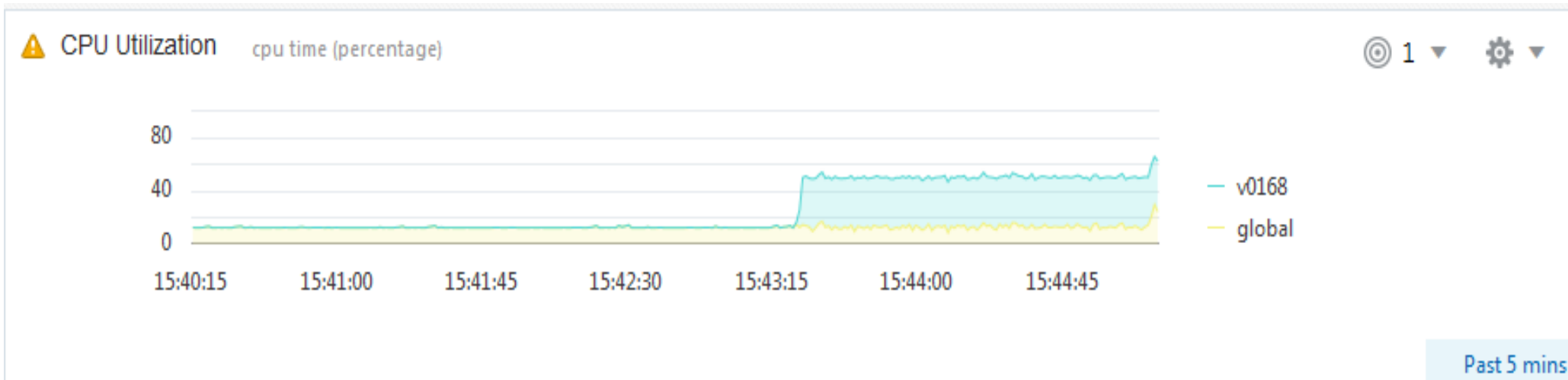
### Memory Usage

Physical memory usage (percentage)

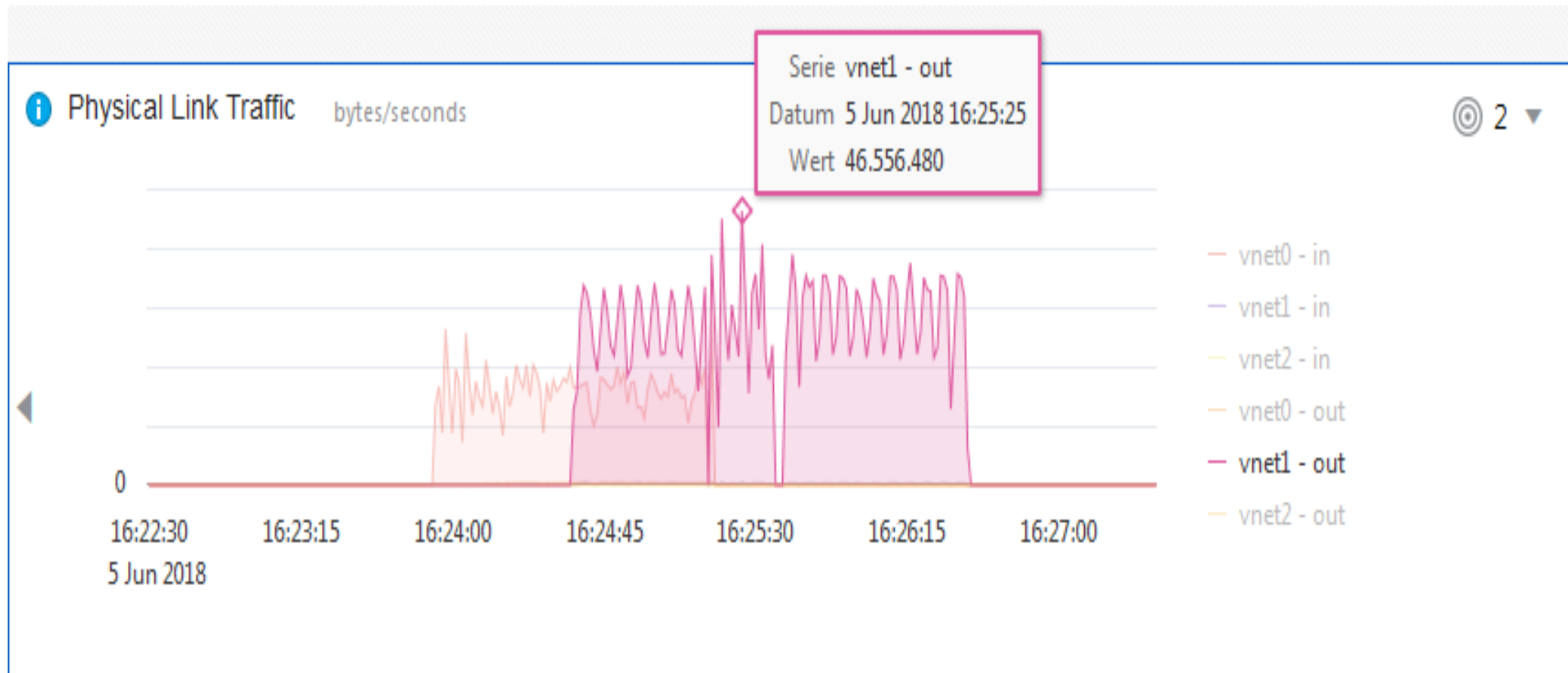


Past 12 hrs

# Solaris 11.4 / Solaris (Web) Dashboard



# Solaris 11.4 / Solaris (Web) Dashboard



# Solaris 11.4 / Admin History

What did Marcel do on 5th June evening?

```
# admhist -a 20180605175000 -b 20180605181000 -v | grep marcel
```

```
2018-06-05 17:59:38.419+02:00 marcel@g0068 cwd=/export/home/marcel  
/usr/sbin/zpool zpool destroy g0068_delegated
```

```
2018-06-05 17:59:52.262+02:00 marcel@g0068 cwd=/export/home/marcel  
/usr/sbin/zpool zpool create v0168_delegated c1d2
```

```
2018-06-05 18:00:45.894+02:00 marcel@g0068 cwd=/root  
/usr/sbin/zpool zpool import v0168_delegated
```

# Solaris 11.4 / ZFS (destroy)

```
# zfs list destroytest/fs1
```

NAME	USED	AVAIL	REFER	MOUNTPOINT
destroytest/fs1	22.1G	17.1G	22.1G	/fs1

```
# time zfs destroy destroytest/fs1; zfs create -o mountpoint=/fs1 destroytest/fs1
```

```
real 0m0.654s
```

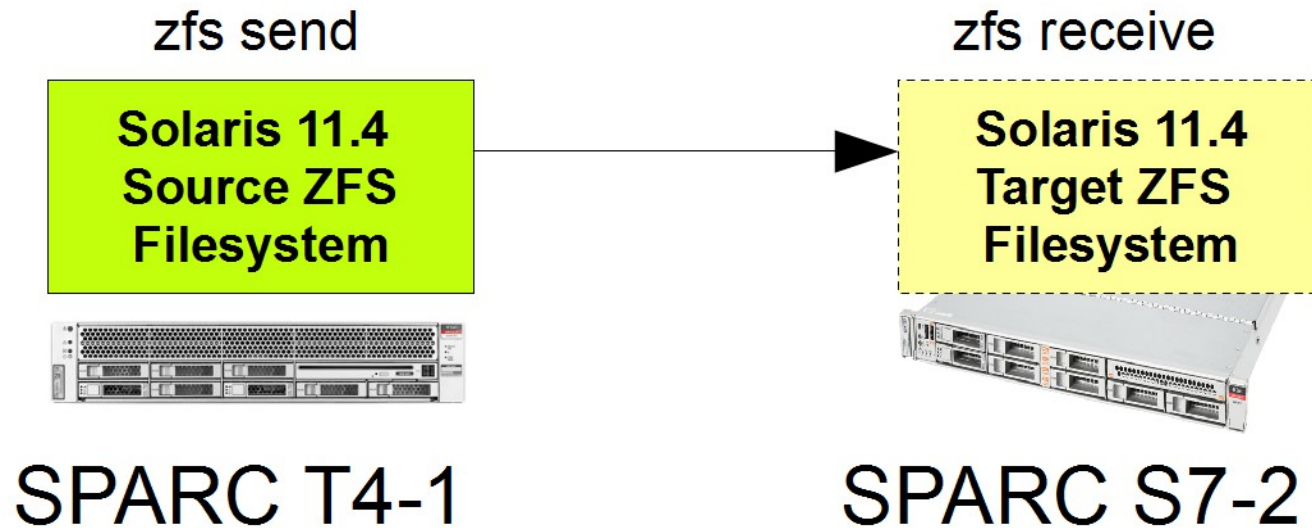
```
user 0m0.005s
```

```
sys 0m0.621s
```

```
# zpool monitor -t destroy destroytest 5
```

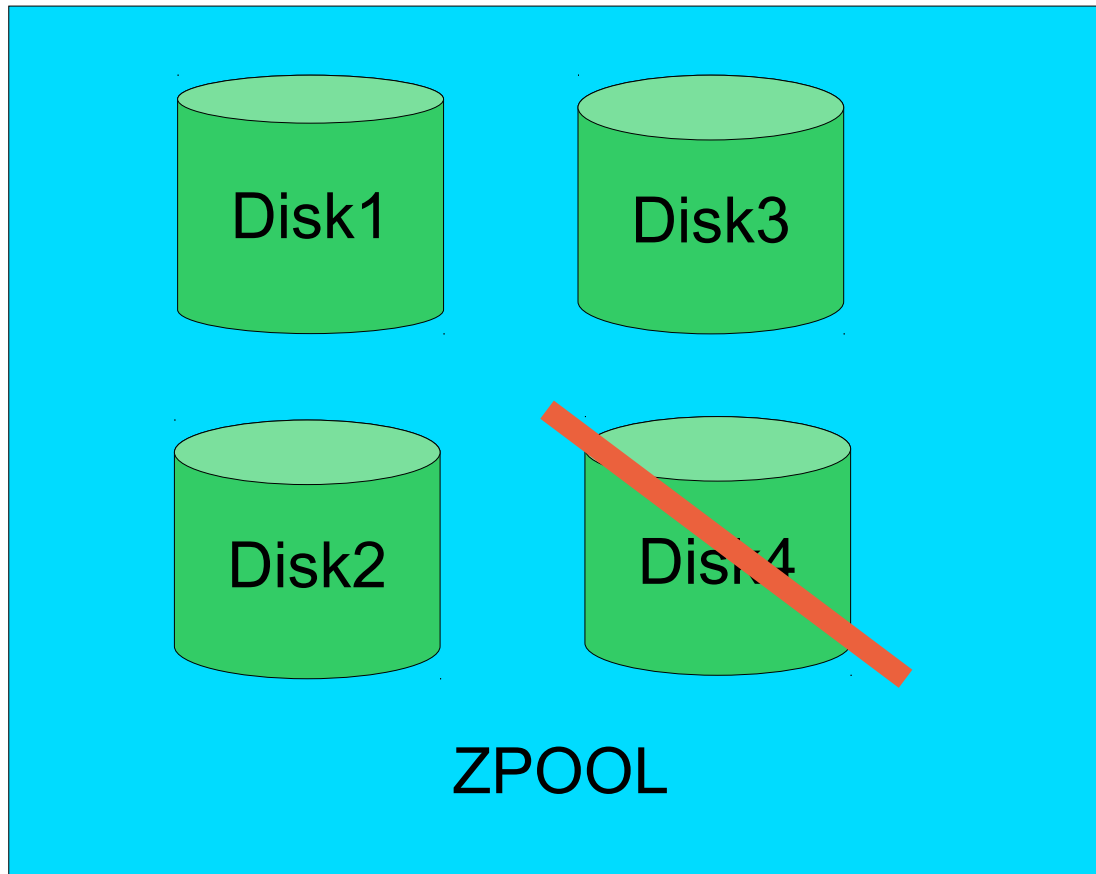
POOL	PROVIDER	TOTAL	SPEED	TIMELEFT
destroytest	destroy	22.1G	0	unknown
destroytest	destroy	20.1G	401M	51s
destroytest	destroy	13.5G	872M	15s
destroytest	destroy	10.8G	767M	14s
destroytest	destroy	4.92G	878M	5s

# Solaris 11.4 / ZFS (Replication)



- Filesystem Replication over the network
- Restart is now supported
- Compressed data is now transferred compressed

## Solaris 11.4 / ZFS (Disk Remove)



- ZPOOLS can shrink now (finally)
- Data is distributed to the other disks



# Solaris 11.4 / Zones (SMF)

```
-bash-4.4$ svcs | grep zones/zone  
online          8:41:22 svc:/system/zones/zone:v0157  
online          8:41:31 svc:/system/zones/zone:v0134
```

- Each zone has his own SMF service
- Dependencies for booting can be defined now

# Solaris 11.4 / Zones (Dataset Add/Remove)

```
# zonecfg -z v0168 -r "add dataset; set name=v0168_delegated; end"
zone 'v0168': Checking: Adding dataset name=v0168_delegated
zone 'v0168': Applying the changes
# zlogin v0168
[Connected to zone 'v0168' pts/7]
Oracle Corporation      SunOS 5.11
Solaris_11/11.4/ON/production.build-59:2018-03-22      March 2018
root@v0168:~# zpool import v0168_delegated
root@v0168:~# zpool list
```

NAME	SIZE	ALLOC	FREE	CAP	DEDUP	HEALTH	ALTROOT
rpool	9.94G	764M	9.19G	7%	1.00x	ONLINE	-
v0168_delegated	9.94G	98.5K	9.94G	0%	1.00x	ONLINE	-

- Delegate ZPOOLS online into zones

## Solaris 11.4 / Small things

- Firewall: Packet Filter (PF) replaces IP Filter (IPF)
- Apache 2.4 replaces Apache 2.2
- fsstat -l, measures Filesystem I/O Latency
- Java 6 removed
- NFS Server Version 4.1
- Names for Network Routes
- Open Source Software
  - New Versions: MySQL, Puppet, Perl, Python, OpenLDAP
  - Oracle Instant Client 12.2 / 18.3
  - OpenStack removed

## Solaris 11.4 / Old Hardware

- Not supported anymore:

SPARC Enterprise M3/4/5/8/9000

Sun Fire T1/2000, SPARC T3

Sun SPARC Enterprise T5xx0/T6xx0

Sun Fire X2x00/X4xx0 (with exceptions)

Sun Blade X6xx0 / X8xx0

Still supported with Solaris 11.3 (MOS Doc 2382427.1)

# Solaris 11.4 / Continuous Delivery

SRU 29  
Jan / 2021

CPU  
Security Fixes

SRU 30  
Feb / 2021

New  
Features

SRU 31  
March / 2021

Bug Fixes

SRU 32  
April / 2021

CPU  
Security Fixes

- No (big) Solaris 11.5 or 11.6 to expect
- Monthly releases with new features and enhancements
- Faster delivery

# Solaris 11.4 / Additions in the past months

- Oracle Solaris Blog <https://blogs.oracle.com/solaris/>
- Oracle Solaris 11.4 Support Repository Updates (SRU) Index (Doc ID 2433412.1)
- A new update (SRU) every month. SRU33 May 2021
- Mostly OpenSource Security Updates
  
- SRU3 – SPECTRE Fix on Intel
- SRU6 – Oracle Database Sheet on WebUI
- SRU8 – UCB Libraries re-added
- SRU12 – Python 3.7 / new ps flags

## Solaris 11.4 / Additions in the past months

- SRU17 – sstored memory leak fixed
- SRU18 – ruby 2.1/2.3 removed
- SRU19 - StatStore Threshold Alarms FMA
- SRU21 – Mellanox 100Gb Ethernet / Printing Update
- SRU24 – Samsung 7TB Disk
- SRU25 – ASR (Auto Service Request) Phone Home
- SRU25 - lz4 compression utility
- SRU27 - Zones Sheet on WebUI
- SRU30 – Ldom 3.6.2 Performance / Python 3.9

# Solaris 11.4 / Kernel Online Updates

```
-bash-5.0$ pkg list ksplice
```

NAME (PUBLISHER)	VERSION	IFO
system/ksplice	11.4-11.4.29.0.1.82.3	i--

```
# pkg set-publisher -g file:///var/tmp/idr4712.1.p5p solaris
```

```
# pkg install idr4712
```

Using spliceadm you can verify the installed splices.

```
# spliceadm
```

ID	STATE	CVE	BUGID
471201	applied	N/A	32407818

```
# spliceadm reverse 471201
```

```
Splice 471201 reversed successfully on Fri Apr 23 13:15:20.
```

```
# spliceadm status
```

ID	STATE	CVE	BUGID
471201	not-applied	N/A	32407818



# Solaris 11.4 / Challenges (1/5)

- **Failback from S11.4 to S11.3 with Zones**  
S11.4 zone BootEnvs are not recognised by S11.3 and not deleted.  
Must be done manually
- **SunLDAP → OpenLDAP**  
ldapsearch/ldapmodify API changes  
data export / import is required  
<http://notallmicrosoft.blogspot.com/2018/04/solaris-114-ldap-changes-for-ldapsearch.html>
- **SunSSH → OpenSSH**  
-bash-4.4\$ ssh -V  
Sun\_SSH\_2.4, SSH protocols 1.5/2.0, OpenSSL 0x100020cf  
-bash-4.4\$ ssh -V  
OpenSSH\_7.5p1, OpenSSL 1.0.2p 14 Aug 2018  
[https://docs.oracle.com/cd/E37838\\_01/html/E61025/openssh1.html#OSMSSssh-transition](https://docs.oracle.com/cd/E37838_01/html/E61025/openssh1.html#OSMSSssh-transition)

## Solaris 11.4 / Challenges (2/5)

- /var/tmp

Cleanup before the upgrade.

Data will be copied to /var/share. Takes time if large or with many files.

WARNING: If you failback to 11.3 and then retry, changed files will **NOT** be copied again.

Workaround

Before the Retry: `zfs destroy rpool/VARSHARE/tmp`

Don't upgrade to SRU 29

Bug 32293902 `migrate_shared_files.py` reflink fails under python3

# Solaris 11.4 / Challenges (3/5)

- Upgrade to S11.4 with Zones

A 'sync-linked' operation failed for child 'zone:v0129' with an unexpected return value of 1 and generated the following output:

```
pkg sync-linked: Package 'network/ipfilter' must be uninstalled or upgraded if the requested operation is to be performed.
```

```
Reject: pkg://solaris/network/ipfilter@0.5.11-0.175.3.35.0.1.0 Reason: Package network/ipfilter is not installed in global zone.
```

```
Reason: Excluded by synced parent incorporation 'consolidation/osnet/osnet-incorporation'
```

```
# zlogin v0129 pkg list setterm
```

NAME (PUBLISHER)	VERSION	IFO
system/locale/setterm	0.5.11-0.175.3.0.0.26.2	i--

```
# pkg list setterm
```

```
pkg list: No packages matching 'setterm' installed
```

Install Package setterm on the Global Zone. Documented in the Release Notes.

[https://docs.oracle.com/cd/E37838\\_01/html/E60973/gtafi.html#scrolltoc](https://docs.oracle.com/cd/E37838_01/html/E60973/gtafi.html#scrolltoc)

## Solaris 11.4 / Challenges (4/5)

- Upgrade fails if S11.4 Packages are on S11.3

Several IPS packages in Solaris 11.3 are not incorporated by their respective incorporations (Doc ID 2525825.1)

```
root@test-server:~# pkg list | grep 11.4
library/python/pyatspi-27      2.30.0-11.4.0.0.1.9.0    i-r
library/python/pyatspi2       2.34.0-11.4.24.0.1.75.1  i--
library/python/pyatspi2-27    2.34.0-11.4.24.0.1.75.1  i--
```

FIX:

```
pkg update --reject library/python/pyatspi2-27 --reject library/python/pyatspi2 \
library/python/pyatspi-27@2.30.0-0.175.3.0.0.26.0
```

## Solaris 11.4 / Challenges (5/5)

- Memory Leak in older sstored

Solaris Statistics Store Service Daemon 'sstored' May Consume a Lot of Memory Due to Memory Leaks in the Daemon on a Solaris System Hosting Oracle Database with Solaris Version 11.4.9.5.0 or Later

(Doc ID 2596279.1) - Fixed in SRU17 (14 January 2020)

# Summary - Why Solaris 11.4?

- Stable, longterm Enterprise OS (2034)
- Secure and stable Containers (Zones) since 2005
- Security Compliance integrated
- Performance/Issues identified with the Solaris Dashboard
- Oracle Licensing: Only for the CPUs you need
- JomaSoft: 21 years Experience incl. Product VDCF
  
- Migrate now!

# Experiences with Oracle Solaris 11.4

## Questions?

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