



SAP HANA na Lenovo Appliance

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+ Lenovo Solution for SAP HANA

Application



SAP HANA®

Spectrum Scale or XFS
FPO Functionality



OS

Red Hat Enterprise Linux 6.5 or 6.6
SUSE Linux Enterprise Server 11 or 12



3850X6, 3950X6, SR950



What is an SAP HANA “appliance”

An in-memory solution integrated with software, hardware, and services.

→ Features

- Optimized, easy to deploy
- Unique Spectrum Scale file system
- Infrastructure reliability, scalability, and availability

→ Advantages

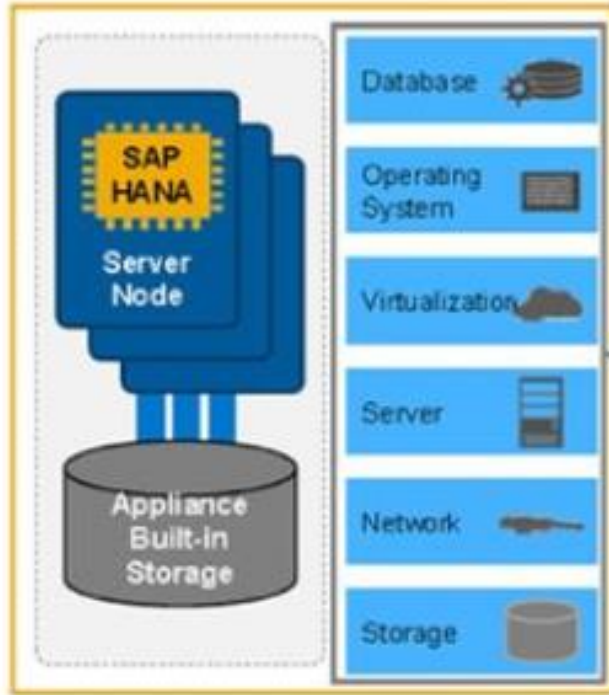
- Largest scale-out capability
- Lab Service infrastructure implementation
- 50% market share on SAP HANA systems

→ Benefits

- Support business growth with scalability
- No SAN with Spectrum Scale flexibility
- Fast deployment and low TCO

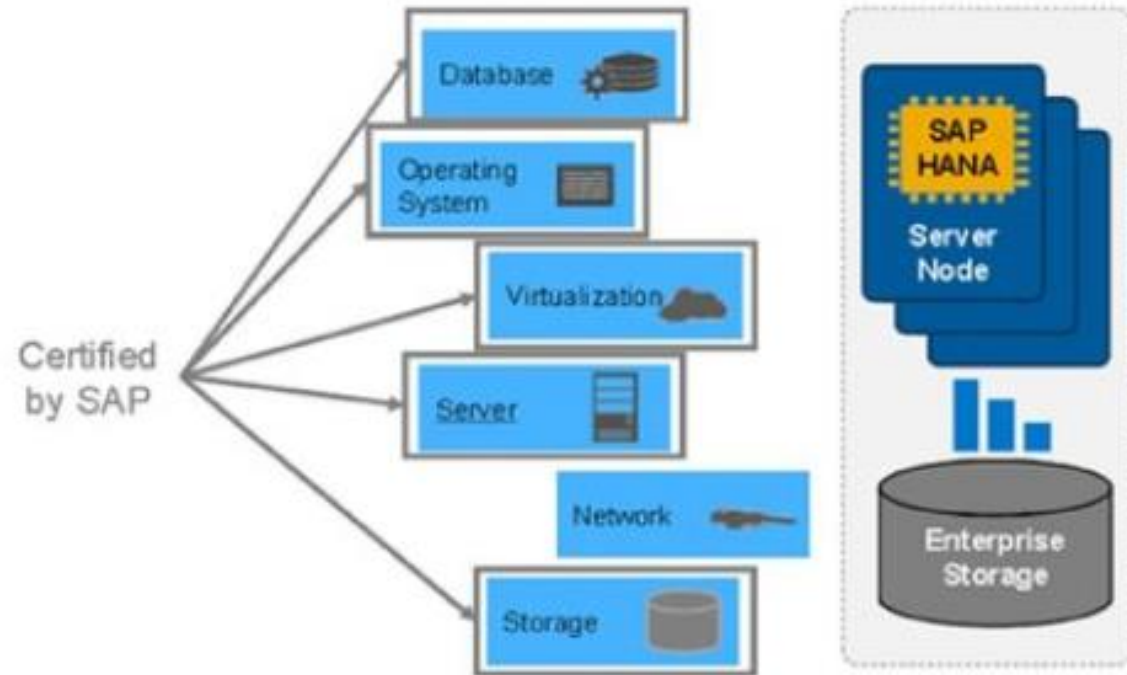


SAP HANA Appliance: "All in one box"



- Pre-assembled, pre-installed and pre-configured hardware and software.
- Complete package certified by SAP

TDI: Use your own preferred solutions

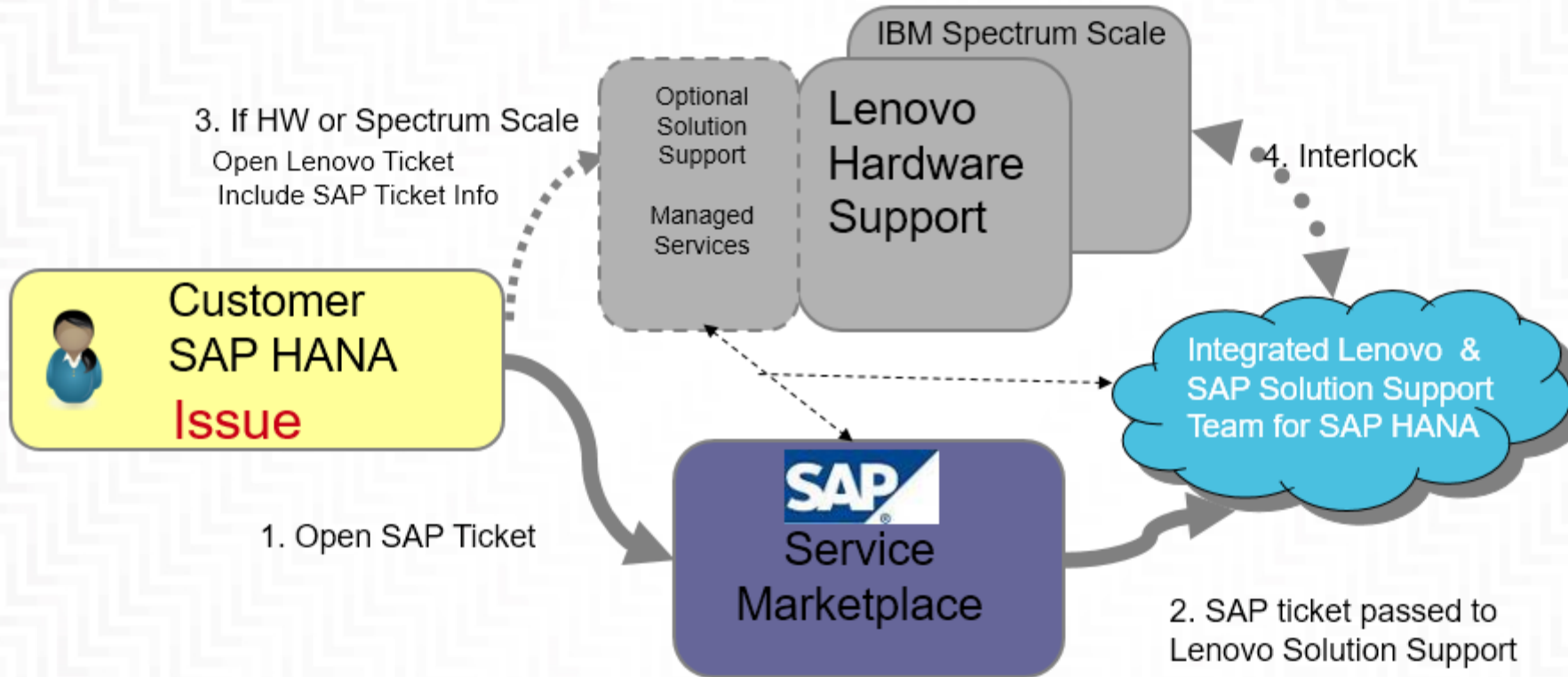


- Custom assembled hardware from SAP-certified components.
- Software installed by SAP-certified engineer

+ Appliance

- Zautomatyzowana powtarzalna instalacja
- Gotowe procedury utrzymania i rozbudowy
- Gotowe narzędzia diagnostyczne
- Tuning z „pudełka”
- Jedno miejsce wsparcia

+ Service for SAP HANA Process Flow





Zgłaszanie problemów

Weryfikacja poprawności działania sprzętu (IMM)

```
saphana-support-lenovo.sh -s
```

Service Support Data z IMM

Wynik z Lenovo DSA

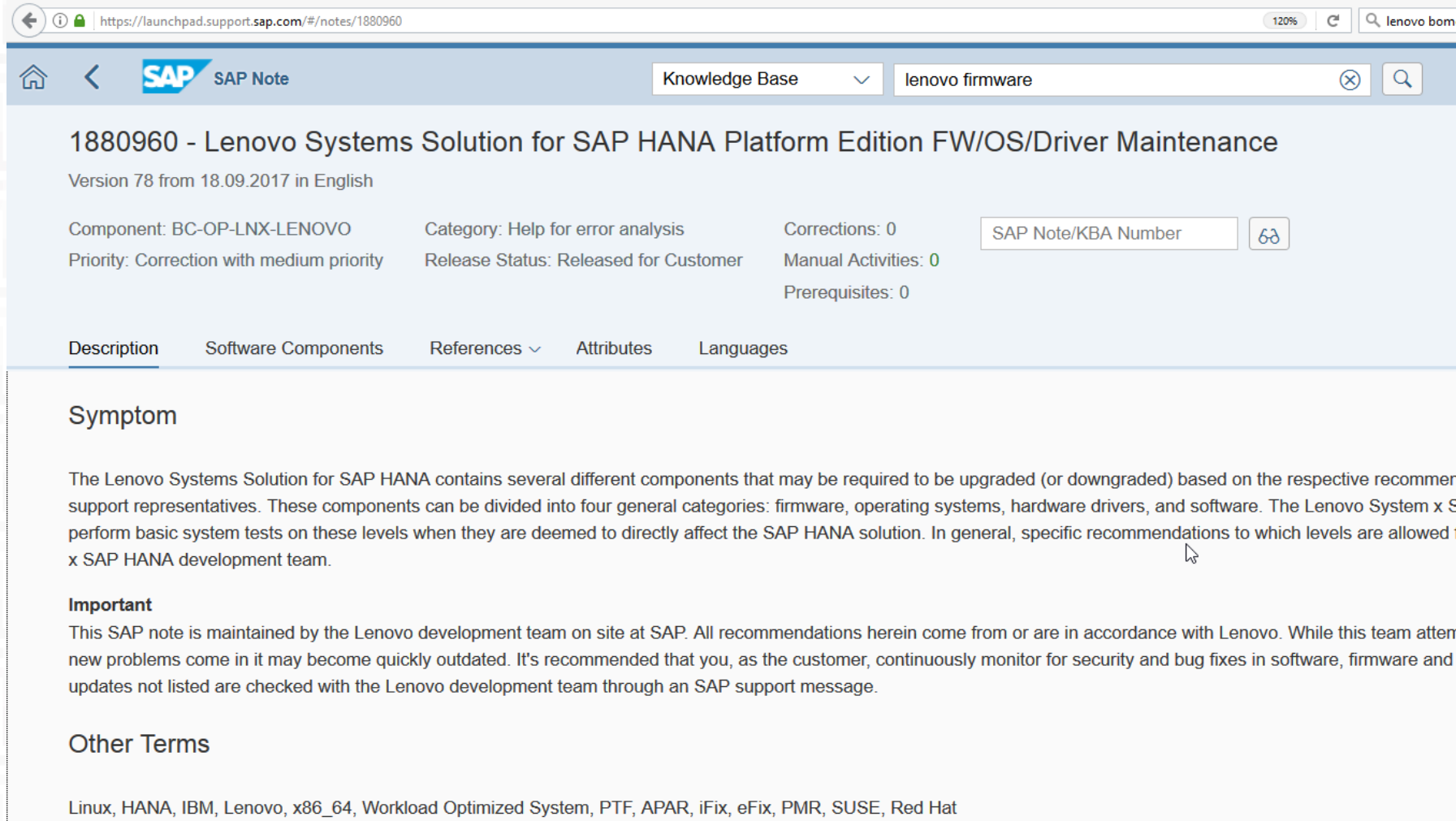
+ Kto jest za co odpowiedzialny?

Area	Task	Hardware vendor	Customer	SAP
Initial Setup	Hardware installation and health check	X		
	Linux OS installation	X		
	HANA platform installation	X		
	Data source connectivity		X	
	Adding DB instances (MCOS)		X	
	SMD agent installation		X	
Operations	HANA DB admin		X	
	Third party software installations		X	
	HANA system monitoring		X	
	HANA DB monitoring		X	
	Backup and recovery		X	
	"Bare metal" recovery		X	
Maintenance	Firmware patching	(X)*	X	
	Linux OS upgrades and patching	(X)*	X	
	Peripheral components patching		X	
	HANA platform components updates & patching		X	
Support	Issue resolution process	(X)*	X	X

* depending on support contract



Lenovo Systems Solution for SAP HANA Platform Edition FW/OS/Driver Maintenance

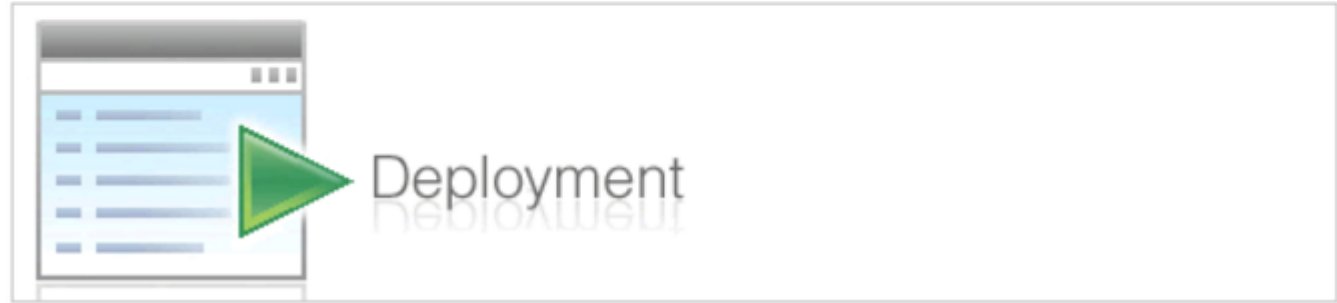


The screenshot shows a web browser window displaying a SAP Knowledge Base article. The browser address bar shows the URL: <https://launchpad.support.sap.com/#/notes/1880960>. The page title is "1880960 - Lenovo Systems Solution for SAP HANA Platform Edition FW/OS/Driver Maintenance". The article is version 78, dated 18.09.2017, in English. The component is BC-OP-LNX-LENOVO, and the category is "Help for error analysis". The priority is "Correction with medium priority", and the release status is "Released for Customer". The article has 0 corrections, 0 manual activities, and 0 prerequisites. The article is categorized under "SAP Note/KBA Number" with the number 63. The article is available in English. The article is titled "Symptom" and describes the Lenovo Systems Solution for SAP HANA, which contains several different components that may be required to be upgraded (or downgraded) based on the respective recommendations of support representatives. These components can be divided into four general categories: firmware, operating systems, hardware drivers, and software. The Lenovo System x SA perform basic system tests on these levels when they are deemed to directly affect the SAP HANA solution. In general, specific recommendations to which levels are allowed for x SAP HANA development team. The article is marked as "Important" and states that this SAP note is maintained by the Lenovo development team on site at SAP. All recommendations herein come from or are in accordance with Lenovo. While this team attempts to address new problems, it may become quickly outdated. It is recommended that you, as the customer, continuously monitor for security and bug fixes in software, firmware, and OS updates not listed are checked with the Lenovo development team through an SAP support message. The article also lists "Other Terms" including Linux, HANA, IBM, Lenovo, x86_64, Workload Optimized System, PTF, APAR, iFix, eFix, PMR, SUSE, and Red Hat.

<https://launchpad.support.sap.com/#/notes/1880960>

**+ Bootable Media Creator (BoMC) for
Lenovo x86 servers**

lenovo®



<https://support.lenovo.com/pl/pl/solutions/Invo-bomc>



Lenovo Check Tool for SAP HANA

← ⓘ 🔒 <https://launchpad.support.sap.com/#/notes/1661146>

🏠 **SAP** SAP Note Knowledge Base

1661146 - Lenovo/IBM Check Tool for SAP HANA appliances Version 45 from 06.10.2017 in English

Component: BC-OP-LNX-LENOVO	Category: Help for error analysis	Corrections: 0	<input type="text" value="SAP Note/KBA Number"/>
Priority: Recommendations / Additional Info	Release Status: Released for Customer	Manual Activities: 0	
		Prerequisites: 0	

Description Software Components References ▾ Attachments Attributes Languages

Symptom

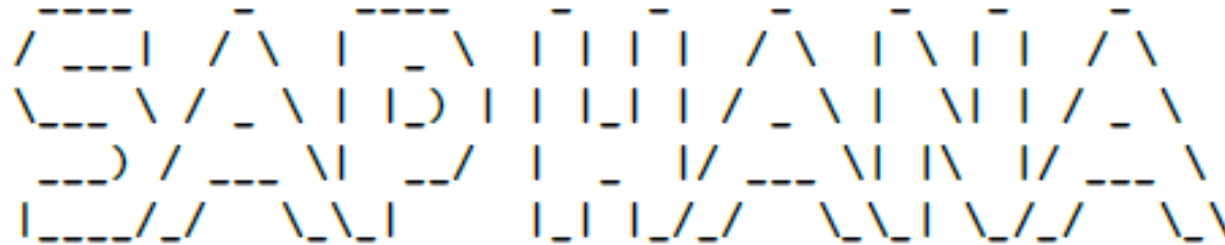
Lenovo/IBM Hardware Check Scripts for SAP HANA appliances - Compiling system information on the Lenovo/IBM Sys determination by SAP and Lenovo/IBM Development Support.

Last document update: 2017-10-06

Other Terms

Linux, HANA, SAPHANA, Support, analysis, error sources, swap, Memory, Linux kernel, SUSE, SLES, Red Hat, RHEL,

<https://launchpad.support.sap.com/#/notes/1661146>



Lenovo Systems Solution for SAP HANA appliance

See SAP Note 1650046 for maintenance and administration information:
<https://service.sap.com/sap/support/notes/1650046>

Regularly check the system health!

```
! INFO: Last hourly update on Mon Jun 22 14:45:02 CEST 2015.  
! NOTICE: Memory usage is 3%.  
! NOTICE: All quota usages below 90%.  
! NOTICE: All GPFS NSDs up and ready.
```

```
hanadwh011:~ # /opt/ibm/saphana/bin/saphana-support-ibm.sh -c
```

```
=====
# IBM SYSTEM CHECK TOOL for SAP HANA -          Version 1479 2014-06-05
# (C) 2011-2014 by IBM Corporation - http://www.ibm.com/linux
# Analysis taken on:                            20140710-1653
=====
```

```
-----
IBM Systems Solution for SAP HANA appliance Hardware Analysis
-----
```

```
Machine analysis for IBM x3850 X6 -[3837FT3]- [06BT715]
```

```
IBM Workload Optimized Solution for SAP HANA appliance Model "AC34S1024"
```

```
OK
```

```
-----
Appliance Solution analysis:
-----
```

```
IBM System x3850 X6: Workload Optimized System for SAP HANA Model AC34S1024
Installed appliance version: license-1.7.73
```

Appliance Solution analysis:

IBM System x3850 X6: Workload Optimized System for SAP HANA Model AC34S1024
Installed appliance version: license-1.7.73

Hardware analysis:

CPU Type: Pentium 4 Intel(R) Xeon(R) CPU E7-8880 v2 @ 2.50GHz
OK

of CPUs: 4 cores: 60 threads: 120
OK

Memory: 1024 GB / Free Memory: 966 GB
OK

ServerRAID: 2 adapters
OK

HDD Disk Size: 3 partitions in 12283 GB total
OK

Raid controller Nr.1:
Model: M5210 | Mount point: /dev/sdb
RAID: | # of Drives: | Drive Size: | Battery Low: No
OK

I



```
-----  
iid=OAFIID:GNOME NullApplet Factory --oaf-ior-fd=24  
hw3adm 14765 1 0.0 322596 18660 /usr/lib64/gnome-main-menu/main-menu --oaf-activate-  
iid=OAFIID:GNOME MainMenu Factory --oaf-ior-fd=18  
hw3adm 14755 1 0.0 210912 3620 /usr/lib/bonobo/bonobo-activation-server --ac-activate --ior-output-  
fd=18  
hw3adm 14748 1 0.0 256840 3632 /usr/bin/pulseaudio --start --log-target=syslog  
hw3adm 14735 1 0.0 67400 2148 /usr/lib64/gvfs/gvfs-fuse-daemon /usr/sap/HW3/home/.gvfs  
hw3adm 14730 1 0.0 159360 3372 gnome-keyring-daemon --start  
hw3adm 14727 1 0.0 42224 2316 /usr/lib64/gvfs/gvfsd  
hw3adm 14723 1 0.0 362196 13300 /usr/lib/gnome-settings-daemon/gnome-settings-daemon  
hw3adm 14714 1 0.0 38100 5088 /usr/lib/GConf/2/gconfd-2  
hw3adm 14711 1 0.0 13740 1040 /bin/dbus-daemon --fork --print-pid 5 --print-address 9 --session  
hw3adm 14710 1 0.0 22216 596 dbus-launch --exit-with-session /usr/bin/gnome-session
```

General Health checks:

NOTE: The following checks are for known problems of the system.
See the FAQ section of the IBM - SAP HANA Operations Guide
SAP Note 1661146 found at <https://service.sap.com/notes>

Only issues will be shown. If there is no output, no check failed.
To show succeeded checks, add the parameter -v. Recommended on first run.

[ERROR] No SAP HANA memory limit set, High risk of "Out of Memory" situations due to new limit calculation.
[ERROR] You must set global allocation limit!

E N D O F I B M D A T A A N A L Y S I S

Lenovo Check Tool for SAP HANA



← ⓘ 🔒 <https://launchpad.support.sap.com/#/notes/1661146>

🏠 **SAP** SAP Note Knowledge Base

1661146 - Lenovo/IBM Check Tool for SAP HANA appliances Version 45 from 06.10.2017 in English

Component: BC-OP-LNX-LENOVO	Category: Help for error analysis	Corrections: 0	<input type="text" value="SAP Note/KBA Number"/>
Priority: Recommendations / Additional Info	Release Status: Released for Customer	Manual Activities: 0	
		Prerequisites: 0	

Description Software Components References ▾ Attachments Attributes Languages

Symptom

Lenovo/IBM Hardware Check Scripts for SAP HANA appliances - Compiling system information on the Lenovo/IBM Sys determination by SAP and Lenovo/IBM Development Support.

Last document update: 2017-10-06

Other Terms

Linux, HANA, SAPHANA, Support, analysis, error sources, swap, Memory, Linux kernel, SUSE, SLES, Red Hat, RHEL,

<https://launchpad.support.sap.com/#/notes/1661146>



```
hana:~ # rpm -Uvh lenovo-saphana-support-2.00.000-17.4327.313d4f6.noarch.rpm
Preparing... ##### [100%]
Updating / installing...
 1:lenovo-saphana-support-2.00.000-1##### [ 50%]
Cleaning up / removing...
 2:lenovo-saphana-support-1.12.121-1##### [100%]
hana:~ # █
```



General Health checks:

NOTE: The following checks are for known problems of the system.
See the FAQ section of the Lenovo - SAP HANA Operations Guide
SAP Note 1661146 found at <https://service.sap.com/notes>

Only issues will be shown. If there is no output, no check failed.
To show succeeded checks, add the parameter -v. Recommended on first run.

```
[WARNING] PK1_HDB01_hana: not set to autostart. Should be on.
[WARNING] HANA parameter 'tcp_backlog' for SID 'LNV' is set to '128', but standard value is '2048'. See FAQ #18
[WARNING] HANA parameter 'maxchannels' for SID 'LNV' is set to '4000', but standard value is '20000' to '40000'. See FAQ #18
[WARNING] HANA parameter 'maxendpoints' for SID 'LNV' is set to '4000', but standard value is '20000' to '40000'. See FAQ #18
[WARNING] HANA parameter 'tcp_backlog' for SID 'PK1' is set to '128', but standard value is '2048'. See FAQ #18
[WARNING] HANA parameter 'maxchannels' for SID 'PK1' is set to '4000', but standard value is '20000' to '40000'. See FAQ #18
[WARNING] HANA parameter 'maxendpoints' for SID 'PK1' is set to '4000', but standard value is '20000' to '40000'. See FAQ #18
[WARNING] kernel parameter 'net.ipv4.tcp_rmem' is set to '8388608 8388608 8388608' but recommended value is '4096 87380 4194304' (see FAQ #21)
[WARNING] kernel parameter 'net.ipv4.tcp_wmem' is set to '8388608 8388608 8388608' but recommended value is '4096 65536 4194304' (see FAQ #21)
[WARNING] kernel parameter 'net.core.rmem_max' is set to '8388608' but recommended value is '4194304' (see FAQ #21)
[WARNING] kernel parameter 'net.core.wmem_max' is set to '8388608' but recommended value is '4194304' (see FAQ #21)
[WARNING] kernel parameter 'net.core.rmem_default' is set to '212992' but recommended value is '4194304' (see FAQ #21)
[WARNING] kernel parameter 'net.core.wmem_default' is set to '212992' but recommended value is '4194304' (see FAQ #21)
[WARNING] kernel parameter 'net.core.optmem_max' is set to '16777216' but recommended value is '4194304' (see FAQ #21)
[WARNING] kernel parameter 'net.ipv4.tcp_low_latency' is set to '0' but recommended value is '1' (see FAQ #21)
[WARNING] Wrong sysctl parameter net.core.somaxconn (is: 128, should be: 4096) (see FAQ #21)
[WARNING] Wrong sysctl parameter net.ipv4.tcp_max_syn_backlog (is: 2048, should be: 8192) (see FAQ #21)
[WARNING] Wrong sysctl parameter net.ipv4.ip_local_port_range (is: 40000 65300, should be: 1024 64999) (see FAQ #21)
[WARNING] Wrong sysctl parameter net.ipv4.tcp_syn_retries (is: 6, should be: 8) (see FAQ #21)
```

END OF LENOVO DATA ANALYSIS

Removing support script dump files older than 7 days.

Runtime was 0h 0min 46s

Support script ended with warning(s).

Logged error(s): 0

Logged warning(s): 19

Return code of this script is 1.

hana:~ # █



```
login as: root
Using keyboard-interactive authentication.
Password:
Last login: Wed Oct 28 13:08:45 2015 from console
```

Lenovo Systems Solution for SAP HANA appliance

See SAP Note 1650046 for maintenance and administration information:
<https://service.sap.com/sap/support/notes/1650046>

Regularly check the system health!

```
! INFO: Last hourly update on Wed Oct 28 13:15:02 CET 2015.
! NOTICE: Memory usage is 1%.
! NOTICE: All quota usages below 90%.
! NOTICE: All GPFS NSDs up and ready.
! ERROR: Found degraded or bad drives on RAID controllers.
```

NOTE: The following checks are for known problems of the system.
Some checks show references to FAQ entries, the FAQ can be found
in SAP Note 2100566 (<https://service.sap.com/sap/support/notes/2100566>)

Only issues will be shown. If there is no output, no check failed.
To show succeeded checks, add the parameter -v. Recommended on first run.

```
[WARNING] S4P_HDB10_plpdchana01: not set to autostart. Should be on.
[WARNING] HANA parameter 'async_read_submit[data]' for SID 'S4P' is missing, expected value is 'on'. See FAQ #18
[WARNING] HANA parameter 'async_write_submit_active[data]' for SID 'S4P' is missing, expected value is 'on'. See FAQ #18
[WARNING] HANA parameter 'async_write_submit_blocks[data]' for SID 'S4P' is missing, expected value is 'all'. See FAQ #18
[WARNING] HANA parameter 'size_kernel_io_queue[data]' for SID 'S4P' is missing, expected value is '2048'. See FAQ #18
[WARNING] HANA parameter 'max_parallel_io_requests[data]' for SID 'S4P' is missing, expected value is '512'. See FAQ #18
[WARNING] HANA parameter 'async_read_submit[log]' for SID 'S4P' is missing, expected value is 'on'. See FAQ #18
[WARNING] HANA parameter 'async_write_submit_active[log]' for SID 'S4P' is missing, expected value is 'on'. See FAQ #18
[WARNING] HANA parameter 'async_write_submit_blocks[log]' for SID 'S4P' is missing, expected value is 'all'. See FAQ #18
[WARNING] HANA parameter 'size_kernel_io_queue[log]' for SID 'S4P' is missing, expected value is '2048'. See FAQ #18
[WARNING] HANA parameter 'max_parallel_io_requests[log]' for SID 'S4P' is missing, expected value is '512'. See FAQ #18
[WARNING] HANA parameter 'maxchannels' for SID 'S4P' is missing, expected value is '20000'. See FAQ #18
[WARNING] HANA parameter 'maxendpoints' for SID 'S4P' is missing, expected value is '20000'. See FAQ #18
[WARNING] Multiple HANA backups found in /hana/shared/S4P/HDB10/backup/data/SYSTEMDB. This is not supported.
[WARNING] Multiple HANA backups found in /hana/shared/S4P/HDB10/backup/data/DB_S4P. This is not supported.
[WARNING] Never store backups permanently on the same filesystem as the HANA Instance. See SAP note 1642148 entry #14
[WARNING] IPMI system event log is full. Please review and clear (ipmitool sel clear).
[ERROR] D1224 SAS Enclosure /c1/e17 has a broken firmware, please upgrade to 5.0.0.40 or higher
        (https://datacentersupport.lenovo.com/us/de/products/storage/lenovo-storage/d1224/downloads).
[WARNING] Parameter net.ipv4.ip_local_port_range is set in /etc/sysctl.conf. Please remove. SAP Host Agent will set the value correctly
[ERROR] Quotas probably set wrong on /dev/bcache0 mounted at /hana. Please run saphana-quota-calculator.sh -c -f /dev/bcache0.
```

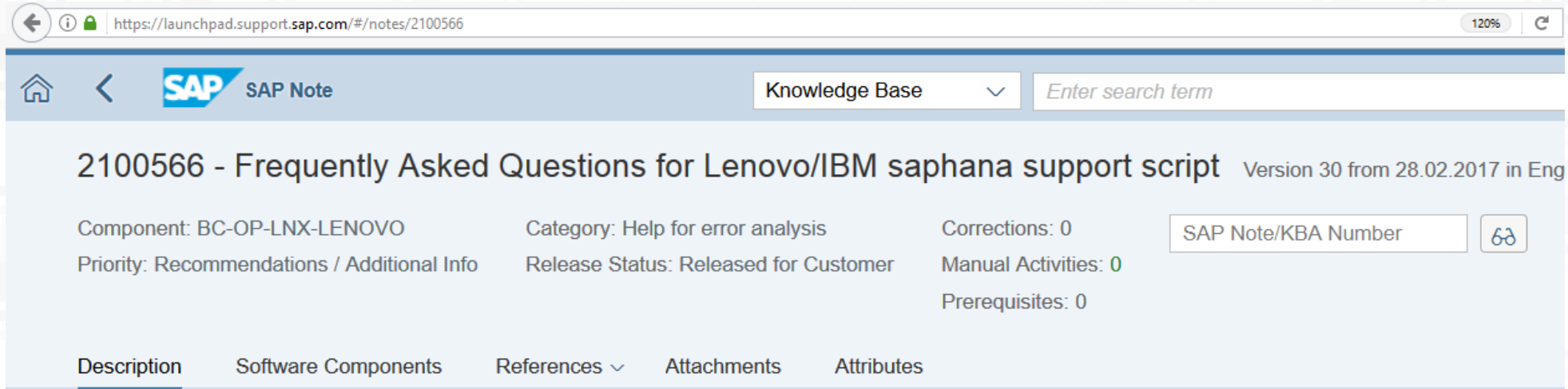
E N D O F L E N O V O D A T A A N A L Y S I S

Runtime was 0h 1min 32s
Logged error(s): 2



```
[WARNING] IPMI system event log is full. Please review and clear (ipmitool sel clear).  
[ERROR] D1224 SAS Enclosure /c1/e17 has a broken firmware, please upgrade to 5.0.0.40 or higher  
(https://datacentersupport.lenovo.com/us/de/products/storage/lenovo-storage/d1224/downloads).  
QUANTUM
```


Frequently Asked Questions for Lenovo/IBM saphana support script



The screenshot shows the SAP Note interface for note 2100566. The browser address bar shows the URL: https://launchpad.support.sap.com/#/notes/2100566. The SAP Note header includes the SAP logo, a navigation arrow, and the text 'SAP Note'. Below this is a 'Knowledge Base' dropdown menu and a search input field with the placeholder 'Enter search term'. The main title of the note is '2100566 - Frequently Asked Questions for Lenovo/IBM saphana support script', with a sub-header 'Version 30 from 28.02.2017 in Eng'. The note's metadata is displayed in a grid: Component: BC-OP-LNX-LENOVO, Category: Help for error analysis, Corrections: 0, SAP Note/KBA Number: 2100566, Priority: Recommendations / Additional Info, Release Status: Released for Customer, Manual Activities: 0, and Prerequisites: 0. Below the metadata is a navigation bar with tabs for 'Description', 'Software Components', 'References', 'Attachments', and 'Attributes'. The 'Description' tab is currently selected.

Symptom

The support script saphana-support-lenovo.sh (or the deprecated version saphana-support-ibm.sh) can detect various known problems in your appliance. In case Please follow only the instructions given in the particular entry. When in doubt please contact Lenovo support via SAP's OSS ticket system.

Warning: These FAQ entries are only valid for certain appliance models and versions. Do not apply the changes in this list until advised by either the support scri

Other Terms

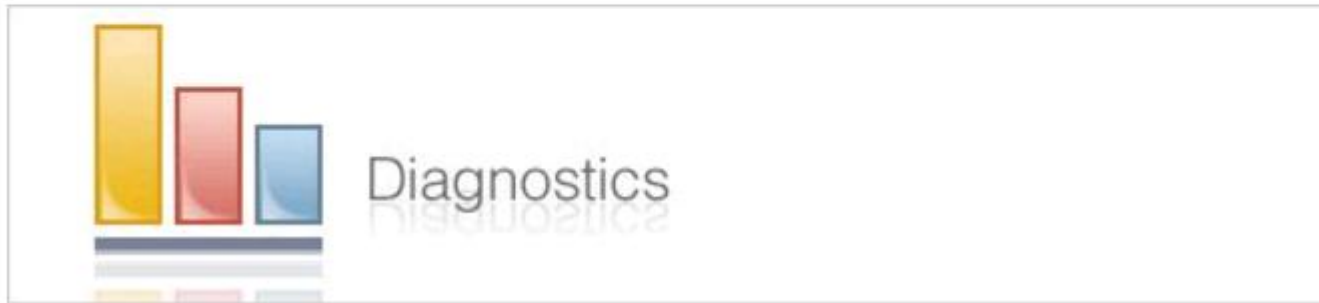
Lenovo, IBM, x86_64, SAPHANA, Operations Guide, System x Solution for SAP HANA, saphana-support-ibm

Reason and Prerequisites

<https://launchpad.support.sap.com/#/notes/2100566>



Dynamic System Analysis (DSA) for Lenovo x86 servers



<https://support.lenovo.com/jp/en/solutions/Invo-dsa>



SUSE Linux Enterprise Server 11 Portable

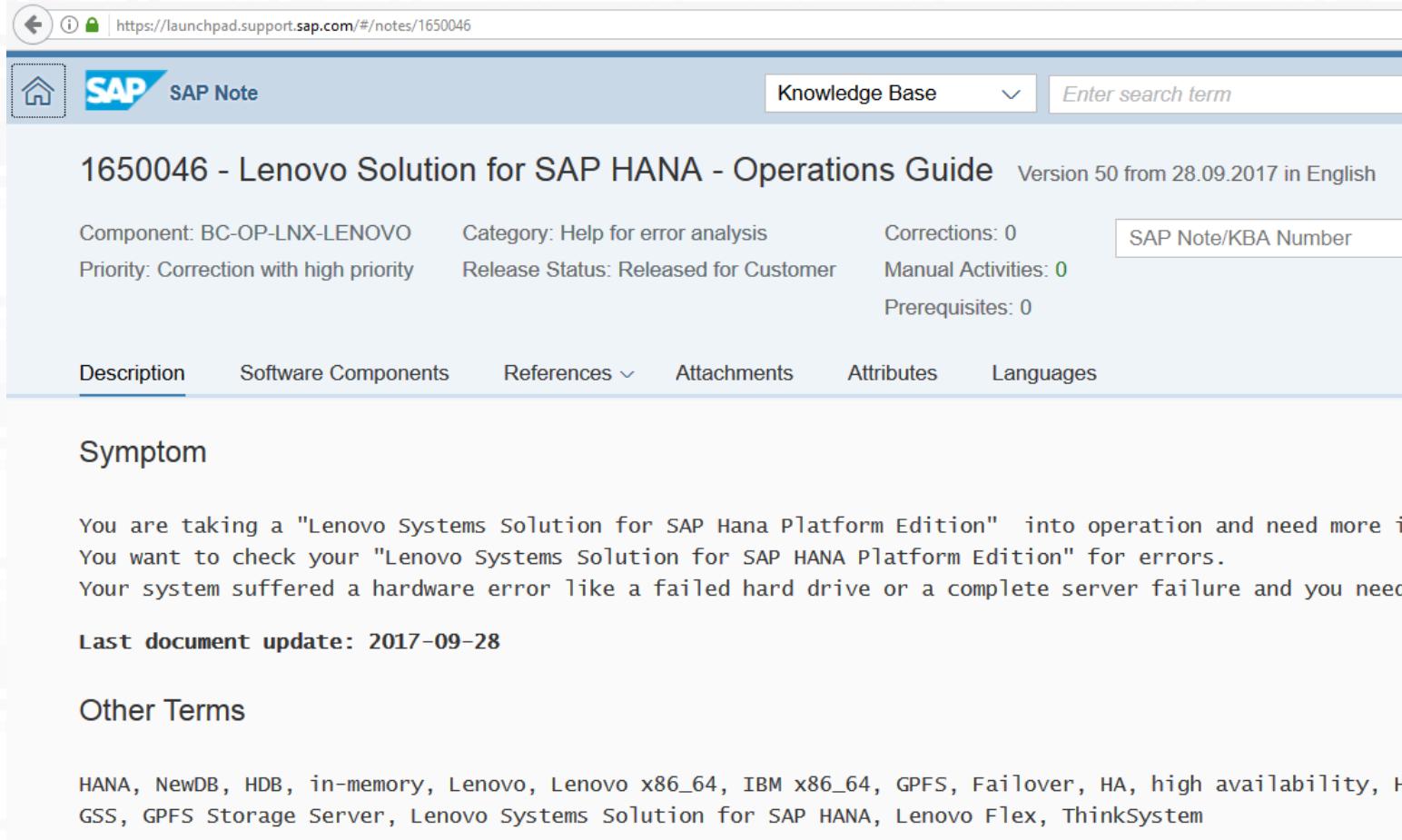
[v10.1 \(64-bit\)](#)

Supported Lenovo systems:

[Show Supported Systems](#) | [Hide Supported Systems](#)



Lenovo Solution for SAP HANA - Operations Guide



The screenshot shows the SAP Note 1650046 page. The browser address bar displays the URL: <https://launchpad.support.sap.com/#/notes/1650046>. The page header includes the SAP logo, 'SAP Note', a 'Knowledge Base' dropdown menu, and a search input field labeled 'Enter search term'. The main content area features the title '1650046 - Lenovo Solution for SAP HANA - Operations Guide' with a subtitle 'Version 50 from 28.09.2017 in English'. Below the title, there are several metadata fields: 'Component: BC-OP-LNX-LENOVO', 'Category: Help for error analysis', 'Corrections: 0', 'Priority: Correction with high priority', 'Release Status: Released for Customer', 'Manual Activities: 0', and 'Prerequisites: 0'. A search box labeled 'SAP Note/KBA Number' is also present. A navigation bar at the bottom of the content area includes links for 'Description', 'Software Components', 'References', 'Attachments', 'Attributes', and 'Languages'. The 'Symptom' section contains the text: 'You are taking a "Lenovo Systems Solution for SAP Hana Platform Edition" into operation and need more in. You want to check your "Lenovo Systems Solution for SAP HANA Platform Edition" for errors. Your system suffered a hardware error like a failed hard drive or a complete server failure and you need'. Below this is the text 'Last document update: 2017-09-28'. The 'Other Terms' section lists: 'HANA, NewDB, HDB, in-memory, Lenovo, Lenovo x86_64, IBM x86_64, GPFS, Failover, HA, high availability, Hi GSS, GPFS Storage Server, Lenovo Systems Solution for SAP HANA, Lenovo Flex, ThinkSystem'.

<https://launchpad.support.sap.com/#/notes/1650046>

➕ <https://launchpad.support.sap.com/#/notes/1650046>

The Lenovo logo is displayed in white text on a green rectangular background. The word "Lenovo" is in a bold, sans-serif font, with a small "TM" trademark symbol to the right.

Lenovo[®] Systems Solution[™] for SAP HANA[®]
Operations Guide for ThinkSystem[®] Servers (SR950)



Lenovo[®] Best Practices Guide for SAP HANA[®]
Special Topic Guide for Backup and Restore

The Lenovo logo, consisting of the word "Lenovo" in white lowercase letters on a green rectangular background. A small "TM" trademark symbol is positioned to the right of the word.

Lenovo[®] Best Practices Guide for SAP HANA[®]
Special Topic Guide for Monitoring

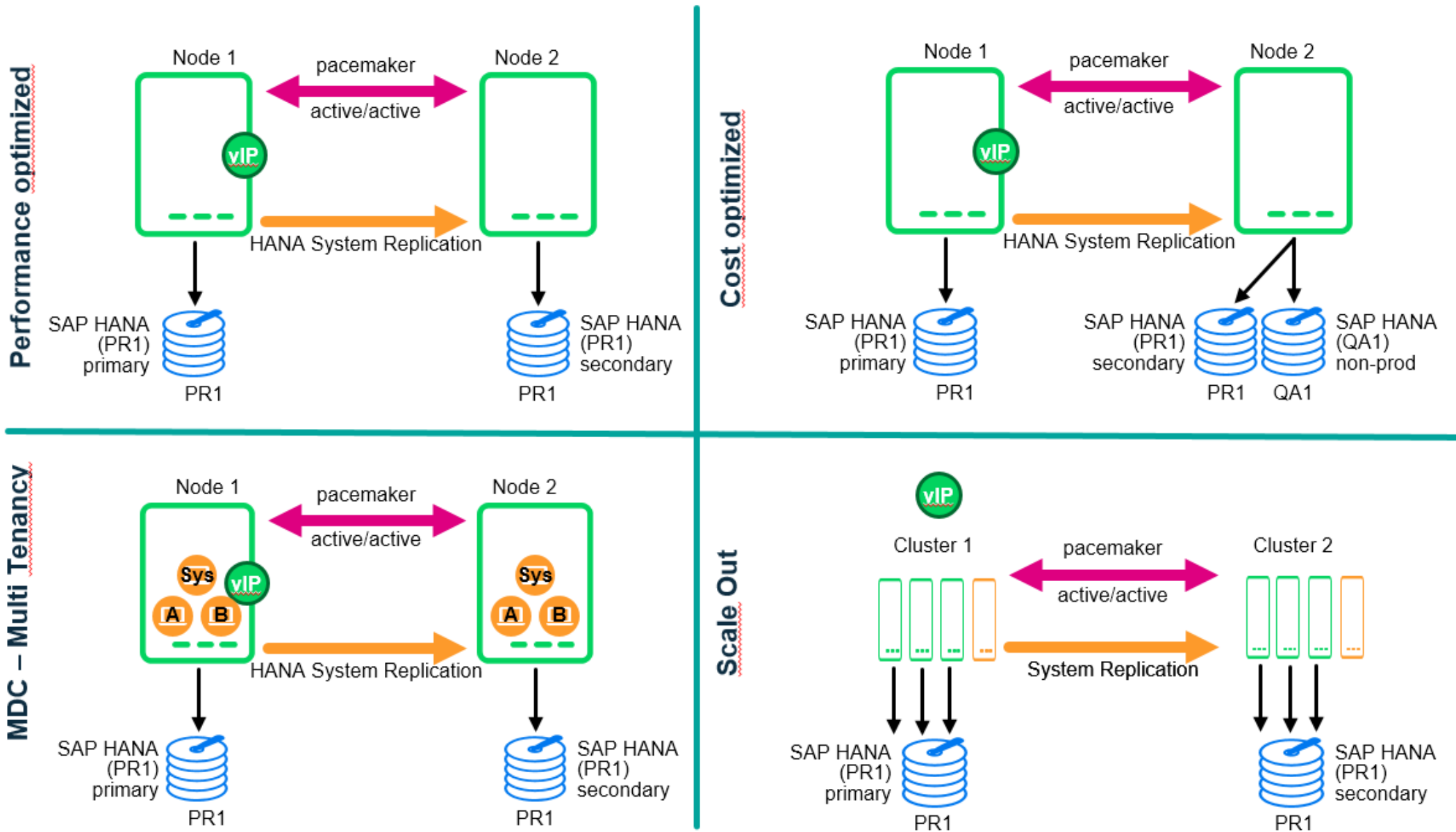


Lenovo[®] Best Practices Guide for SAP HANA[®]
Special Topic Guide for Virtualization

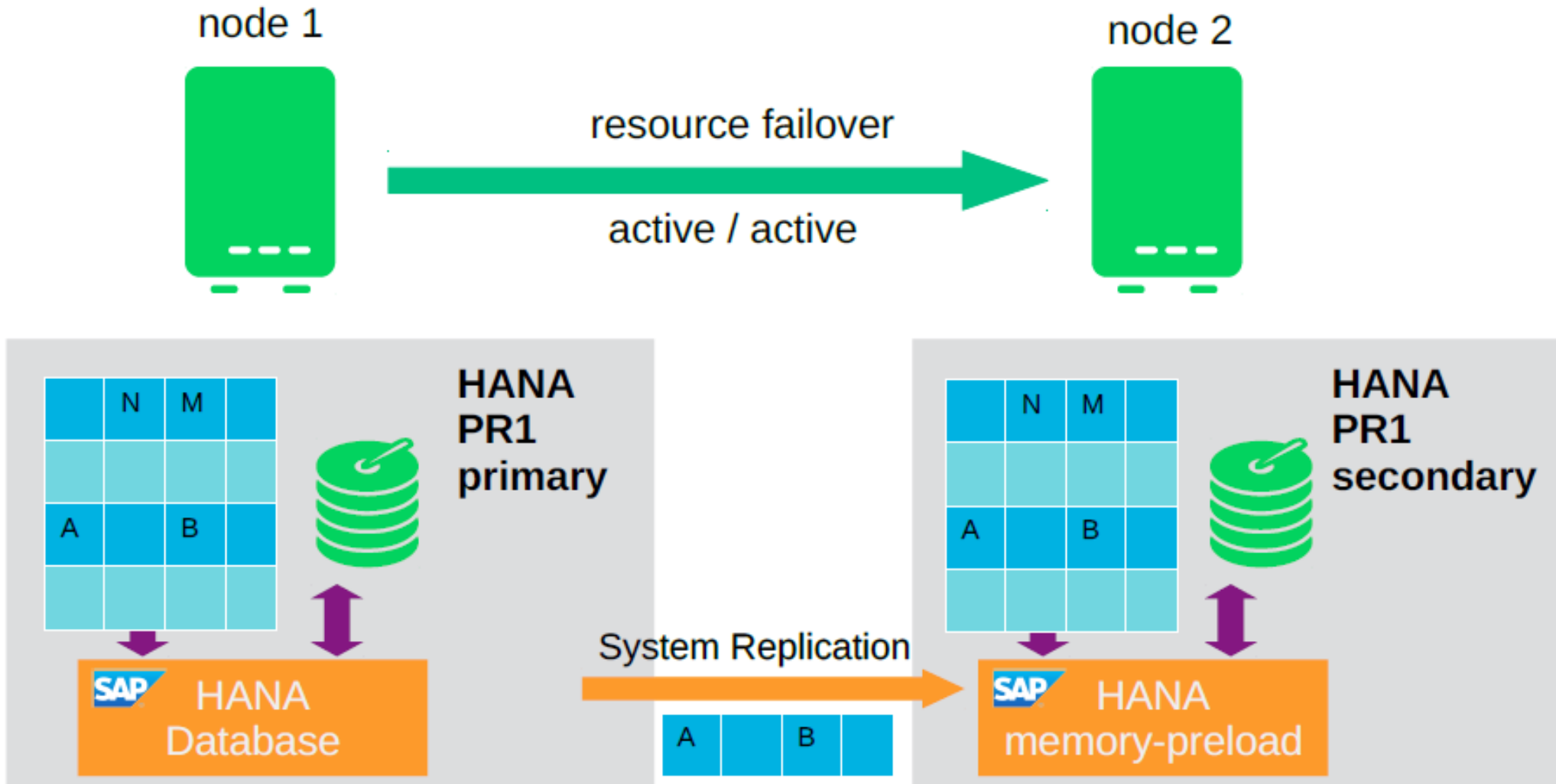
SLES HA

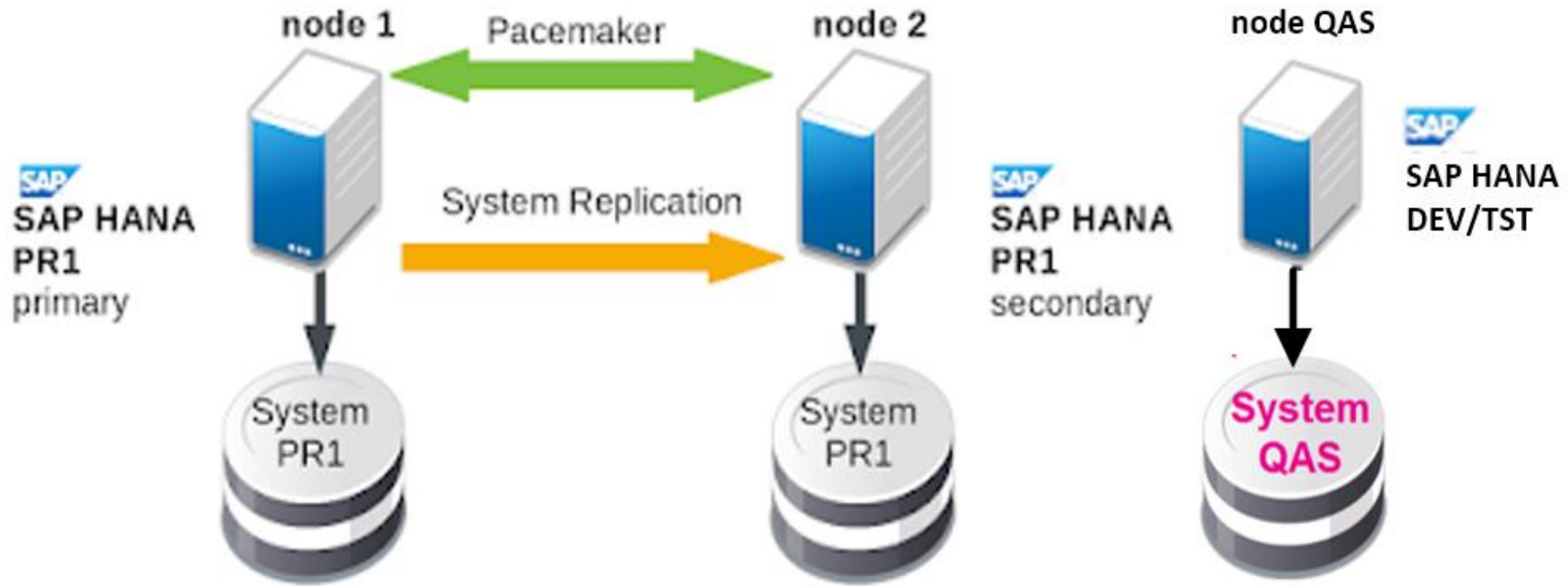


+ Supported SAPHanaSR Scenarios



+ SAP HANA System Replication

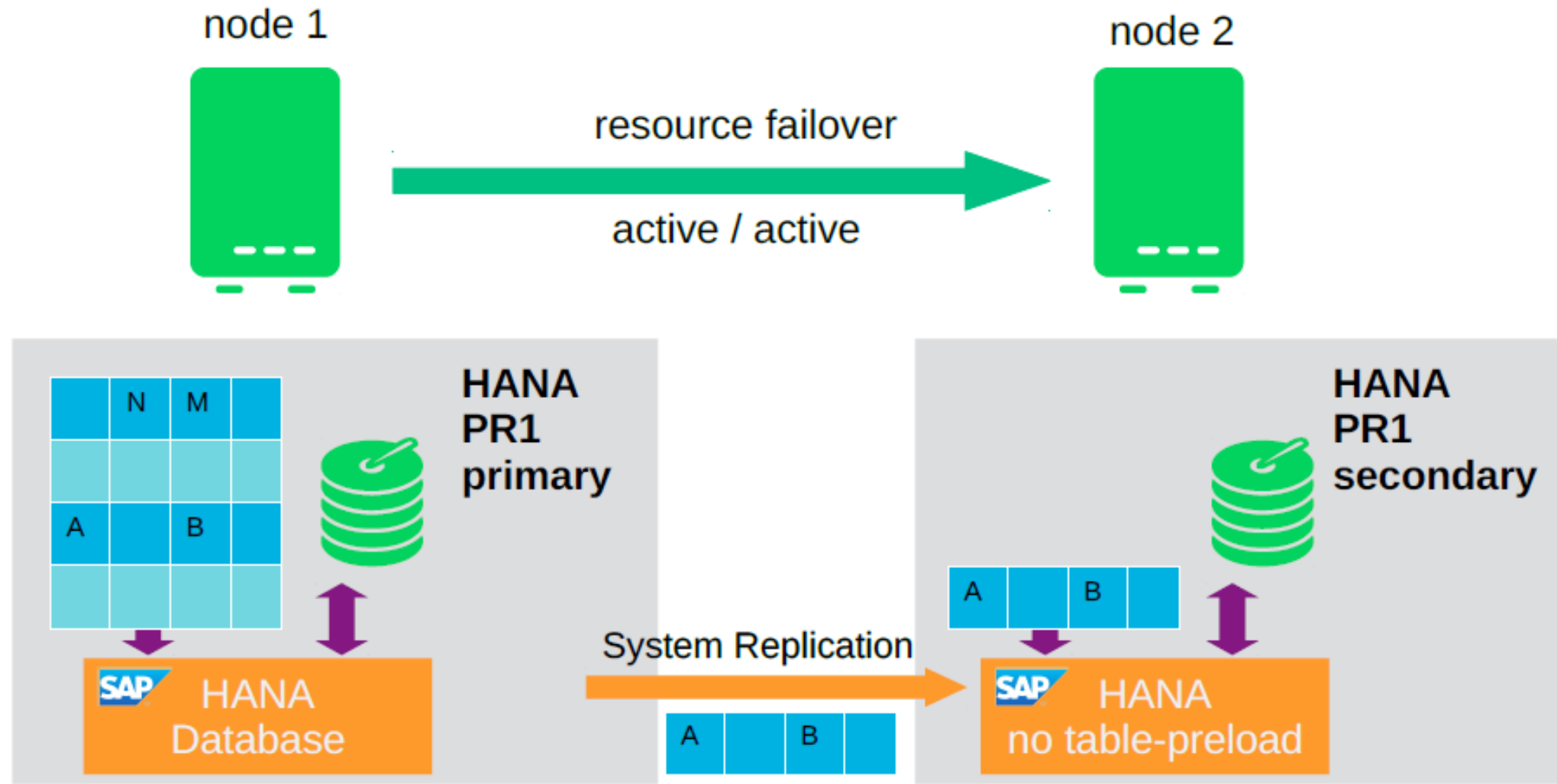


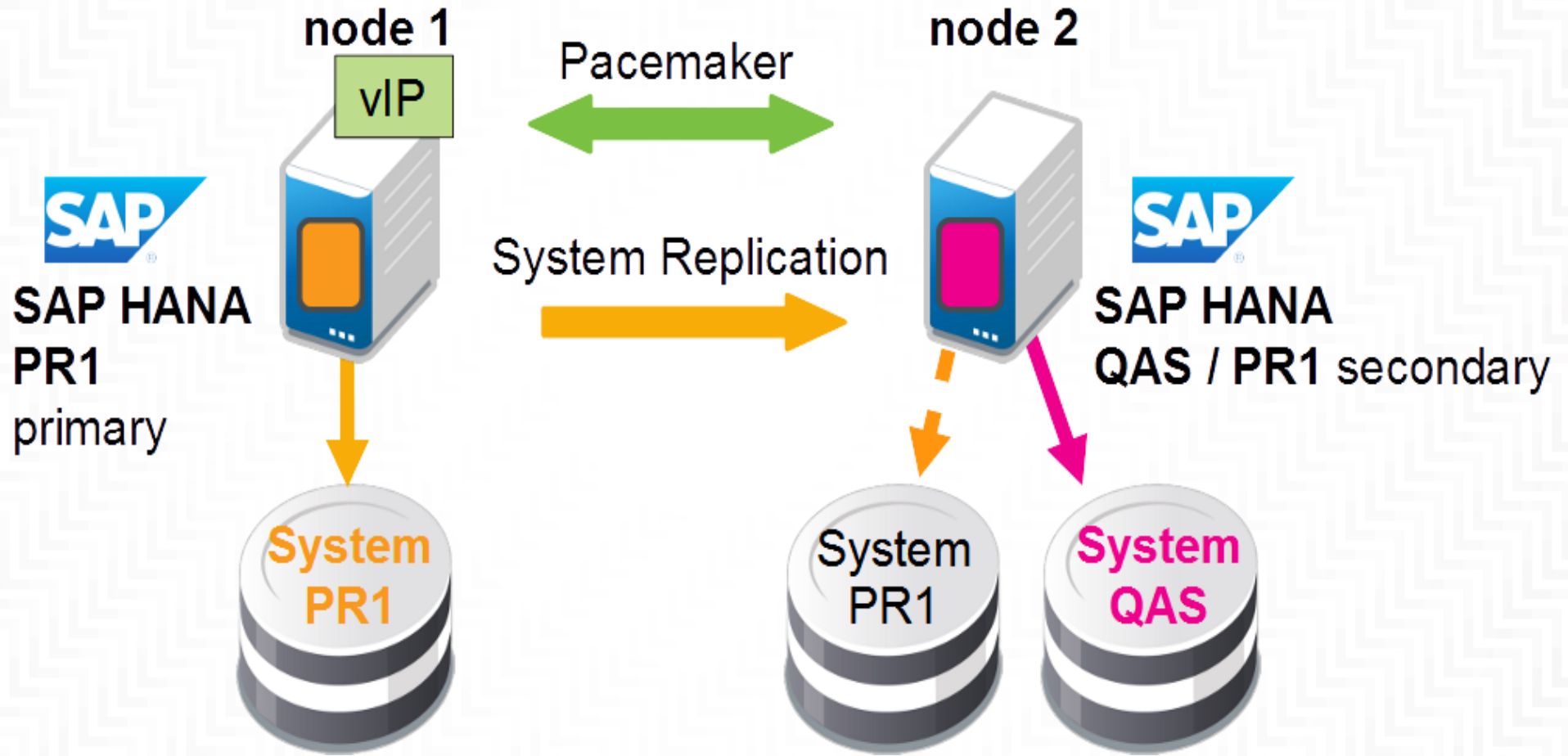




SAP HANA SR Performance Optimized Scenario

SUSE Linux Enterprise Server for SAP
Applications 12 SP1



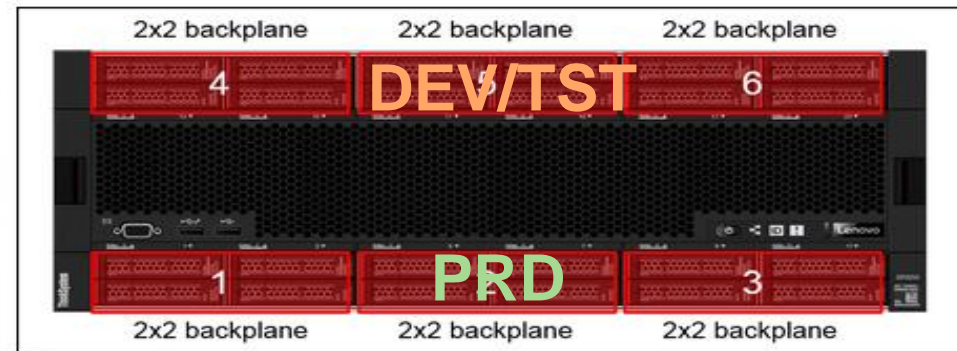
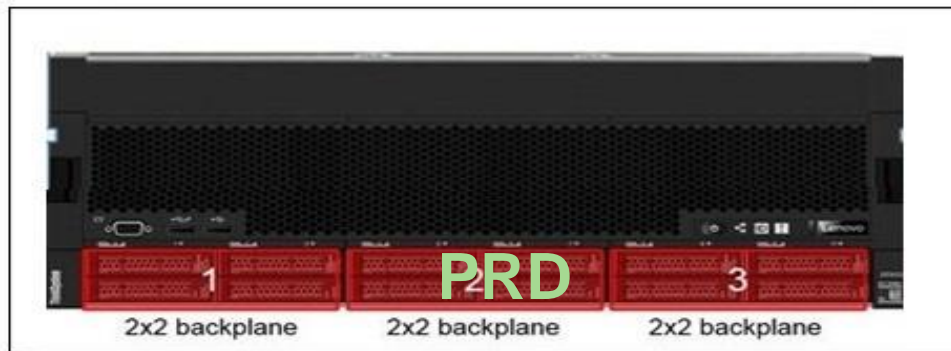


+ O czym pamiętać!

- DEV/TST na oddzielnych dyskach
- Dłuższe przełączenie
- Bardziej skomplikowana procedura przełączenia
- SRHOOK's
- **Dużo testować !!!**

+ Dodatkowe dyski dla DEV/TST !

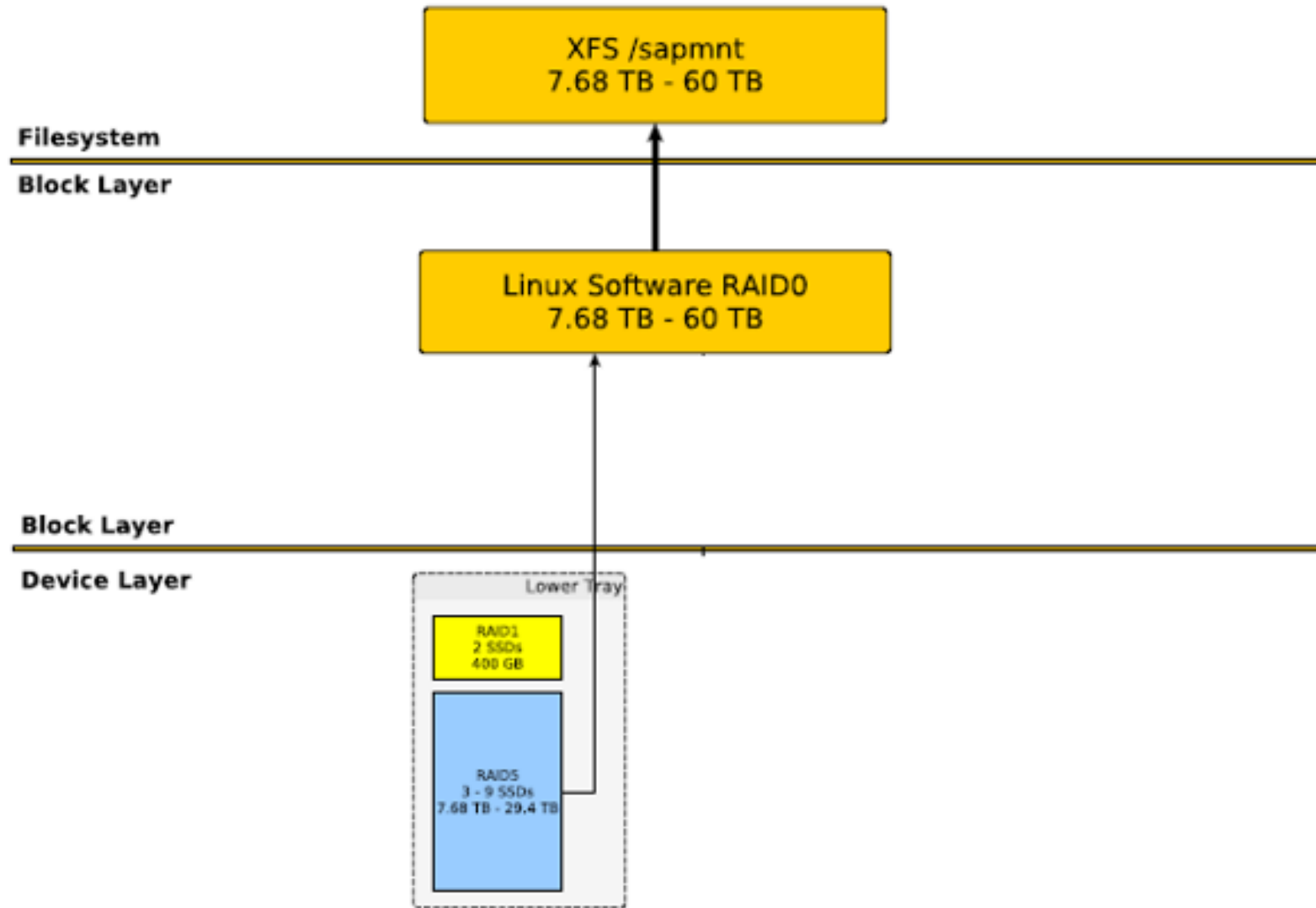
- Dedykowany kontroler na zasoby
- Dedykowane dyski
- Najlepiej o zbliżonej konfiguracji do Produkcji



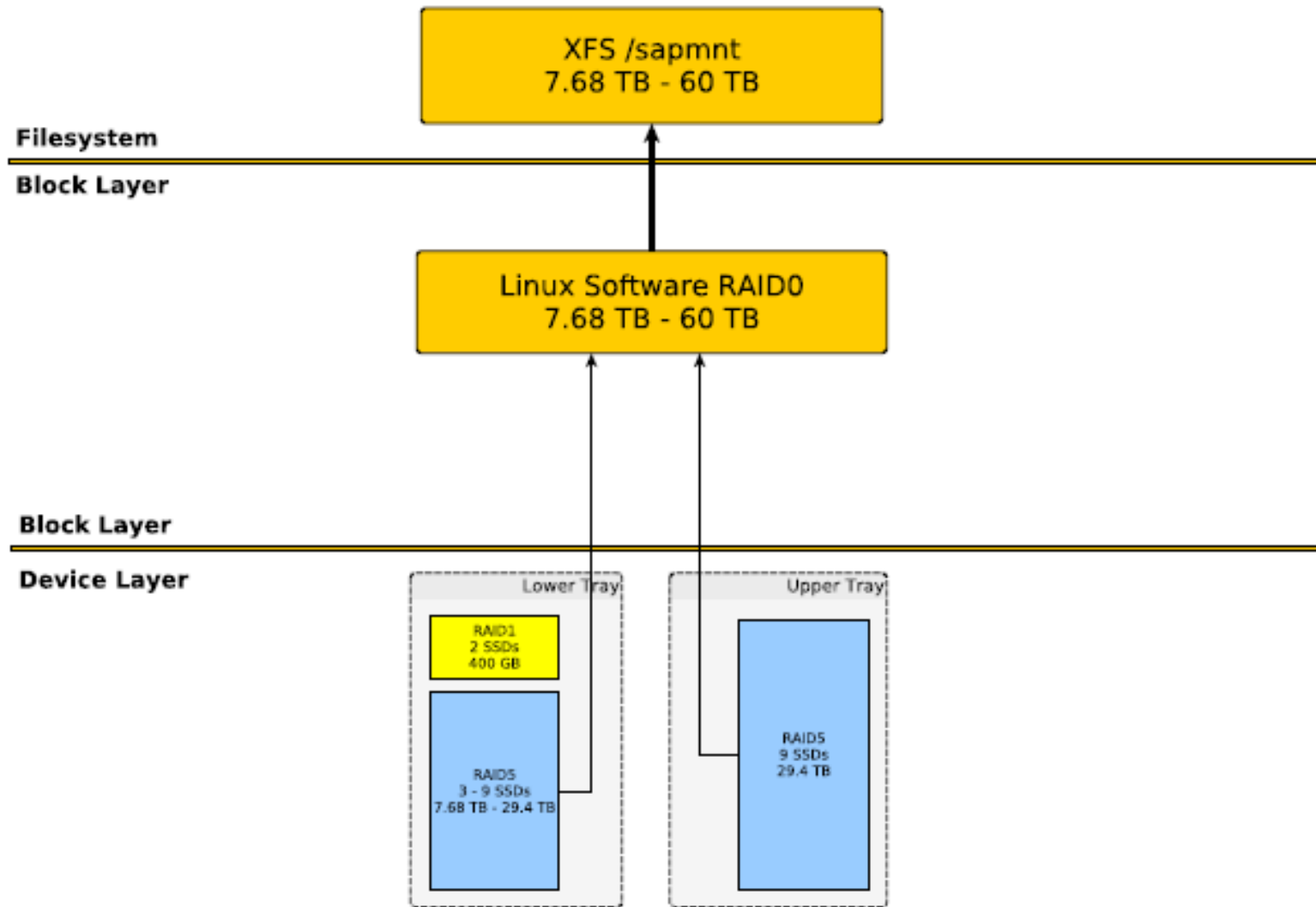
+ Rozbudowa

- Dodajemy RAM / CPU ?
- Dodajemy dyski
- Dodajemy HW/SW RAID
- Rozszerzamy system plików
- Zmieniamy Quoty na systemie plików

+ Rozbudowa



+ Rozbudowa



+ Przydatne linki

- In-memory Computing with SAP HANA on Lenovo Systems <https://lenovopress.com/sg248086-in-memory-computing-with-sap-hana-on-lenovo-systems>
- Lenovopress HANA <https://lenovopress.com/search#term=sap%2520hana&sort=relevance>
- Lenovo SR650 <https://lenovopress.com/lp0644-lenovo-thinksystem-sr650-server>
- Lenovo SR950 <https://lenovopress.com/lp0647-thinksystem-sr950-server>

- Lenovo/IBM Check Tool for SAP HANA appliances <https://launchpad.support.sap.com/#/notes/1661146>
- Lenovo Support Tool for SAP HANA appliances <https://launchpad.support.sap.com/#/notes/2533844>
- Lenovo Solution for SAP HANA - Operations Guide <https://launchpad.support.sap.com/#/notes/1650046>
- Lenovo Systems Solution for SAP HANA Platform Edition FW/OS/Driver Maintenance <https://launchpad.support.sap.com/#/notes/1880960>
- Lenovo Systems Solution for SAP HANA Platform Edition FW/OS/Driver Maintenance (SR950) <https://launchpad.support.sap.com/#/notes/2533550>
- Frequently Asked Questions for Lenovo/IBM saphana support script <https://launchpad.support.sap.com/#/notes/2100566>
- FAQ: SAP HANA Memory <https://launchpad.support.sap.com/#/notes/1999997>

+ All Flash Configurations – SR650 – 2 socket - standalone

Memory Size	192GB	288GB mixed DIMM sizes	384GB	576GB mixed DIMM sizes	768GB	1536GB	3072GB*
Server	SR650	SR650	SR650	SR650	SR650	SR650	SR650
MachineType	7X06	7X06	7X06	7X06	7X06	7X06	7X06
Configuration Identifier	2S2U_2SKL192SSDS	2S2U_2SKL288SSDS	2S2U_2SKL384SSDS	2S2U_2SKL576SSDS	2S2U_2SKL768SSDS	2S2U_2SKL1536SSDS	2S2U_2SKL3072SSDS
Skylake CPU	2 x 8176	2 x 8176	2 x 8176	2 x 8176	2 x 8176	2 x 8176	2 x 8176M
DIMM configuration	192GB DDR4 (24x 8GB or 12x 16GB)	288GB DDR4 (12x 8GB and 12x 16GB)	384GB DDR4 (24x 16GB or 12x 32GB)	576GB DDR4 (12x 16GB and 12x 32GB)	768GB DDR4 (24x 32GB or 12x 64GB)	1536GB DDR4 (24x 64GB or 12x 128GB)	3072GB DDR4 (24x 128GB)
Storage Setup	2x 240GB SATA 3x 800GB SSD	2x 240GB SATA 4x 800GB SSD	2x 240GB SATA 4x 800GB SSD	2x 240GB SATA 6x 800GB SSD or 3x 1.6TB SSD	2x 240GB SATA 6x 800GB or 4x 1.6TB SSD	2x 240GB SATA 3x 3.84TB SSD or 6x 1.6TB SSD	2x 240GB SATA 5x 3.84TB SSD
RAID Adapters	1x 930-8i	1x 930-8i	1x 930-8i	1x 930-8i	1x 930-8i	1x 930-8i	1x 930-8i
Storage Capacity	1.6TB RAID5 data/log	2.4TB RAID5 data/log	2.4 TB RAID5 data/log	4.0 TB or 3.2TB RAID5 data/log	4.0TB or 4.8TB RAID5 data/log	7.6TB or 8.0TB RAID5 data/log	15.3TB RAID5 data/log
Network Connectivity	4x 10GbE or 4x 1GigE	4x 10GbE or 4x 1GigE	4x 10GbE or 4x 1GigE	4x 10GbE or 4x 1GigE	4x 10GbE or 4x 1GigE	4x 10GbE or 4x 1GigE	4x 10GbE or 4x 1GigE
Upgrade Options	192 -> 288 192 -> 384 192 -> 576		384 -> 576 384 -> 768		768 -> 1536	1536 -> 3072	

alternate processor type:
Intel Skylake 8180/8180M
for improved performance

* For S/4HANA and Suite on HANA only
(not for Datamart, BWoH and BW/4)

+ All Flash Configurations – SR950 – 2 socket - standalone

Memory Size	192GB	384GB	576GB mixed DIMM sizes	768GB	1536GB	2304GB* mixed DIMM sizes	3072GB*
Server	SR950	SR950	SR950	SR950	SR950	SR950	SR950
MachineType	7X13	7X13	7X13	7X13	7X13	7X13	7X13
Configuration Identifier	2SKL192SSDS	2SKL384SSDS	2SKL576SSDS	2SKL768SSDS	2SKL1536SSDS	2SKL2304SSDS	2SKL3072SSDS
Skylake CPU	2x 8176	2x 8176	2x 8176	2x 8176	2x 8176	2x 8176M	2x 8176M
DIMM configuration	192GB DDR4 (12x 16GB)	384GB DDR4 (24x 16GB or 12x 32GB)	576GB DDR4 (12x 16GB and 12x 32GB)	768GB DDR4 (24x 32GB or 12x 64GB)	1536GB DDR4 (24x 64GB or 12x 128GB)	2304GB DDR4 (12x 64GB and 12x 128GB)	3072GB DDR4 (24x 128GB)
Storage Setup	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 4x 3.84TB SSD	2x 400GB SSD 5x 3.84TB SSD
RAID Adapters	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i
Storage Capacity	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	11.5 TB RAID5 data/log	15.3 TB RAID5 data/log
Network Connectivity	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE
Upgrade Options	192 → 384	384 → 768 2s → 4s	2s → 4s	768 → 1536 2s → 4s	1536 → 3072 2s → 4s	2s → 4s	2s → 4s

alternate processor type:
Intel Skylake 8180/8180M for improved performance

* For S/4HANA and Suite on HANA only (not for Datamart, BWoH and BW/4)

+ All Flash Configurations – SR950 – 4 socket - standalone

Memory Size	384GB	768GB	1152GB mixed DIMM sizes	1536GB	3072GB	4608GB* mixed DIMM sizes	6144GB*
Server	SR950	SR950	SR950	SR950	SR950	SR950	SR950
MachineType	7X13	7X13	7X13	7X13	7X13	7X13	7X13
Configuration Identifier	4SKL384SSDS	4SKL768SSDS	4SKL1152SSDS	4SKL1536SSDS	4SKL3072SSDS	4SKL4608SSDS	4SKL6144SSDS
Skylake CPU	4x 8176	4x 8176	4x 8176	4x 8176	4x 8176	4x 8176M	4x 8176M
DIMM configuration	384GB DDR4 (24x 16GB)	768GB DDR4 (48x 16GB or 24x 32GB)	1152GB DDR4 (24x 16GB and 24x 32GB)	1536GB DDR4 (48x 32GB or 24x 64GB)	3072GB DDR4 (48x 64GB or 24x 128GB)	4608GB DDR4 (24x 64GB and 24x 128GB)	6144GB DDR4 (48x 128GB)
Storage Setup	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 5x 3.84TB SSD	2x 400GB SSD 7x 3.84TB SSD	2x 400GB SSD 9x 3.84TB SSD
RAID Adapters	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i
Storage Capacity	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	15.3 TB RAID5 data/log	23.0 TB RAID5 data/log	30.7 TB RAID5 data/log
Network Connectivity	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE
Upgrade Options	384 → 768	768 → 1536 4s → 8s	4s → 8s	1536 → 3072 4s → 8s	3072 → 6144 4s → 8s	4s → 8s	4s → 8s

alternate processor type:
Intel Skylake 8180/8180M for improved performance

* For S/4HANA and Suite on HANA only
(not for Datamart, BWoH and BW/4)

+ All Flash Configurations – SR950 – 8 socket - standalone

Memory Size	768GB	1536GB	2304GB mixed DIMM sizes	3072GB	6144GB	9216GB* mixed DIMM sizes	12288GB*
Server	SR950	SR950	SR950	SR950	SR950	SR950	SR950
MachineType	7X13	7X13	7X13	7X13	7X13	7X13	7X13
Configuration Identifier	8SKL768SSDS	8SKL1536SSD S	8SKL2304SSD S	8SKL3072SSD S	8SKL6144SSD S	8SKL9216SSDS	8SKL12288SSDS
Skylake CPU	8x 8176	8x 8176	8x 8176	8x 8176	8x 8176	8x 8176M	8x 8176M
DIMM configuration	768GB DDR4 (48x 16GB)	1536GB DDR4 (96x 16GB or 48x 32GB)	2304GB DDR4 (48x 16GB and 48x 32GB)	3072GB DDR4 (96x 32GB or 48x 64GB)	6144GB DDR4 (96x 64GB or 48x 128GB)	9216GB DDR4 (48x 64GB and 48x 128GB)	12288GB DDR4 (96x 128GB)
Storage Setup	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 3x 3.84TB SSD	2x 400GB SSD 5x 3.84TB SSD	2x 400GB SSD 9x 3.84TB SSD	2x 400GB SSD 14x 3.84TB SSD or 7x 7.68TB SSD	2x 400GB SSD 18x 3.84TB SSD or 9x 7.68TB SSD
RAID Adapters	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	1x 930-16i	2x 930-16i (or 1x ; in case 7.68TB SSDs are used)	2x 930-16i (or 1x ; in case 7.68TB SSDs are used)
Storage Capacity	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	7.6 TB RAID5 data/log	15.3 TB RAID5 data/log	30.7 TB RAID5 data/log	46.0 TB RAID5 data/log	61.4 TB RAID5 data/log
Network Connectivity	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE
Upgrade Options	768 → 1536	1536 → 3072		3072 → 6144	6144 → 12288		

alternate processor type:
Intel Skylake 8180/8180M for improved
performance

* For S/4HANA and Suite on HANA only
(not for Datamart, BWoH and BW/4)

+ All Flash Configurations – SR950 – 4 and 8 socket - scaleout

Memory Size	1536GB	3072GB
Server	SR950	SR950
MachineType	7X13	7X13
Configuration Identifier	4SKL1536SSDG	4SKL3072SSDG
Scaleout Nodes	Scaleout to 94 nodes	Scaleout to 94 nodes
Skylake CPU	4x 8176	4x 8176
DIMM configuration	1536GB DDR4 (48x 32GB or 24x 64GB)	3072GB DDR4 (48x 64GB or 24x 128GB)
Storage Setup	2x 400GB SSD 5x 3.84TB SSD	2x 400GB SSD 9x 3.84TB SSD
RAID Adapters	1x 930-16i	1x 930-16i
Storage Capacity	15.3 TB RAID5 data/log	30.7 TB RAID5 data/log
Network Connectivity	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE
Upgrade Options	1536 → 3072 4s → 8s	4s → 8s

Memory Size	3072GB	6144GB**	9216GB* mixed DIMM sizes	12288GB*
Server	SR950	SR950	SR950	SR950
MachineType	7X13	7X13	7X13	7X13
Configuration Identifier	8SKL3072SSDG	8SKL6144SSDG	8SKL9216SSDG	8SKL12288SSDG
Scaleout Nodes	Scaleout to 94 nodes	Scaleout to 94 nodes	Scaleout to 4+1 node	Scaleout to 4+1 node
Skylake CPU	8x 8176	8x 8176	8x 8176M	8x 8176M
DIMM configuration	3072GB DDR4 (96x 32GB or 48x 64GB)	6144GB DDR4 (96x 64GB or 48x 128GB)	9216GB DDR4 (48x 64GB and 48x 128GB)	12288GB DDR4 (96x 128GB)
Storage Setup	2x 400GB SSD 9x 3.84TB SSD	2x 400GB SSD 18x 3.84TB SSD or 9x 7.68TB SSD	2x 400GB SSD 14x 7.68TB SSD	2x 400GB SSD 18x 7.68TB SSD
RAID Adapters	1x 930-16i	2x 930-16i (or 1x ; in case 7.68TB SSDs are used)	2x 930-16i	2x 930-16i
Storage Capacity	30.7 TB RAID5 data/log	61.4 TB RAID5 data/log	92.1 TB RAID5 data/log	122.8 TB RAID5 data/log
Network Connectivity	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE	4x 10GbE 4x 1GigE
Upgrade Options	3072 → 6144			

alternate processor type:
Intel Skylake 8180/8180M for improved performance

** up to 4 nodes for S/4HANA (scaleout-up to 94 nodes for Data-mart, BWoH and BW/4H only)

* For S/4HANA only

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