

Linux Distribution Collaboration ...on a Mainframe!

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Raleigh, NC USA

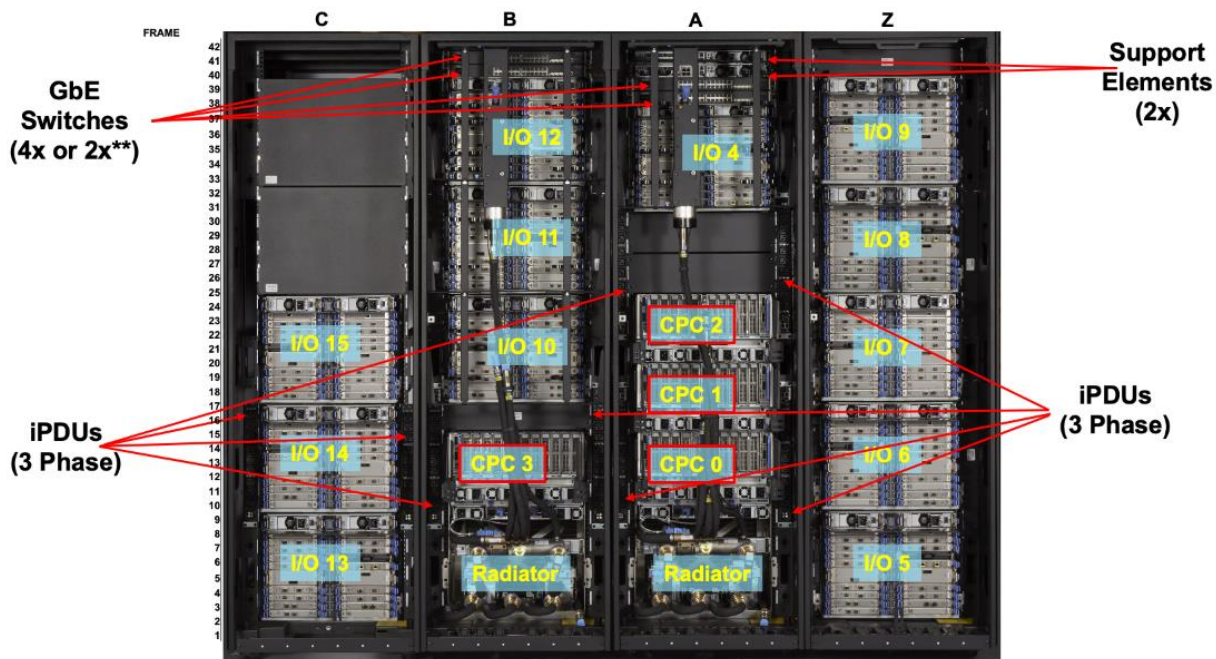
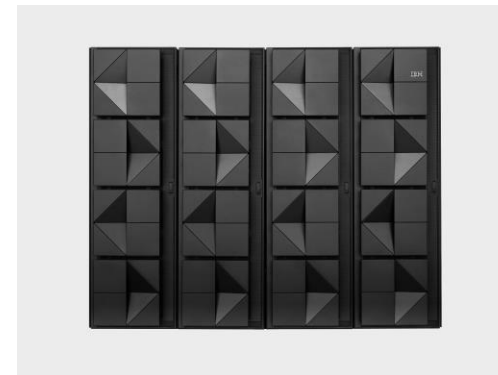


What is a
mainframe?



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What is a mainframe?



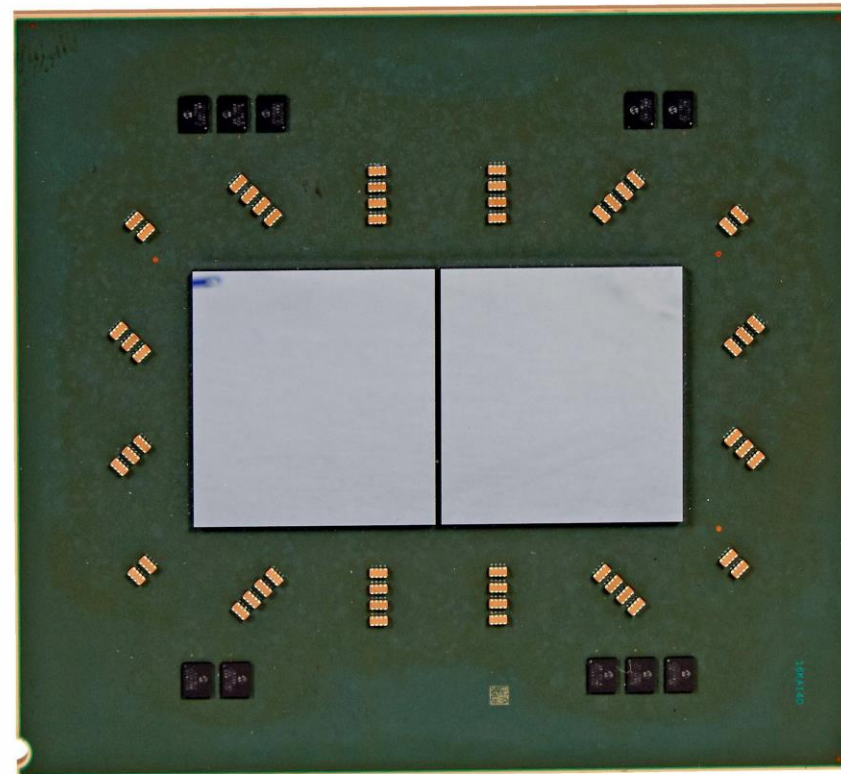
Max setup in a 4-frame system:

- 4 Central Processor Complex (CPC) drawers
 - 200 processor cores
 - 40TB of memory
- 12 I/O drawers



What is a mainframe?

- IBM Telum chip
 - New on-chip Integrated Accelerator for AI
 - On-chip Compression/decompression
 - CP Assist for Cryptographic Functions (CPACF) in each core
 - Fully redesigned cache system (and it's BIG!)



2 IBM Telum chips on an IBM z16 Dual Chip Module (DCM)

What is a mainframe?

- And Linux runs on them!
 - (it has for over 20 years)

...some of them *only* run Linux.



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Hardware Architectures

- amd64 – 64-bit x86
 - standard laptop, desktop, server
- arm64 – 64-bit ARM
 - state of the art ARM-driven servers, modern cellphones, Raspberry Pi 3 & 4, Apple M1 & M2, some Chromebooks
- ppc64(le) – 64-bit PowerPC
 - IBM POWER & openPOWER-driven servers, Wii U, PS3, Xbox 360
- **s390x**
 - **IBM Z and LinuxONE (mainframes)**

And open source projects can release on various architectures, for example:

Download Kubernetes

An easier way to get the binaries you need (or a link to them)

OPERATING SYSTEMS			ARCHITECTURES					
darwin	linux	windows	386	amd64	arm	arm64	ppc64le	s390x



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Why support lots of architectures?

- Expand direct user base
- Meet expectations of projects that depend upon yours
- Satisfy technical curiosity
- Expand skills/expertise



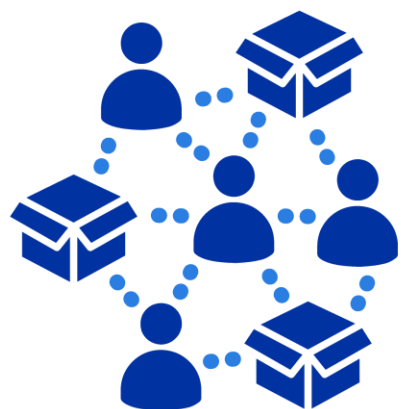
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Things you need to consider

- Access to servers or hardware emulators, depending on the project
- Management of bugs/issues
 - Little endian vs. Big endian (memory addressing) issues
 - Installation and internal scripts that make assumptions about architecture
- Dependency management/support
- Domain expertise



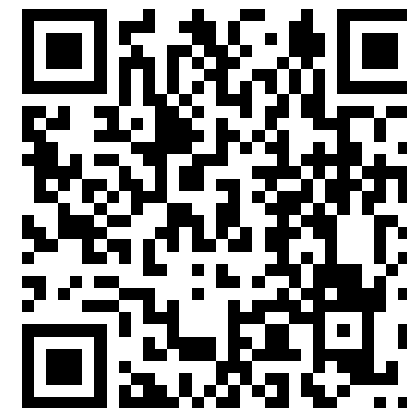
But we can help!



OPEN **MAINFRAME** PROJECT

**Linux
Distributions**

Working Group



<https://wiki.openmainframeproject.org/display/LinuxDistrosWG>



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OPEN MAINFRAME PROJECT

The Open Mainframe Project was founded in 2015, as a focal point for deployment and use of Linux and Open Source in a mainframe computing environment.

The Open Mainframe Project is part of the Linux Foundation.

<https://openmainframeproject.org/>



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OPEN **MAINFRAME** PROJECT

Linux Distributions

Working Group

Launched in 2021 with the following purpose:

To oversee the health and maintenance of the s390x port of various Linux distributions to ensure that the s390x port remains a supported architecture for them all.

To this end, the group will collaborate on shared challenges and successes, work together to nurture new contributors, and make sure they also have the infrastructure they need.



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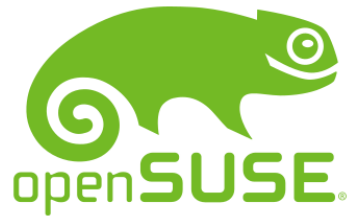
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Red Hat



debian



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Aside: What about the "distro wars"?

- That's mostly the users
- Developers of the various Linux distributions have always collaborated
 - Upstream" in software projects they all include in their distributions
 - Shared security disclosure mailing lists
 - Knowledge sharing at industry events (like ATO!)
 - SIGs, and WGs, like us!



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How it works

- We largely collaborate via mailing list and monthly team meetings to discuss:
 - Outstanding issues of note that may impact others
 - Efforts and strategies to resolve issues
 - Sharing of patches
 - Help with infrastructure requirements
 - Porting efforts at IBM from various tools teams
- Just launched a forum on the Open Mainframe Project discourse forum for additional input and user feedback



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At a team meeting, Sarah Julia Kriesch of openSUSE brought up a build issue, Dan Horák of Fedora has a patch!

- Remote desktop xrdp client isn't building on openSUSE:
https://build.opensuse.org/package/live_build_log/openSUSE:Factory:zSystems/xrdp/standard/s390x
(the server is fine, which is the more common use case)
 - Ulrich checked - upstream claims to support it, a patch went in in March 2021
 - FYI Fedora patch: <https://src.fedoraproject.org/rpms/xrdp/blob/rawhide/f/xrdp-0.9.16-arch.patch>



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Dan Horák of Fedora brings an issue with LDC to the group on the mailing list, and Ulrich of the tools team at IBM starts looking into it.



Ulrich Weigand Ulrich.Weigand@de.ibm.com via lists.openmainframeprojec... Wed, Sep 14, 1:11 PM
to Andreas, Peter, dan@danny.cz, wg-linux-distros@lists.openmainframeproject.org ▾

Dan Horák <dan@danny.cz> wrote:

>seems the D language becomes a necessity in the Linux ecosystem. If I
>understand correctly, then the GNOME desktop project will rely on
><https://github.com/ximion/appstream-generator> which is an app written
>in D (using LDC [1]). There is a D language compiler available for
>s390x in the GCC toolchain, but D in GCC lacks a full ppc64le support
>[2]. LDC seems to support ppc64le, but lacks s390x. Ideally we in
>Fedora want a single toolchain to be available across all supported
>arches. I am currently looking what bits are missing or what needs
>porting in LDC. Any help is welcome :-)

>

>[1] <https://github.com/ldc-developers/ldc/releases>

>[2] https://gcc.gnu.org/bugzilla/show_bug.cgi?id=106832

Thanks for pointing this out, Dan! I do think that ideally both ppc64le and s390x should be supported by both LDC and GCC; we'll have to see what we need to do to make this happen.

Peter - are you aware of the GCC bug mentioned above? I think your team should be involved in this discussion.

Andreas - what's the current status of D support in GCC on s390x? I seem to remember that something was working at some point, but I'm not sure whether we're regularly verifying this.

As to LDC support on s390x, from a quick glance at the source code it seems there's mainly some ABI support missing - that should be easy enough to add. I can have a look here.



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Elizabeth K. Joseph of IBM learned via social media that Alpine Linux was at risk of dropping their s390x port due to issues with rustbuild, brought it up at a team meeting, and Ulrich's team jumped in.

 Closed Created 5 months ago by  Ariadne Conill 

drop s390x

Rust is increasingly a dependency for key Alpine components, and Rust does not work on s390x.

In addition, Alpine is not getting sufficient community interest to keep the port in good shape (I am pretty much the only one working on it these days), while there is no engineering support from IBM for the port.

As such, I would like to propose decommissioning the port, unless the TSC approves a plan to keep it going that involves IBM and other stakeholders.

Incidentally, a quick poll of known downstream consumers (e.g. Kubernetes Ingress) of Alpine s390x did not indicate that s390x support was terribly important to them.



Ulrich Weigand @uweigand · 1 month ago

The changes in [aports!34493 \(closed\)](#) have now been merged, and s390x Rust packages should finally be available in Alpine again. Thanks to [@AlekseiNikiforovIBM](#) and everybody else working to make this happen!

In case you run into any problems specific to the s390x architecture in the future again, please do not hesitate to reach out to me, and I'll try to make sure we at IBM provide whatever support we can. We are definitely very interested in keeping s390x as supported platform for Alpine.



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Dan Horák of Fedora brought up a bug on the mailing list with openJDK, it was discussed at a meeting, and Tyler Steele of IBM wrote a patch that fixed it.

[wg-linux-distros] OpenJDK needs some attention External Inbox x

 **Dan Horák** dan@danny.cz via lists.open... Fri, Jun 10, 12:44 AM ☆ ↶ ⋮
to wg-linux-distros ▾

Hi all,

seems OpenJDK port for s390x needs some attention too, please see <https://bugs.openjdk.org/browse/JDK-8288128> for details.

Thanks,

Dan

 **JDK / JDK-8288128**
S390X: Fix crashes after JDK-8284161 (Virtual Threads)

Details

Type:	 Bug	Status:	RESOLVED
Priority:	 P2	Resolution:	Fixed
Affects Version/s:	19	Fix Version/s:	19
Component/s:	hotspot		
Labels:	loom oraclejdk-na		
Subcomponent:	runtime		
Resolved In Build:	b30		



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What else?

- [device interrupts for virtual card readers that were ignored by the kernel](#) (patch in the works!)
- [Expanded D language support](#)
- Possible shared customer/client implementations or requirements around DPDK to garner more resources
- .NET 7 availability being worked on by multiple distributions (started with RHEL)
- libcds/firebird: First time, that the package build for s390x is successful on openSUSE
- [frame pointer option enabling](#) (already forwarded and approved with some changes)
- Ongoing fixes for [Redpanda](#) support
- [OpenMPI build errors](#)
- Issues with btrfs-progs which have [now been fixed upstream](#)
- Neovim LuaJIT support [not activated for s390x](#) upstream (ongoing)
- WebKit: [Crashes and infinite recursion in JSC::LLInt::CLoop::execute](#) on s390x
- kubernetes ingress-nginx [considering dropping s390x](#)



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Collaborative development of automated tests for openQA

- Sub project for automated testing by openSUSE
- AlmaLinux has contributed RH KVM tests for s390x to openQA repositories
- RockyLinux has followed after the announcement



<http://open.qa/>



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All Tests Job Groups ▾ Login

Welcome to AlmaLinux openQA

Life is too short for manual testing!

[Learn more »](#)



AlmaLinux Prerelease x86_64



AlmaLinux Prerelease AArch64



AlmaLinux Prerelease ppc64le



AlmaLinux Prerelease s390x



<https://openqa.almalinux.org/>



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Project Resources:

- Wiki: <https://wiki.openmainframeproject.org/display/LinuxDistrosWG>
- Mailing list: <https://lists.openmainframeproject.org/g/wg-linux-distros>
- #linux-distros-wg on Open Mainframe Project Slack
- Forum: <https://community.openmainframeproject.org/c/linux-s390x>



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Access to s390x development resources

As a developer of an open source software project, this site provides an overview of the technical resources available free of charge for developers seeking to build for Linux on IBM Z:

- <https://openmainframeproject.org/news/developer-resources-for-linux-on-s390x/>

- Linux VMs from IBM (temporary and permanent)
- Jenkins service from the OSU OSL
- Travis CI build service
- CircleCI self-hosted runner binaries
- openSUSE Build Service
- Launchpad Personal Package Archives



Questions? Comments?

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