

z/Now!

Resources for Developing Open
Source Software for Linux on IBM Z
and LinuxONE

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@PLEIA2

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IBM Z / s390x / zArchitecture

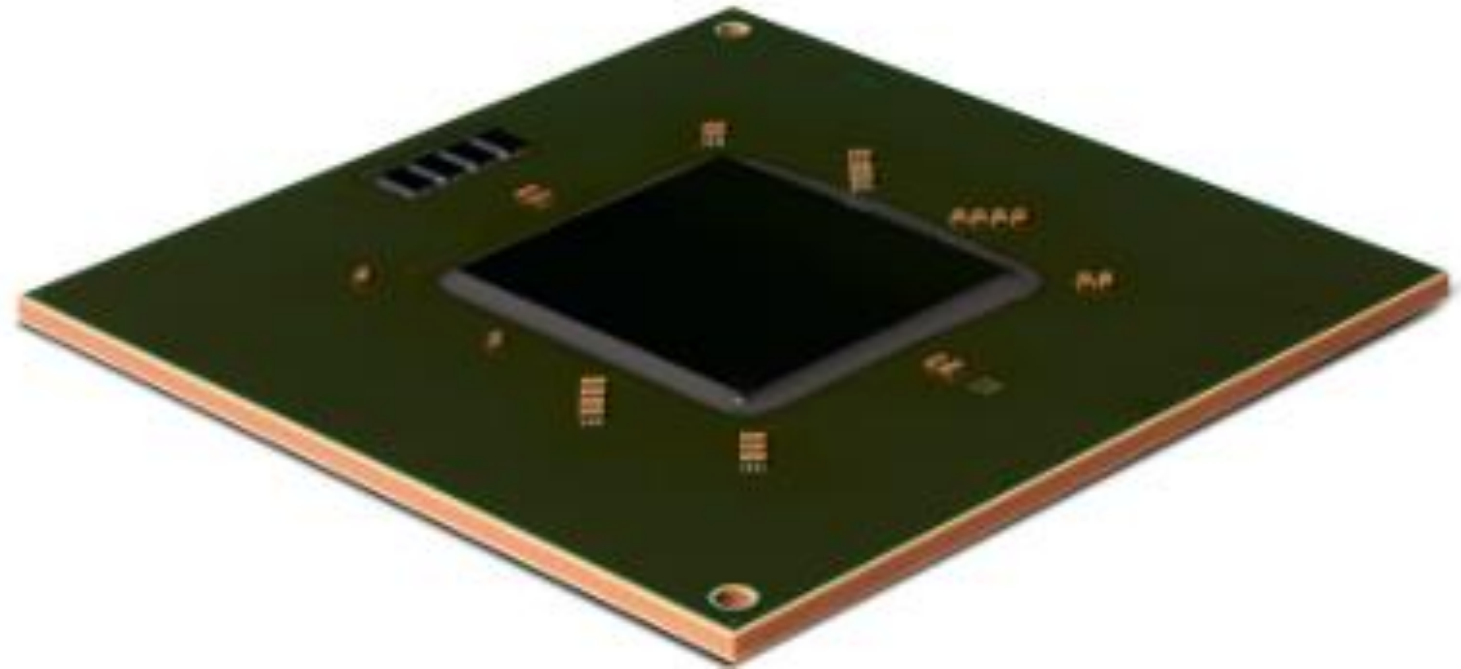
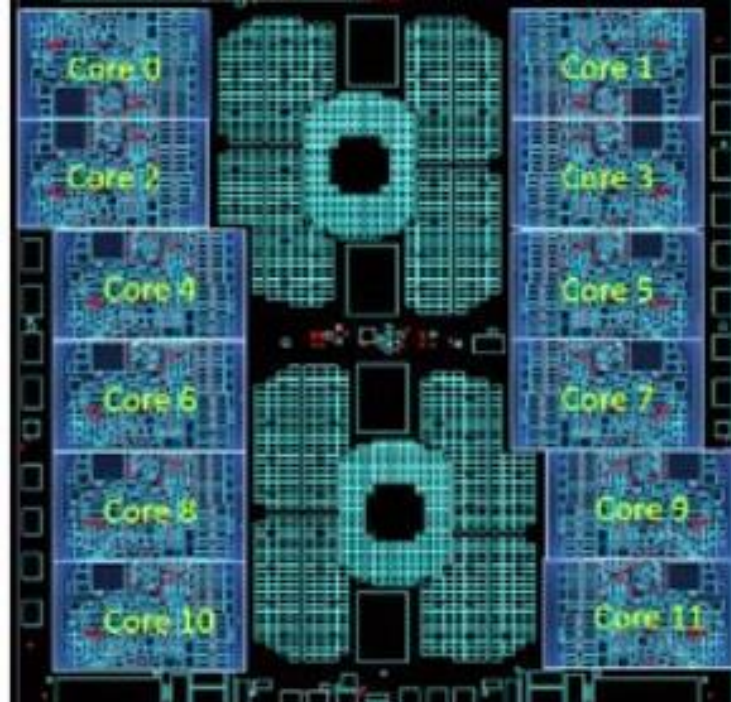
190 5.2ghz processor units (PUs), with 12
cores per chip

But also...

40TB of RAM

60 PCIe control units across 12 PCIe I/O
drawers

22 dedicated I/O offload processors (SAPs)
pre-allocated per system



The IBM Telum Processor Design



Performance and Scale

- Optimized core
- New cache hierarchy & multi-chip fabric



Embedded Accelerators

- Sort, Compression, Crypto
- AI



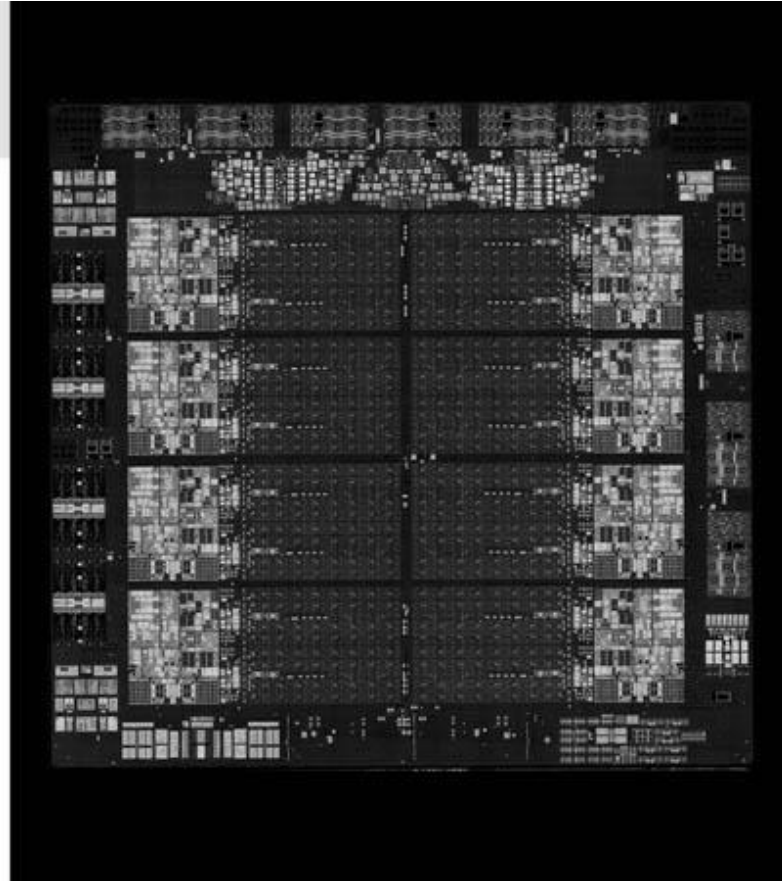
Industry-leading Security

- Encrypted Memory
- Improved Trusted Execution Environment



Unmatched Reliability and Availability

- L2 cache SRAM wipe-out error correction & sparing
- 8-DIMM Redundant Array of Memory (RAIM)



Upcoming: Telum Processor

"IBM Telum Processor: the next-gen microprocessor for IBM Z and IBM LinuxONE" <https://www.ibm.com/blogs/systems/ibm-telum-processor-the-next-gen-microprocessor-for-ibm-z-and-ibm-linuxone/>

Terminal Talk: "Christian Jacobi tells us all about Telum" <https://www.terminaltalk.net/e/christian-jacobi-tells-us-all-about-telum/>

Linux on IBM Z

Started out as the "Bigfoot" (i370) port by several community members in 1998-99.

IBM released the first Linux kernel patches to support s390x in December 1999.

In October 2000, **SUSE Linux Enterprise Server (SLES)** became the first, still in production, enterprise Linux to support s390x.

Red Hat Enterprise Linux (RHEL) quickly followed as the second, still in production, enterprise Linux for the mainframe.

Ubuntu support was announced in 2016 and began with Ubuntu 16.04.

Linux Today

Announced at the Linux Foundation's LinuxCon 2015, IBM released the first Linux-only mainframe, the IBM LinuxONE.

Today's LinuxONE is in its third iteration, with the LinuxONE III released in September 2019.



2015: LinuxONE Emperor & Rockhopper



2017: LinuxONE Emperor II & Rockhopper II



2019: LinuxONE III

IBM Z has an open source legacy!

- IN 1955, THE VOLUNTEER-RUN SHARE INC WAS FOUNDED.
- A KEY RESOURCE FOR THIS ORGANIZATION WAS THE SHARE LIBRARY OF SOFTWARE THAT SYSTEMS PROGRAMMERS WOULD SHARE AMONG THEIR PEERS, FREELY.
- IN 1959, SHARE RELEASED THE SHARE OPERATING SYSTEM (SOS), ONE OF THE FIRST TRUE "OPERATING SYSTEMS"¹ AND WIKIPEDIA SAYS OF SOS:
 - *"SOS WAS ONE OF THE FIRST INSTANCES OF "COMMONS-BASED PEER PRODUCTION" NOW WIDELY USED IN THE DEVELOPMENT OF FREE AND OPEN-SOURCE SOFTWARE SUCH AS LINUX AND THE GNU PROJECT."*

¹ [HTTPS://EN.WIKIPEDIA.ORG/WIKI/SHARE_\(COMPUTING\)](https://en.wikipedia.org/wiki/Share_(computing))



Are other
projects porting
their apps?

Yes!

Linux Distributions & Virtualization



Community Versions



Networking & Monitoring



Cloud & Container Services



Languages & Runtimes



DevOps/Automation



Middleware



Big Data, Observability, Analytics



Databases



www.ibm.com/community/z/open-source-software/

Finding Open Source Software for Linux

- Search distributions with the Open Mainframe Project Software Discovery Tool <https://www.openmainframeproject.org/projects/software-discovery-tool>
- Browse the IBM Z and LinuxONE Container Registry <https://ibm.github.io/ibm-z-oss-hub/main/main.html>
- Go directly to the project, do they have s390x builds?
- Ask your vendor, is there a port they maintain?



Full project hosting, including code, and mailing lists

Blogs and podcasts of general interest to the open source mainframe community

Slack and forums for communication among participants

Project support for 3rd party open source projects seeking infrastructure (VMs, CI/CD services)

Annual conference!






IBM LinuxONE Community Cloud

"The IBM LinuxONE Community Cloud is a no-charge, 24 x 7, enterprise-grade, open access, shared public cloud environment on IBM's LinuxONE platform. Developers, students, professors, entrepreneurs, or anyone from all over the world can sign up for 120-day access to a virtual server with full access to develop, test, or run open source applications on LinuxONE, or to access any of the other services offered."

Visit <https://developer.ibm.com/linuxone> to get started

And join the LinuxONE Community Cloud Community at <https://www.ibm.com/community/z/linuxone-cc/>


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Source	Published	Status	Series	Section	Build Status
 golang-hello-world - 0.0~git20190613.ec269b1-1ppa6 (changes file)	2019-06-13	Published	Bionic	Games	✓




Publishing details
Published on 2019-06-13

Changelog
golang-hello-world (0.0~git20190613.ec269b1-1ppa6) bionic; urgency=medium

- * Update release version to latest LTS

--  [lyz@princessleia.com](#) (Elizabeth K. Joseph) Thu, 13 Jun 2019 14:05:50 -0700


Builds

-  amd64
-  i386
-  s390x

Built packages
golang-hello-world Simple "Hello World" program in Go

Package files

- [golang-hello-world_0.0~git20190613.ec269b1-1ppa6.debian.tar.xz](#) (1.6 KiB)
- [golang-hello-world_0.0~git20190613.ec269b1-1ppa6.dsc](#) (2.0 KiB)
- [golang-hello-world_0.0~git20190613.ec269b1-1ppa6_amd64.deb](#) (366.2 KiB)
- [golang-hello-world_0.0~git20190613.ec269b1-1ppa6_i386.deb](#) (353.1 KiB)
- [golang-hello-world_0.0~git20190613.ec269b1-1ppa6_s390x.deb](#) (345.1 KiB)
- [golang-hello-world_0.0~git20190613.ec269b1.orig.tar.xz](#) (4.0 KiB)

►  [golang-hello-world - 0.0~git20190613.ec269b1-1ppa3 \(changes file\)](#) 2019-06-13 Published Xenial Games ✓

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Ubuntu Personal Package Archives (PPAs) on Launchpad.net

Documentation:
<https://help.launchpad.net/Packaging/PPA>

Downloads Support Community Development

openSUSE Build Service > Projects > home:markkp:branches:openSUSE:Factory:zSystems > snappy

Overview Repositories Revisions Requests Users Advanced

A fast compressor/decompressor library

Links to devel:libraries:c_++ / Download package

Snappy is a compression/decompression library. It does not aim for maximum compression, or compatibility with any other compression library; instead, it aims for very high speeds and reasonable compression. For instance, compared to the fastest mode of zlib, Snappy is an order of magnitude faster for most inputs, but the resulting compressed files are anywhere from 20% to 100% bigger. On a single core of a Core i7 processor in 64-bit mode, Snappy compresses at about 250 MB/sec or more and decompresses at about 500 MB/sec or more.

Do NOT submit it to factory without asking or the package will be yours to maintain.

Source Files (show unmerged sources)

Show 25 entries Search:

Filename	Size	Changed	Actions
1.1.7.tar.gz	1.04 MB	2018-02-08	
baselibs.conf	11 Bytes	2015-07-29	
snappy-pcfile.patch	2.43 KB	2018-02-08	
snappy.changes	4.53 KB	2018-02-08	
snappy.spec	3.07 KB	2018-02-08	

Showing 1 to 5 of 5 entries Previous 1 Next

Latest Revision

Mark Post (markkp) committed 6 days ago (revision 1)

Browse Source

Build Results Rpmlint Results

snappy

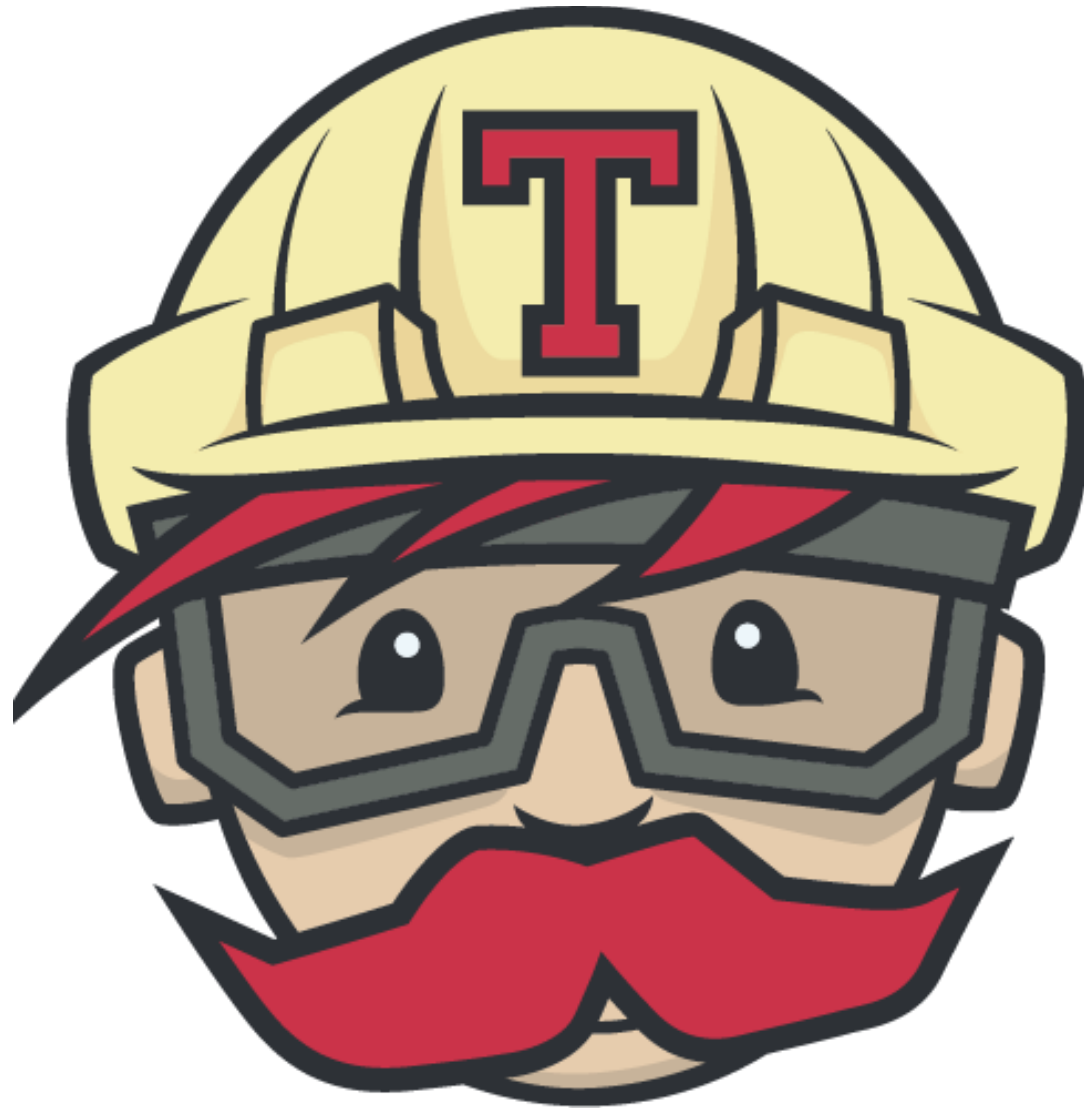
SLE_12_SP2	x86_64
SLE_12_SP3	aarch64 ppc64le s390x
SLE_12_SP4	aarch64 ppc64le s390x x86_64
SLE_15	s390x
openSUSE_Factory	i586 x86_64
openSUSE_Factory_ARM	armv7hl aarch64
openSUSE_Factory_PowerPC	ppc64le ppc64
openSUSE_Factory_zSystems	s390x
openSUSE_Leap_15.0	x86_64
openSUSE_Leap_15.1	x86_64
openSUSE_Leap_42.3	x86_64

openSUSE
build service
at build.opensuse.org



Jenkins instance for s390x maintained by the **Oregon State University Open Source Lab** (OSU OSL)

<https://osuosl.org/services/ibm-z/>



TravisCI build service for s390x (Beta trial for open source projects)

Documentation: <https://docs.travis-ci.com/user/multi-cpu-architectures/>



So, any programming language?

Programming Language Tips

Source code across architectures will generally be identical, but it needs to be compiled (C, C++), or otherwise interpreted (Python, Node.js) for this architecture.

That means you need a compiler or an interpreter built for the mainframe.

The mainframe architecture is big-endian, but most of the supported architectures today are little-endian.

Your code will probably build and run, give it a try!

If not, note that the higher level a language is, the more luck you'll have. Lower level languages like C do more hardware-specific operations, higher level languages like Node.js have much of that abstracted away.

Questions?

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Join us in the IBM Z Community:

<https://www.ibm.com/community/z/open-source/>