OPEN
MAINFRAME
PROJECT

Collaboration and Growth of Open Source Enterprise Computing with Open Mainframe Project

Len Santalucia
Chairperson
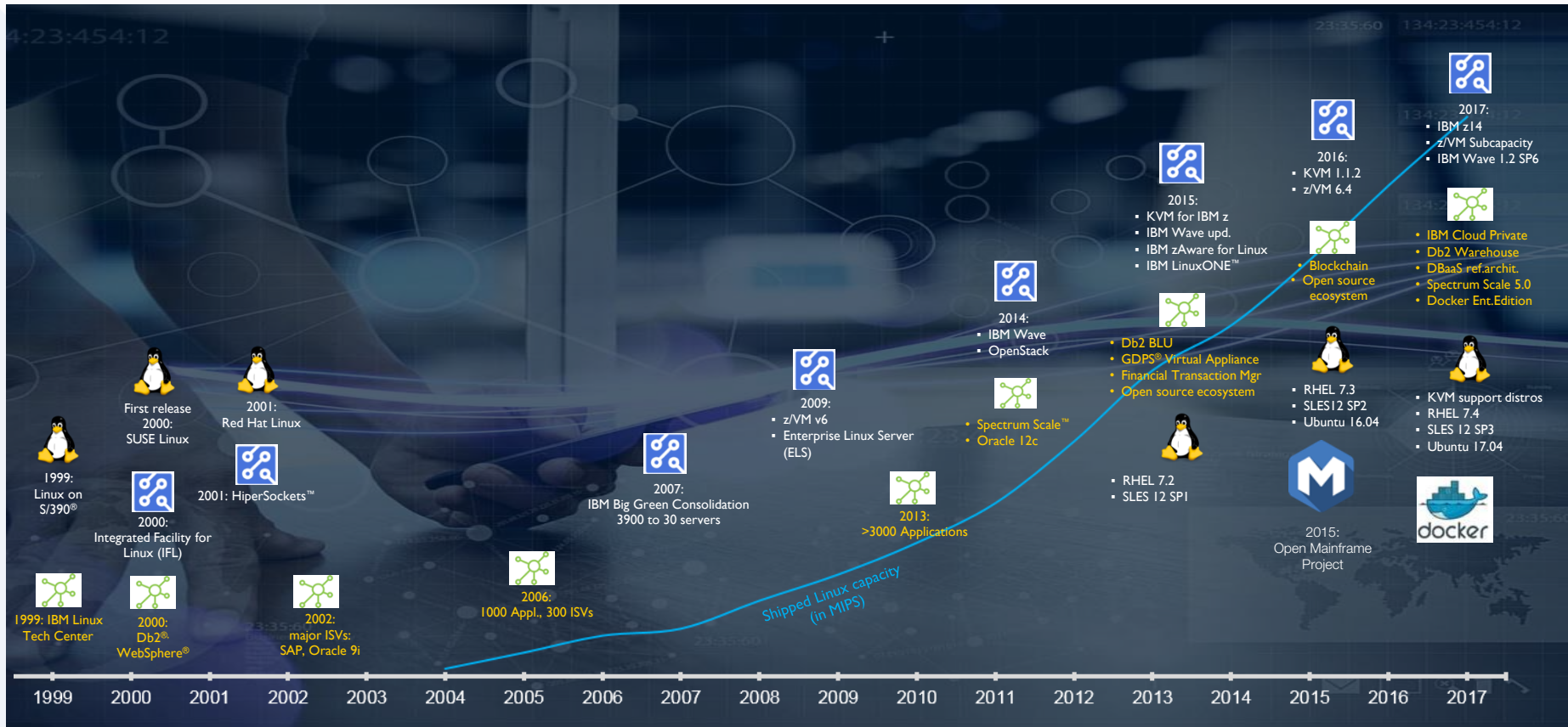*LSantalucia@vicominfinity.com*

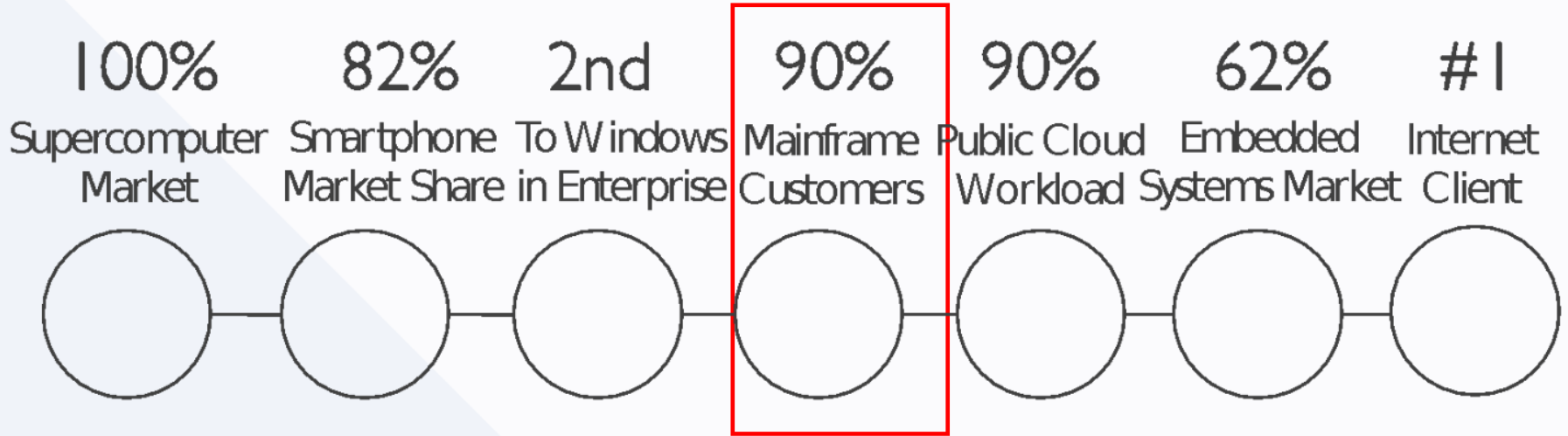# Not this mainframe…

The modern mainframe (IBM z14)

- Up to 170, 10 core 5.2ghz processors (read more at https://en.wikipedia.org/wiki/IBM_z14_(microprocessor))
- Up to 32TB of RAIM (random array of independent memory)
- Heavy optimization for i/o bound workloads
- Hardware based encryption
- Fault tolerant, native hot swapping of hardware components (z stands for zero downtime)
- And….runs Linux and Open Source!

Open Source on the Mainframe - A Journey of Innovation and Technology

1999:
Linux on S/390®

1999: IBM Linux Tech Center

2000:
SUSE Linux

First release 2000:
SUSE Linux

2000:
Integrated Facility for Linux (IFL)

2000:
Db2® WebSphere®

2001:
Red Hat Linux

2001: HiperSockets™

2002: major ISVs:
SAP, Oracle 9i

2006:
1000 Appl., 300 ISVs

2007:
IBM Big Green Consolidation
3900 to 30 servers

2009:
▪ z/VM v6
▪ Enterprise Linux Server (ELS)

2013:
>3000 Applications

2014:
▪ IBM Wave
▪ OpenStack

- Spectrum Scale™
- Oracle 12c

2015:
▪ KVM for IBM z
▪ IBM Wave upd.
▪ IBM zAware for Linux
▪ IBM LinuxONE™

- Db2 BLU
- GDPS® Virtual Appliance
- Financial Transaction Mgr
- Open source ecosystem

▪ RHEL 7.2
▪ SLES 12 SP1

2016:
▪ KVM 1.1.2
▪ z/VM 6.4

- Blockchain
- Open source ecosystem

▪ RHEL 7.3
▪ SLES12 SP2
▪ Ubuntu 16.04

2015:
Open Mainframe Project

2017:
▪ IBM z14
▪ z/VM Subcapacity
▪ IBM Wave 1.2 SP6

- IBM Cloud Private
- Db2 Warehouse
- DBaaS ref.archit.
- Spectrum Scale 5.0
- Docker Ent.Edition

▪ KVM support distros
▪ RHEL 7.4
▪ SLES 12 SP3
▪ Ubuntu 17.04

Shipped Linux capacity
(in MIPS)

| 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |

Mainframe is key part of Open Source success

100%	82%	2nd	90%	90%	62%	#1
Supercomputer Market	Smartphone Market Share	To Windows in Enterprise	Mainframe Customers	Public Cloud Workload	Embedded Systems Market	Internet Client

Every market Linux has entered it eventually dominates

How does mainframe impact me?

Banking

Insurance

Healthcare

Government

Transportation

Retail

- Pays 1 in 6 U.S. workers
- Pays 1 in 4 Canadian workers
- Processed nearly 53 million W-2's in 2014

…all thanks to mainframe!

- Largest municipal police force in the US – 35,000+ officers
- Crime rates have reduced YoY, officers better equipped to identify and process suspects in the field
- Reduced costs and improved service

…all thanks to mainframe!

plasticbank.org

- Global organization focused on reducing ocean plastic by enabling recycling of plastic in impoverished regions.
- Connecting developing counties with world markets at scale

…all thanks to mainframe!

(see more at https://youtu.be/p0WH-EJ8FTA)

Mainframes are here today and will be tomorrow

Important Criteria When Considering Where To Deploy New Applications

More important   Less important

% Extremely/Very important

Data integrity	Security	Performance	Availability	Scalability	Ease of mgmnt	Disaster recovery	Reg compliance	Latency	Reduced cost	Rapid deployment	Consolidation
96%	95%	95%	93%	88%	85%	84%	80%	76%	76%	74%	69%

% Top-3 MOST Important

| 34% | 60% | 49% | 26% | 26% | 20% | 14% | 18% | 8% | 22% | 14% | 6% |

Mainframe's strengths align with enterprise needs of today

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Why a Foundation?

Open Source on Mainframe challenges

Disconnected, independent efforts; no shared "hub" of innovation

Community events are industry specific, not vendor agnostic

Open source on the mainframe lacks a neutral home for growth

No place for students and academic institutions to engage

Enterprise level engagement with upstream projects limited

Why a Foundation? Open Ecosystems are Critical to Us All

"It's one thing to create a great piece of software. It's quite another to have it make a mark on the entire industry. These are the companies and organizations whose work has had a significant impact on what others build, how they build it, and ultimately, who uses it."

SD Times Influencers: Apple, Facebook, Google, IBM, Intel, Microsoft, GitHub, Netflix, Red Hat, Slack, *The Linux Foundation*

Look to The Linux Foundation

Thankfully, that's where The Linux Foundation® comes in. For nearly two decades, The Linux Foundation has provided unparalleled support for open source communities through financial and intellectual resources, governance structure, IT infrastructure, services, events, and training.

Dedicated to building sustainable ecosystems around open source projects, The Linux Foundation is working with the global technology community to solve the world's hardest problems through open source and **creating the largest shared technology investment in history**.

The Linux Foundation is the umbrella organization for **more than 60 open source projects** accelerating open technology development and commercial adoption. Some of the game-changing initiatives hosted by The Linux Foundation include:

The Linux Foundation focuses on creating innovation engines

Successful projects depend on members, developers, standards and infrastructure to develop products that the market will adopt
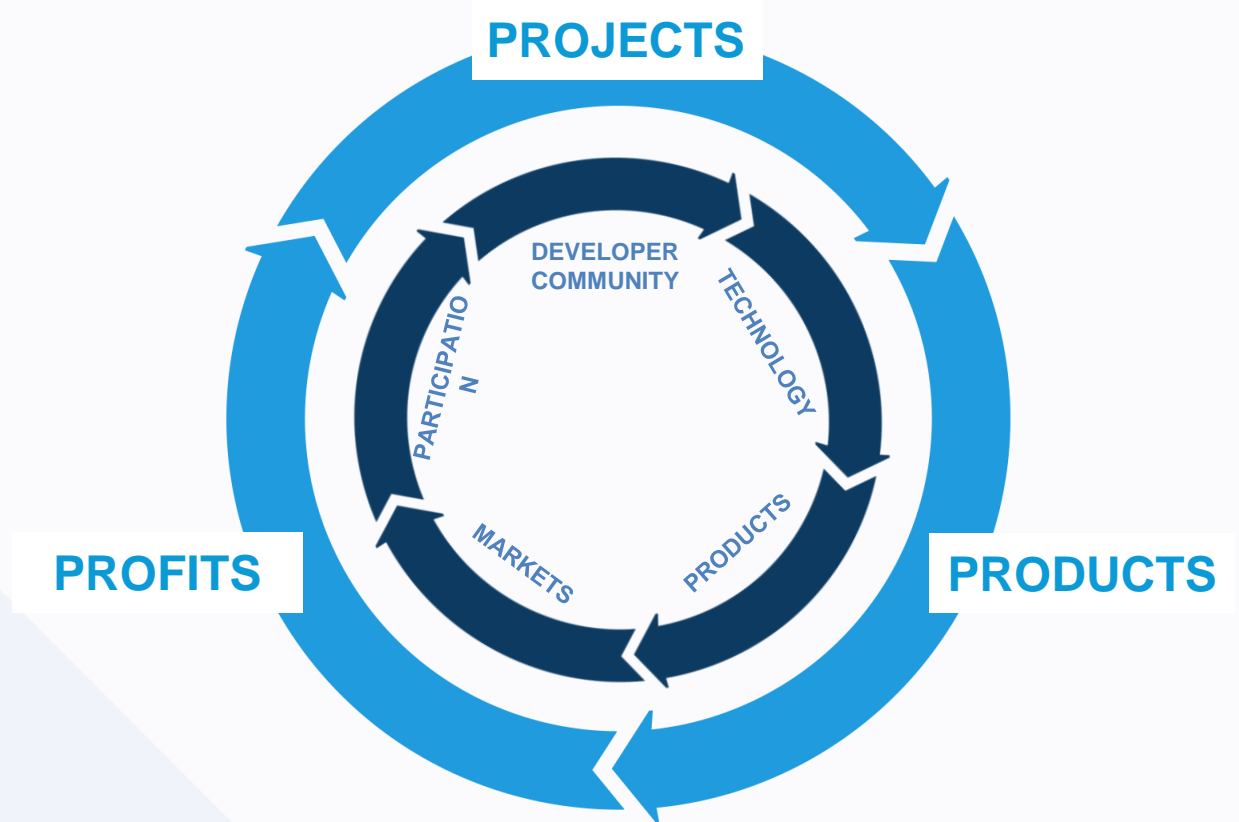
Foundations enable the gears of innovation to spin faster

One Developer at a Time and
One Industry at a Time

Mission of the Open Mainframe Project:

Build community and adoption of Open Source on the mainframe

- **Eliminating barriers** to Open Source adoption on the mainframe

- **Demonstrating value** of the mainframe on technical and business levels

- **Strengthening collaboration** points and resources for the community to thrive

Eliminating barriers to Open Source adoption on the mainframe

- Engaged as central expert in demonstrating the mainframe as a viable open source platform, with compelling advantage.
- Promotion of modern application and workload examples on the mainframe
- Growing career opportunities and academic community engagement
- Hosting and participating in local programming and promotion of Open Source on the mainframe
- Sponsorship of global initiatives and contests to grow enthusiasm for the platform

Demonstrating value of the mainframe on technical and business levels

- Showcase of technical and business case studies through blogs, white papers, and other media.
- Champion software and hardware solutions with clients

Strengthening collaboration points and resources for the community to thrive

- Engagement through Technical Steering Committee projects and independent projects by members
- Visibility to tools, resources, and community forums to tackle technical challenges
- Career opportunities from internships through retirement

Creating spaces for mainframe community open source collaboration

ADE

Internship

Zowe

z/VM Cloud Connector

TerseDecompress

Atom language syntax highlighting for z/VM

z/OSMF Workflows

Connecting z/OS to enterprise devops with Zowe

- Zowe is an extensible framework for connecting applications and tools to z/OS mainframe data and applications.
- It's aim is to make the 'z/OS mainframe an integrated and agile platform within the changing IT architectural landscape.
- Zowe is the first open source project launched on z/OS. All code is licensed under the Eclipse Public License version 2.0

Why Zowe ?

Information Technology is undergoing a revolution of changing architectures

Co-Existence With
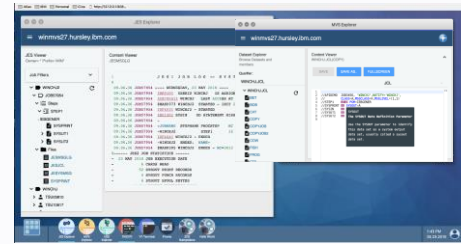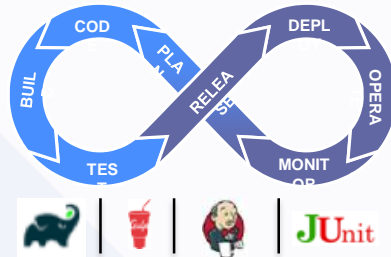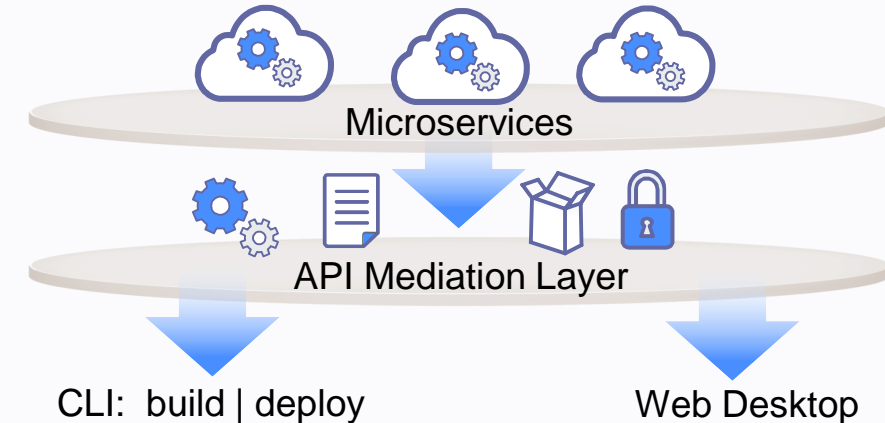Other Cloud Models
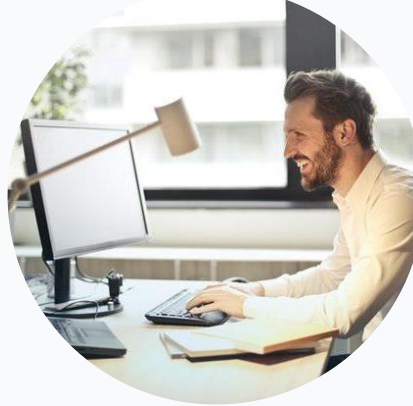
Protecting Future
Investments
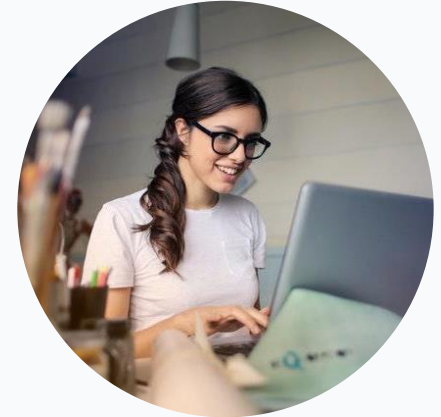
Simple and Familiar

Zowe framework and ecosystem at a glance

Core Zowe includes API Mediation Layer, CLI, and Web Desktop.

Vendors can build 'Zowe Compliant' plugins that will leverage this framework.

Microservices

API Mediation Layer

CLI: build | deploy

Web Desktop

Plugins

Plugins

Plugins

Plugins

Plugins

Plugins
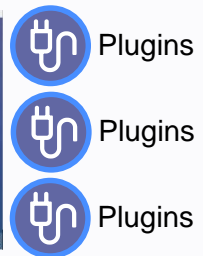
ADE: Bringing mainframe innovation to Open Source

- Anomaly detection Engine for Linux Logs (ADE) project brings innovation that has long been on the mainframe to the larger Linux world

- ADE detects anomalous time slices and messages in Linux logs (either RFC3164 or RFC5424 format) using statistical learning.

- Learn more at http://openmainframeproject.github.io/ade/

Anomaly Detection Engine Log Investigation Tool

2015-12-11T19:00:00.000-05:00

Dates: 2015-12-11T19:00:00.000-05:00 -- 2015-12-12T19:00:00.000-05:00
Number of intervals: 144
Interval Size : 10 minutes

System ID	Anomaly scores
sys1.openmainframe.org	

Score	Meaning
101	Very rare
95-100	Quite rare
80-94	Unusual
0-79	Normal

| Interval Index	Interval Time	Anomaly Score	Number of Unique Messages	Num of New Msgs	Num of Never Seen Before Msgs	Missing	Reason for Missing	Interval, V2
0	0:00 - 0:10	99.5	32	7	0	false		XML
1	0:10 - 0:20	98.9	26	6	0	false		XML
2	0:20 - 0:30	98.9	28	5	0	false		XML

Internship and academic engagement programs are putting mainframe in the hands of the next generation

Summer Internship Program

Blockchain Hackathon for EPSI University in France
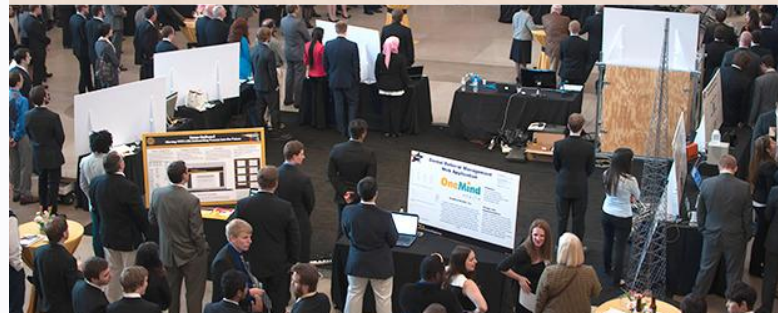
VCU Capstone Partnership

36
Interns sponsored

14
Supporting academic institutions

100+
Students impacted

Open Mainframe innovation thrives here

- OMP provides a vendor-neutral home for mainframe-centric open source projects
    - Code hosting/infrastructure
    - Governance
    - Legal/Trademark defense
    - Ecosystem development
- LF staff support project communities establishing guidelines and best practices to enable diverse community growth and adoption
- Our philosophy creates natural collaboration opportunities between mainframe-centric open source projects

Project lifecycle, guidance, and proposal process openly defined at
https://github.com/openmainframeproject/tsc/tree/master/process

Sustained mainframe support in the broad open source community through the Supported Projects program

Infrastructure	Developer support	Market awareness	Governance/IP Home

Participating Open Source Projects include

Telling the "mainframer" story

- Monthly interview series that highlights both new and old in mainframe
- Goal is to showcase why people have mainframe in their careers and their views of the technology and career field
- Read and listen at https://www.openmainframeproject.org/category/blog/i-am-a-mainframer

Bringing together the open source and mainframe conversation

Sponsored Meetup Program
https://www.openmainframeproject.org/meetup-program

Slack Channel
https://slack.openmainframeproject.org

Community Forums
https://community.openmainframeproject.org/

OPEN MAINFRAME PROJECT COMMUNITY FORUM

Calling SMAPI from Linux		6	266
What Open Source tools are missing from OS/390 and need to be ported?	Compatibility	13	506
Welcome to the Open Mainframe Project Discourse Forum		8	942
Open Mainframe Academic Committee	General Knowledgebase	0	51
Cloudstack for z/VM Meeting July 21, 2017		1	123
Anyone doing Big Data on z?	Compatibility	9	370
Cloudstack for z/VM Meeting July 14, 2017		1	108
What can Mainframers do to best capture all of its capabilities?	General Knowledgebase	0	63
Cloudstack for z/VM Meeting June 28, 2017		2	136
Blockchain and the Mainframe	General Knowledgebase	1	89
Cloudstack for z/VM Meeting June 16, 2017		5	162
Open Mainframe Project Summer 2017 Interns	Academic Communications	2	116

Open Mainframe Project community traction

4
years since launch

29
Supporting organizations

7
Hosted Mainframe centric
Open Source Projects

100+
Students impacted
through internships and
academic programs

Members

How to participate in Open Mainframe Project

Open participation for all interested in Mainframe and Open Source

Community discussion and collaboration - both virtually and at regional events.

6 Shared R&D open source projects - or bring your project to be hosted here

Corporate sponsorship for showing stewardship in the community

Learn more about the Open Mainframe Project

- Find out more and subscribe to our newsletter at www.openmainframeproject.org
- Organizational membership opportunities at https://www.openmainframeproject.org/about/join or email at membership@openmainframeproject.com
- Talk to me after this talk!

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Questions?

Thank you!

Membership Benefits (1)

Industry Leadership

- Shape the Open Source Mainframe market
- Network with other members of Open Mainframe Project
- Participate in Open Mainframe Project event and speaking opportunities
- Join Open Mainframe Project Projects
- Serve on the the Governing Board to help shape investments of Linux and Open Source on Mainframe (Platinum only)

Marketing Opportunities

- Benefit from and participate in Open Mainframe Project marketing efforts
- Engage with your peers on the marketing committee
- Feature your products and applications that leverage Linux and Open Source on Mainframe at key industry events, website and marketing collateral

40

Membership Benefits (2)

Technology Leadership

- Contribute to and influence the direction of Open Mainframe Project technical investments
- Drive leadership for future enhancements and extensions that matter for your business
- Ability to guide feature sets in requirements documents and future technology roadmaps
- Support and drive community work by being a voting member of the Technical Steering Committee (Platinum only)

Learning and Engaging

- Engage and collaborate with the membership community to enhance your Open Source/Linux on Mainframe roadmap.
- Work together across company lines and industries.
- Create products & apps secure in the knowledge that they will be interoperable in across enterprise class architectures.

Corporate, Academic, Associate Membership Levels

Level	Annual Fee	Board Seat	TSC Seat	Marketing Committee	Notes
Platinum	$120,000	Yes	Voting	Yes	Initial 2-year participant commitment
Platinum End-User	$30,000	Yes	Voting	Yes	Initial 2-year participant commitment
Silver	5,000 employees or more = $35,000 3,000 < 5,000 employees = $30,000 1,000 < 3,000 employees = $25,000 500 < 1,000 employees = $20,000 100 < 500 employees = $12,000 < 100 employees = $7,000	1 per 10	Non Voting	Yes	
Academic	Free	1 per 10	Non Voting	Yes	Restricted to academic institutions
Associate	Free	No	Non Voting	Yes	Non-profits, open source projects

To join Open Mainframe Project, go to https://www.openmainframeproject.org/about/join or email at membership@openmainframeproject.com

Listed fees include Linux Foundation Silver membership. If you are already a Linux Foundation Member, reduced pricing is available.