

IBM POWER9: Power update

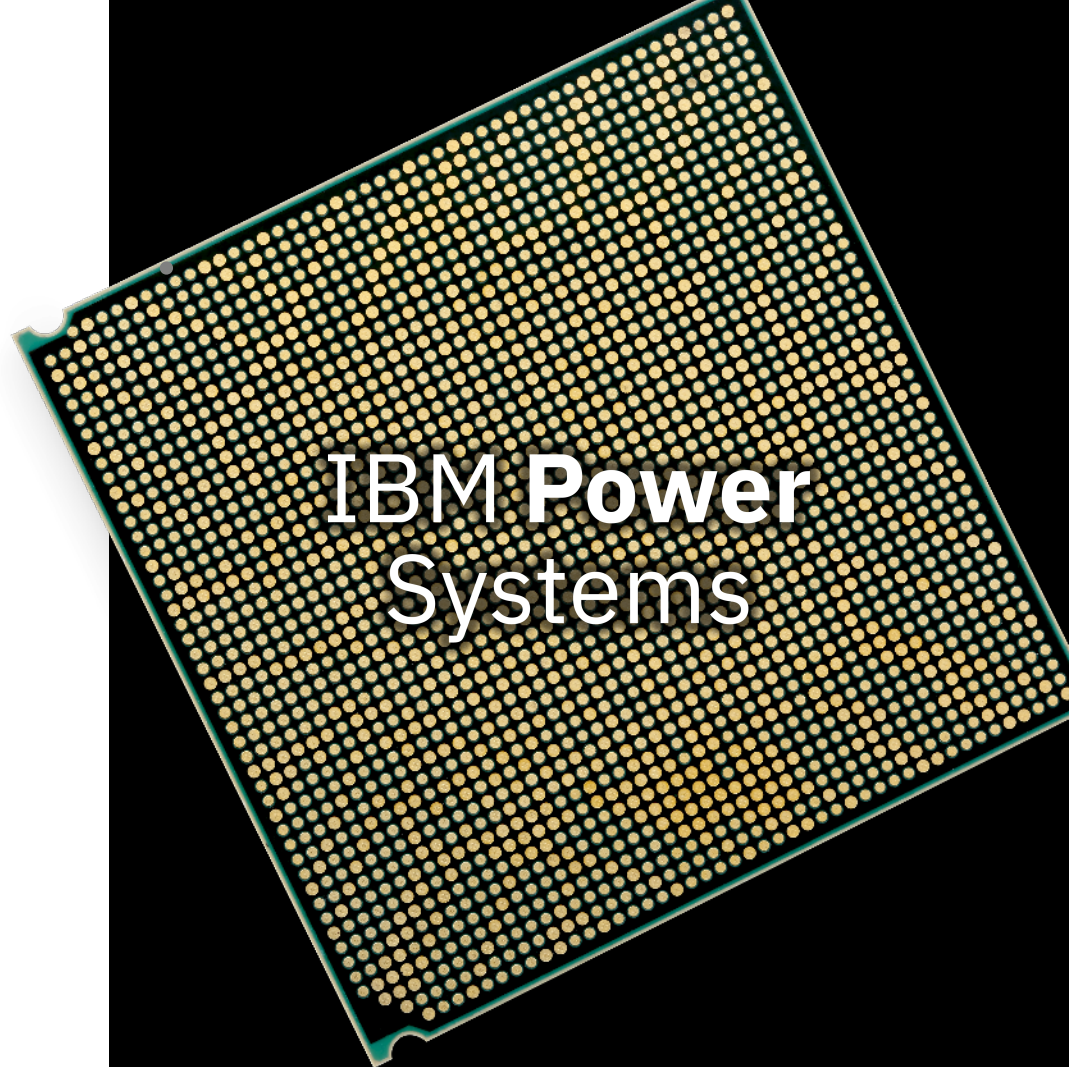
Novinky z oblasti IBM Systems Server portfólia s dôrazom na Linuxové riešenia, AI a "in-memory" databázove riešenia ako napr. SAP HANA a SAS Viya

27. Máj, 2020

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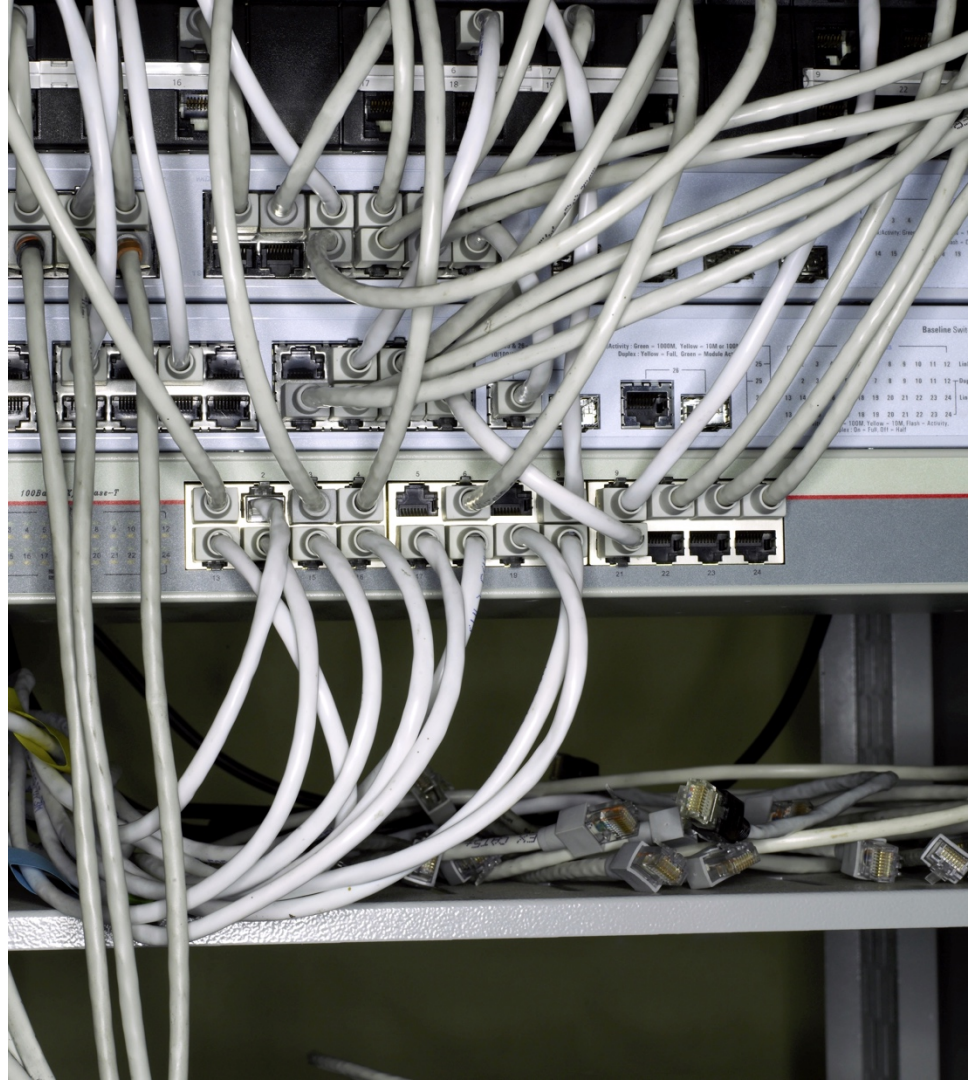
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Agenda

- Na čo sa dnes používa IBM POWER ?
- AIX a System i Roadmap
- POWER a Cloud
- POWER a SAP HANA
- POWER a SAS
- Nový POWER9 Server (IC922) – Nový server pre AI Inferencing a Linuxove nasadenia



Na čo sa dnes používa IBM POWER ?
- je to stále relevantná technológia ?

HPC – Summit (najvýkonnejší počítač na svete) P9+Nvidia

Microservices – Docker Container, Kubernetes

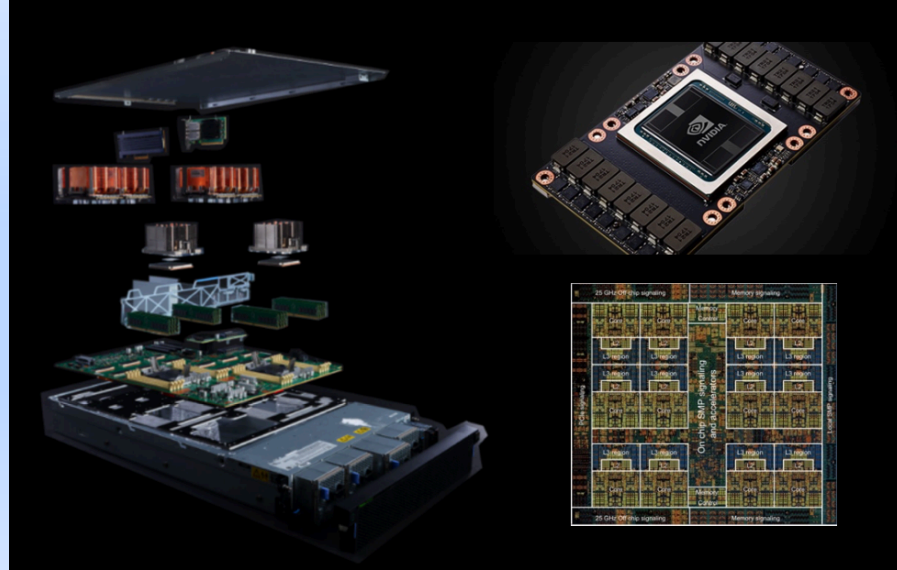
IT Automation – OpenStack/vmware + PowerVC

Hybrid Cloud – IBM Power in IBM Cloud, OpenShift

AI a ML - GPU/FPGA Accelerated Computing (AC922, IC922)

In-Memory DB a Analytics – SAP HANA, SAS Viya na Power

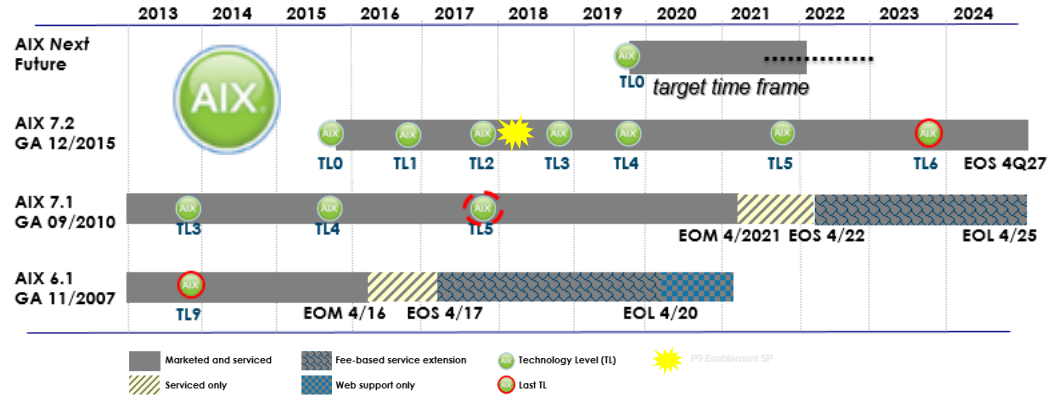
Security – POWER9, Data at rest Encryption, Tape



Nad'alej s nimi počítame: 10+ rokov roadmapa pre IBM i a AIX

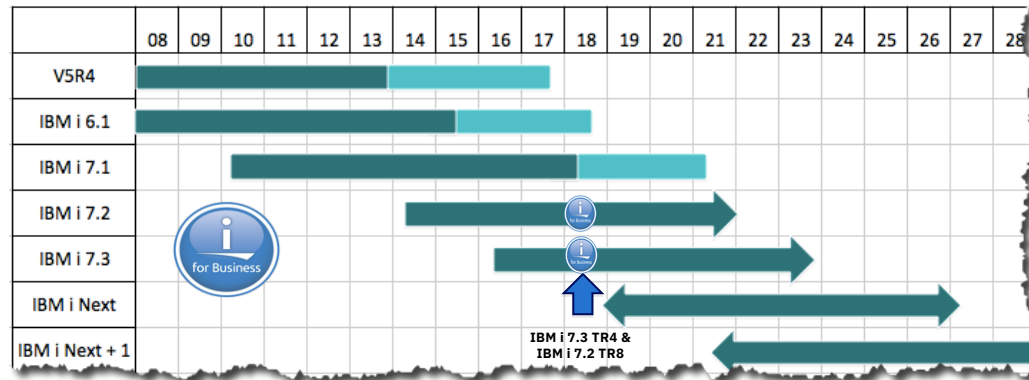
AIX Highlights

- AIX Security: PowerSC and PowerSC MFA updates for malware intrusion prevention and for strong authentication
- New workload acceleration with Shared Memory Communications over RDMA (SMC-R)
- Availability: AIX Live Update Enhancements; GDR 1.2; PowerHA 7.2
- Cloud Management: IBM Cloud PowerVC Manager for SDI; Import/Export;
- AIX 7.2 native support for POWER9 – e.g. enabling NVMe



IBM i Highlights

- POWER9 exploitation
- Expanding the secure-ability of IBM i with TLS, secure APIs, logs for SIEM solutions
- Expanded Install Options – installation process using USB 3.0 media
- Encryption and compression for cloud storage
- Increasing Productivity of Developers & Administrators



AIX 5.3 requires full I/O virtualization on POWER8
7.1 Versioned WPARs are an option to run AIX 5.3 env. on P8

0% financing for POWER9 servers and other IBM HW products

15 months 0% financing including 3-month interest free payment deferral

Acquire now – 0%, 15 months - start paying August 2020

You get

- Easy way how to conserve cash during COVID-19 crisis
- An affordable way to acquire your Power solution
- Help stretching your budget
- Less cash constraint
- Cost matched to benefits

0%

IBM Global Financing offers credit qualified customers 15 months financing at 0% interest, including a 3 months payment deferral

- 15-month total term – 0% interest
- 3 months with no payments followed by 12 monthly in advance payments - simply divide the price by 12 to calculate the monthly payment, valid for various deal sizes

Credit qualified customers such as Slovenská Sporiteľňa are eligible for 0% financing up to 24 months.

Promoted 0% financing is available on a 15-month Loan, Installment Payment Plan and Full Payout Lease. Offering is valid for eligible products, from as low as 20,000 EUR for credit qualified clients in Slovakia, sold directly through IBM or through an authorized IBM Business Partner.



Accelerated servers



Enterprise servers



Scale-out servers



Hyperconverged infrastructure

For more information feel free to contact your IBM Global Financing representative
Matúš Vitko, +421 911 105 415, matus.vitko@sk.ibm.com

POWER a Cloud

IBM POWER v cloude

Compute nodes hosting

- IBM POWER9 **in IBM Cloud** for AI, AIX, Linux, IBM i
- IBM POWER9 **LPARs in Google Cloud** AIX, Linux
- Public providers PowerCloud (CZ), LPARBox, SiteOx

Hybrid Cloud with Kubernetes/OpenShift, OpenStack, vmware

Hyperconverged infrastructure with IBM POWER nodes for **Nutanix or vmware over vRealize + PowerVC**



OpenShift 4.3 on Power – teraz k dispozícii ! *

Red Hat Blog: <https://www.openshift.com/blog/openshift-4.3-now-available-on-ibm-power-systems-1>

IBM Blog: <https://developer.ibm.com/linuxonpower/2020/04/30/red-hat-openshift-4-now-available-on-ibm-power-systems/>

Try it Now for free for 60 days: <https://cloud.redhat.com/openshift/install>

Get started with OpenShift

Try Red Hat OpenShift 4 now, or set up your own clusters in the environment of your choice.

[Instant access to a cluster](#)[Create your own cluster](#)

Try Red Hat OpenShift 4 now

Get instant access to OpenShift 4 clusters and see the features for yourself. With our simple tutorials and playgrounds, you can learn as you go.

LEARN

10 MINUTES | BEGINNER

[Getting started with OpenShift](#)

Use the OpenShift Container Platform to build and deploy

LEARN

15 MINUTES | BEGINNER

[Deploying applications from images](#)

Deploy an application from an

INSTANT CLUSTER

OPEN-ENDED | BEGINNER

[OpenShift 4 playground](#)

Explore OpenShift 4 us' playground, which give

Create your own OpenShift 4 cluster – <https://cloud.redhat.com/openshift/install>

The screenshot shows the 'Install OpenShift Container Platform 4' page in the Red Hat OpenShift Cluster Manager. The left sidebar contains navigation links: Clusters (active), Subscriptions, Documentation, Support Cases, Cluster Manager Feedback, and Red Hat Marketplace. The main content area is titled 'Select an infrastructure provider' and displays a grid of nine options:

- aws**: Run on Amazon Web Services (highlighted with a blue border)
- Azure**: Run on Microsoft Azure
- Google Cloud**: Run on Google Cloud Platform
- vmware vSphere**: Run on VMware vSphere
- Red Hat OpenStack Platform**: Run on Red Hat OpenStack
- Red Hat Virtualization**: Run on Red Hat Virtualization
- IBM Z IBM LinuxONE**: Run on IBM Z
- Power Systems**: Run on Power (highlighted with a green border)
- Run on Bare Metal**: Run on Bare Metal

A green starburst graphic is overlaid on the 'Power Systems' option, containing the text: **OpenShift 4.3 *Try it now***. The URL <https://cloud.redhat.com/openshift/install/aws> is visible in the bottom left corner.

Install OpenShift 4.3 on Power with 60-day evaluation subscription !



 Red Hat OpenShift
Cluster Manager

Clusters

Subscriptions

Documentation

Support Cases

Cluster Manager Feedback

Red Hat Marketplace

[Clusters](#) > [Create](#) > [OpenShift Container Platform](#) > [Power](#)

Install OpenShift Container Platform 4

Install on Power with user-provisioned infrastructure

 **New clusters are automatically registered with a 60-day evaluation subscription.**

Evaluation subscriptions do not include support from Red Hat. You can edit your subscription settings after the cluster is created.

With OpenShift Container Platform you can install a cluster on Power infrastructure that you provide

Follow the [official documentation](#)  for detailed installation instructions.

[Get started](#)

Relevant downloads are provided below.

Cloud Solutions on Power – Užitočné odkazy

Clients @ IBM Developer

<http://ibm.biz/power-hybrid-cloud>

Why IBM Power Systems hybrid cloud?

Hybrid cloud is a platform for applications and infrastructure, built on two or more components from public cloud, private cloud, and on-premises IT infrastructure. Hybrid cloud improves experiences for both public and private cloud by offering better flexibility and balance. Applications and services can be deployed and managed where they make the most sense and can be run from anywhere as needed. With a broad portfolio of private and public cloud solutions, IBM Power Systems can seamlessly integrate into your organization's hybrid cloud strategy or help you get started on your journey to hybrid cloud.

OpenShift 4.3
Try it now

BPs & IBM Sellers @ Seismic

Red Hat OpenShift + Private Cloud Solutions for Power

Public Cloud Expansion Solutions for Power

Cloud Pak for Data on Power

Hyperconverged Systems Powered by Nutanix

Red Hat OpenShift and Private Cloud Solutions for Power

- OpenShift and IBM Cloud Paks on Power — Seller Enablement
- OpenShift and IBM Cloud Paks on Power — Client Presentation
- OpenShift and IBM Cloud Paks on Power — Solution Brief
- OpenShift and IBM Cloud Paks on Power — Competitive
- Red Hat and IBM Systems — Synergy Plays

PREPARE	SELL
Cloud Paks on OpenShift Roadmap and Content Timeline	Open Source Building Blocks for Chapter 2 (Ansible, Docker, Kubernetes, and OpenShift L1)
OpenShift on Power Systems - Technical Deep Dive (recording)	Readying the Enterprise for Chapter 2 (OpenShift, Cloud Paks, and IBM Systems L2)
Private Cloud on POWER - Technical Deep Dive	OpenShift and IBM Cloud Paks on Power in 5 minutes
Client Experience Centers Portal: Demos, briefings, benchmarks, and workshops	Why Power Systems for Private Cloud (recording)
	IBM + RH Hybrid Solutions on Power Systems - Client Presentation



[Check out the OpenShift 4 on Power Systems blog:](#)

<https://ibm.seismic.com/Link/Content/DChm--E3Y6uEmGIhQ5wlrGcw>

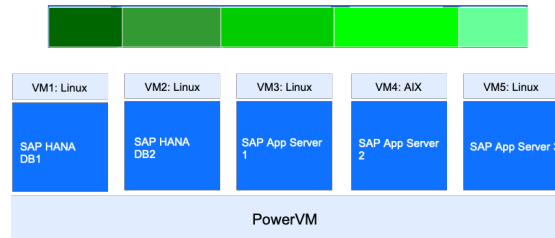
POWER a SAP HANA

Novinky SAP HANA na POWER

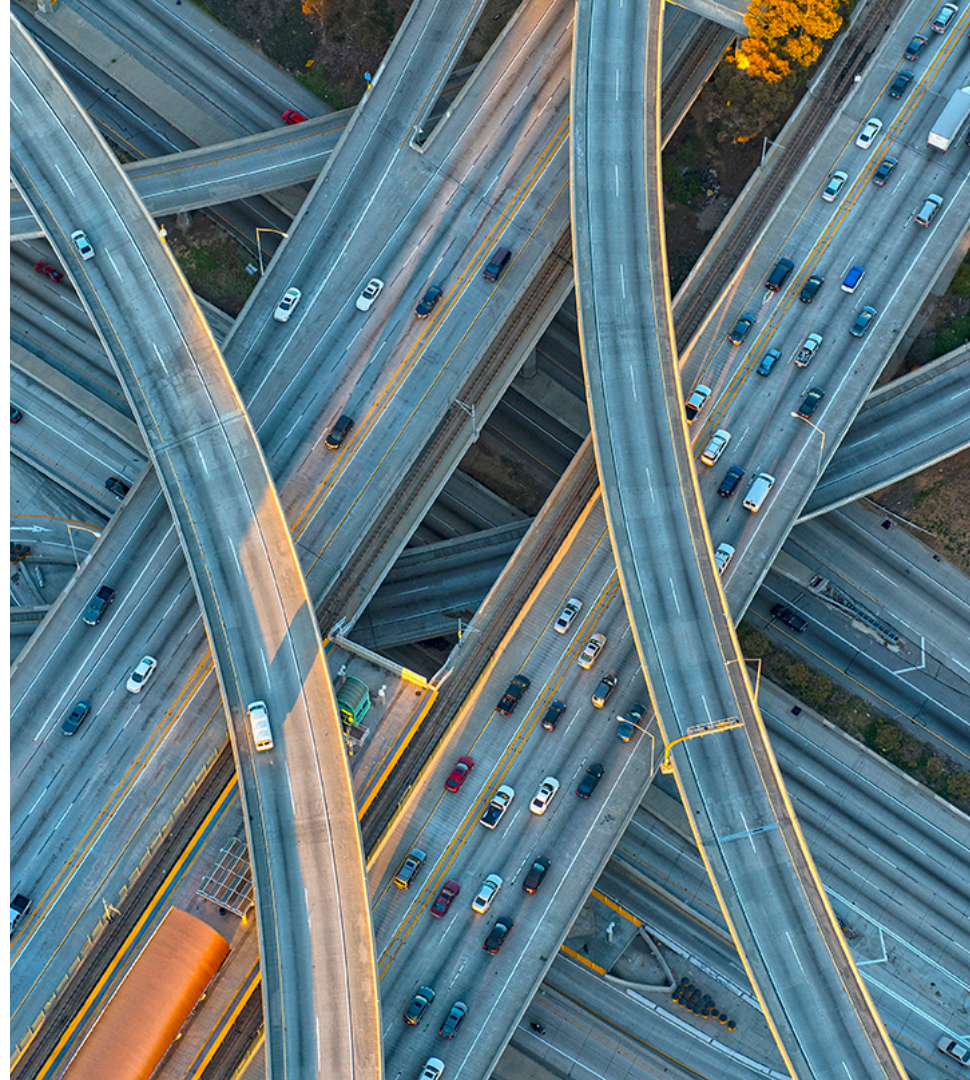
Virtual Persistent Memory on Power

- Až **17x** rýchlejší HANA štart *
- Až **30%** rýchlejší HANA shutdown *
- Nová funkcionality integrovaná v PowerVM a firmware (DRAM rozdelenie na dva regióny)
- Stávajúci zákazníci P9 nemusia nič dokupovať (nutný iba update FW)

Shared Processor Pool



*The >17x improvement in SAP HANA startup time and 30% faster SAP HANA shutdown time with Virtual Persistent Memory are based on our internal tests with POWER9 system 9040-MR9 that has 48 cores and 8 TB memory. Configuration details for comparison test with POWER9 firmware level equal or greater VM940_FW940.00 (27) – 4TB main memory compared with 512MB main memory and 3584MB virtual persistent memory. Both configurations included following SAP HANA db VMs - 1 x SAP HANA database server with 28 dedicated cores and 512 to 4196 GB main memory, 1 x SAP Netweaver Application Server with 16 ded. cores and 512 GB main memory



POWER a SAS

Výhody IBM POWER + IBM Storage pre SAS

IBM Power Systems
+
IBM Storage



Flexibilita



Spoľahlivosť



Vysoký výkon

Výhody IBM POWER + IBM Storage pre SAS



Flexibilita

Výhody IBM Power

Virtualizácia založená na firmvéri, ktorá má izoláciu výkonu a zvýšené zabezpečenie

Iba PowerVM virtualizácia, voči ostatným konkurentom, s nulovým počtom reportovaných bezpečnostných chýb¹



Spôľahlivosť

Výhody IBM Power

Hodnotený ako #1 v oblasti spoľahlivosti posledných 11 rokov¹

Výhody IBM Storage

IBM Storage garantuje 100% dostupnosť s technológiou HyperSwap



Vysoký výkon

Výhody IBM Power

2x

I/O
priepustnosť¹

1.8x

Pamäťová
priepustnosť²

5.6x

CPU GPU
interconnect³

Svetový superpočítač #1 a #2 v top500.org je IBM Power Systems

1. Source: National Vulnerability Database, <http://nvd.nist.gov/home.cfm>, March 2020

40+ rokov partnerstva medzi SAS a IBM

IBM hardware je optimalizovaný pre SAS aplikácie:

- SAS 9.4 pre AIX na IBM Power Systems
- SAS Viya on Linux na IBM Power Systems
- IBM Spectrum LSF tvorí základ pre SAS Grid

A profile photograph of Ken Gahagan, a man with short dark hair, wearing a light blue collared shirt, looking towards the left.

Ken Gahagan

Director, R&D

SAS

“POWER9 has this high-throughput capability that other processors do not have.”

“[POWER9 is] a perfect fit for our machine learning and deep learning capability in SAS Viya”

Ken Gahagan
Director, R&D
SAS

[Video: Driving innovation with SAS® Software and IBM Power Systems](#) 17

POWER9 Server (IC922)

- Nový server pre AI Inferencing a Linuxove nasadenia



IBM IC922 – Cenovo dostupné riešenie "End-to-end"

This OpenPOWER 3rd party developed server addresses four needs:

1. GPU based Inferencing AI & other HPC workloads

1. 6 GPU PCIe adapters [8 statement of direction]
2. 2 TB memory
3. 40 POWER9 CPU cores with SMT=4
4. Lower cost Inferencing partner for AI on the AC922

2. High density Storage server

- 24 internal disk bays for HD, SSD plus NVMe drives

3. Cloud Server (like RHEL OpenShift)

- Low cost & flexible set of resource options

4. Generic Linux / KVM VMs on POWER Server


- Low cost & flexible set of resource options
- KVM supported at a later date

The diagram features four blue arrows pointing from the numbered list items on the left towards a central light-blue circle on the right. The circle contains text describing the server's specialized use. The text is color-coded: 'Specialised use or a mixed workloads like:' is in blue, 'Cloud (OpenShift) with some GPU Inferencing + Data nodes' is in green, and 'Data nodes' is in orange.

Specialised use
or a mixed
workloads like:
Cloud (OpenShift)
with some GPU
Inferencing +
Data nodes

IBM Power Systems portfólio

- od cenovo dostupných Linux systémov až po Enterprise riešenia

Enterprise AI Workloads	Mission Critical Workloads (Linux, AIX, IBM i)		
 nvidia	Power Scale-Out Systems	Power Enterprise Systems	
AC922 IC922	S922/S914/S924 H922/H924/L922	E950	E980
			

ubuntu



Zhrnutie

POWER9 vs x86 – Benefits pre cloud, AI workloads aj tradičné AIX a System i riešenia



**More Container Apps
Less Cost**

3.2X

Greater containers/core²

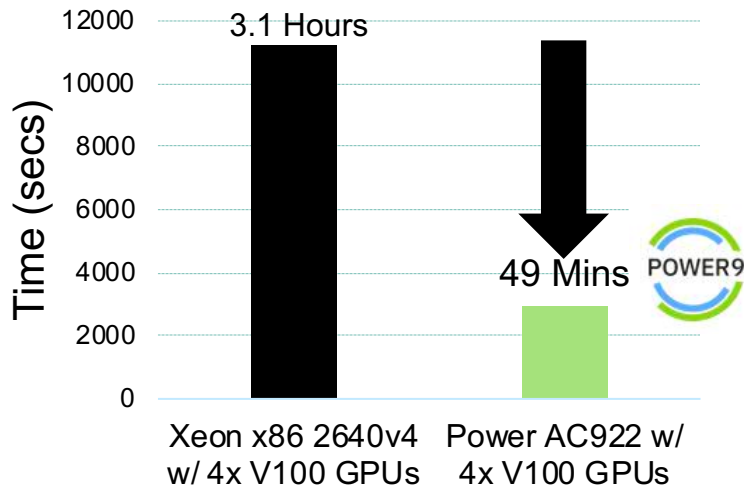
2.6X

Better price-performance³
(based on number of containers)



AI Models Train ~4X Faster

Caffe with LMS (Large Model Support)
Runtime of 1000 Iterations



**Power is Open Source Hardware
(Chips & Systems)**

OpenPOWER



OpenCAPI



Hewlett Packard Enterprise



POWER9 Architecture vs. Intel x86

4x

Threads per core
vs x86

5.6x

Up to 5.6x more I/O
bandwidth than x86

2.6x

More RAM possible
vs. x86

2X

I/O Bandwidth - 1st PCIe
Gen 4 Busses

7-10X

CPU to GPU
Bandwidth

Užitečné odkazy - IC922, AI ...

IBM Power System IC922 Marketplace page:

<https://www.ibm.com/us-en/marketplace/power-system-ic922>

Data Sheet:

<https://www.ibm.com/downloads/cas/LVYP6RM2>

IBM Power System IC922 Technical Overview and Introduction (draft):

<http://www.redbooks.ibm.com/redpieces/abstracts/redp5584.html>

IBM Power System IC922 Knowledge Center:

https://www.ibm.com/support/knowledgecenter/POWER9/p9hdx/9183_22x_landing.htm

Enterprise AI Brochure

<https://ibm.box.com/v/IBM-EAI-brochure>

Data, Train, Inference (DTI) Solution Guide <https://www.ibm.com/downloads/cas/YE6N4XRV>

Why Your AI Infrastructure needs Both Training and Inference

<https://www.ibm.com/account/reg/us-en/signup?formid=urx-41232>

Ďakujem !

Cloud Solutions for Power Systems

**Red Hat OpenShift
+ Private Cloud**

Solutions for Power

**Hybrid
Multicloud**

Integration across
Public & Private Cloud

IBM Cloud Paks

for Data, Management,
Applications, Integration,
and Automation

**Public Cloud
Expansion**

Solutions for Power

**Hyperconverged
Systems**

Powered by Nutanix

Kontakt

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Backup slides

Red Hat OpenShift (OCP) and Power



- Red Hat's private cloud offering
- Ideal for Red Hat stack clients
- Initial release of OCP on Power in October 2018
- PowerVM support now available (April 2019)
- Primarily targeted at developers
- Containerize and manage existing Red Hat or open source applications via OCP catalog
- Runs across Power Systems portfolio
- Independent Power and x86 Cluster Support

POWER Cloud Benefits

- Build, run open source cloud native apps with full control of Kubernetes on Power (Bare-metal, KVM, PowerVM)
- POWER9 exploitation to modernize AIX and IBM i apps and accelerate AI/Deep Learning algorithms

A screenshot of the OpenShift Container Platform dashboard. The top navigation bar shows "OPENSIFT CONTAINER PLATFORM" and "Local NodeJS+MongoDB". The main content area displays a grid of application tiles, including "Apache HTTP Server", "Django + PostgreSQL", and "MongoDB". A sidebar on the left contains navigation options like "Overview", "Applications", "Builds", "Resources", "Storage", "Monitoring", and "Catalog".

Open Hybrid Cloud Fabric / Kubernetes Platform Mgmt.

PHYSICAL VIRTUAL PRIVATE PUBLIC HYBRID



Provide a high value Platform for Mission Critical Workloads while Modernizing for Open Source, Cloud & AI

– AIX and other Power Systems SW Highlights

Workload Optimization

Cloud

Continuous Availability

Security & Compliance

New Levels of Workload Scalability

- Improved (de)compression performance leveraging Power9 on-chip GZIP accelerator
- Improved interrupt performance via XIVE enablement
- VMM lock scaling for improved SAP workload performance
- High speed network adapter (100Gb) performance improvements

AI for data residing on AIX

- Availability of Python based Machine Learning packages on the AIX toolbox
- Tech Preview: Enable scoring / inferencing capabilities on PowerVM-based Systems (via WML CE / H2O DAI)

AIX in the public Cloud

- AIX in the IBM Cloud
- AIX in the Google Cloud
- AIX in the Skytap Cloud (e.g. Azure)
- AIX in various other CSPs' Clouds

AIX & Cloud native Apps

- Integration with Cloud native apps / IBM Cloud Paks on OpenShift
- API access to workloads / data running on AIX

AIX & Open Source

- A huge set of added / updated packages on the AIX Toolbox
- Building blocks for AIX patching and VIOS update use cases (Ansible!, Chef, Puppet)

Enhanced Scope & Usability for AIX Live Update

- Kerberos Support
- AutoFS Support
- Improved preview behavior
- Improved error handling

PowerVM 3.1.1

- Enhanced SSP network resiliency / built-in network failover

PowerHA for AIX 7.2.4

- Cross Cluster Verification
- MQ Listener Support

VM Recovery Manager 1.4

- VM workgroups spanning multiple hosts
- HA/DR unified management



Enhanced Security and Compliance Capabilities

- AIX Secure Boot
- AIX Trusted Installs
- IPSEC Resiliency Improvements
- SMB 2.1 support

PowerSC 1.3

- Set of new AIX compliance profiles
 - DoD STIG 7
 - SAP
 - CIS
- PowerSC MFA Integration

PowerSC MFA 1.2.0.2

- Web Services APIs
- Failover scenario support

PowerHA for AIX 7.2.4



IBM i 7.4 TR 2 and IBM i 7.3 TR8 Highlights

High Availability & Disaster Recovery

- IBM Db2 Mirror for i – supports internal storage storage including NVMe
- PowerHA - Automation, use of SQL services, simplified updates
- BRMS - Highly requested enhancements and extensions

Db2 for i

- New SQL functions e.g. INTERPRET & COMPARE_FILE;
- SQL Services for Work Management functions

Security (for 7.3 TR8)

- TLS 1.3, TLS 1.2
- New Digital Certificate Manager Interface

Increasing Productivity of Developers & Administrators

- IBM i Access Client Solutions improved content assist support plus more ease-of-use functions
- Updated RPG Built-ins - %TIMESTAMP, %KDS & LIKEDS
- RDi – enhancements from requested RFEs

Open Source enhancements

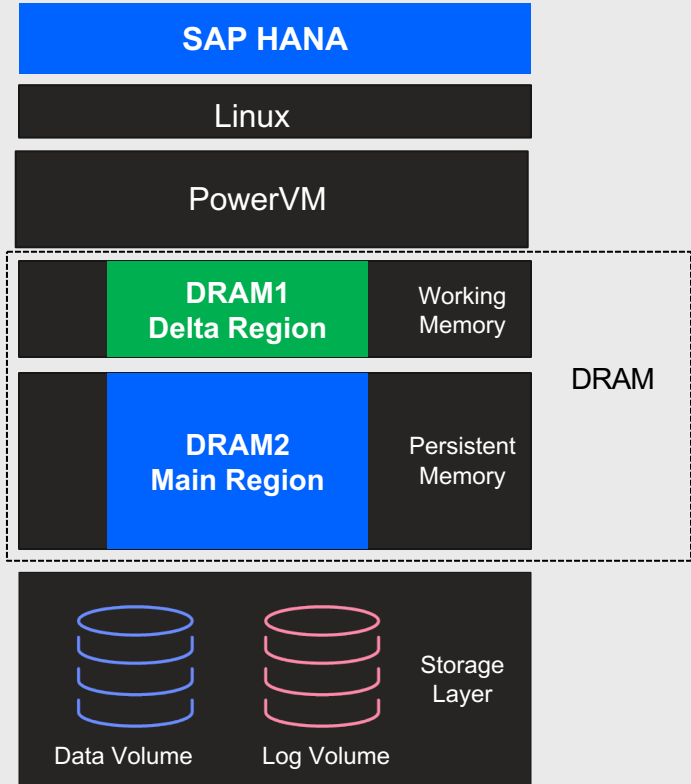
- Improved content assist plus more ease-of-use functions
- Jq
- Python and Security environment updates

Other

- Clustering – more automation
- Virtual Tape Libraries
- Hybrid Networking – Making full use of high-speed fabric with Live Partition Mobility



Virtual PMEM for SAP HANA on IBM Power Systems



- DRAM is split into two regions DRAM1 (delta region) & DRAM2 (Main region)
- DRAM2 is presented as PMEM device
- DRAM2 region is initialized with Main region when it is added for the first time
- Data written from DRAM2 to data volume after delta merge (creates new main)
- Changes to database continuously logged to Log volume
- Restart of HANA or Linux do not require main region to be loaded from Storage layer into DRAM2