

Open Source on POWER

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IBM Belgium & Luxembourg

Partly based on Jesse R. Gorzinski's presentation at LUG 2017



Agenda

- Open Source in the enterprise today
- The OpenPOWER Foundation
- Open source with Unix-based Oss :
 - Linux
 - AIX
- Open source with IBM i
- Conclusion

Agenda

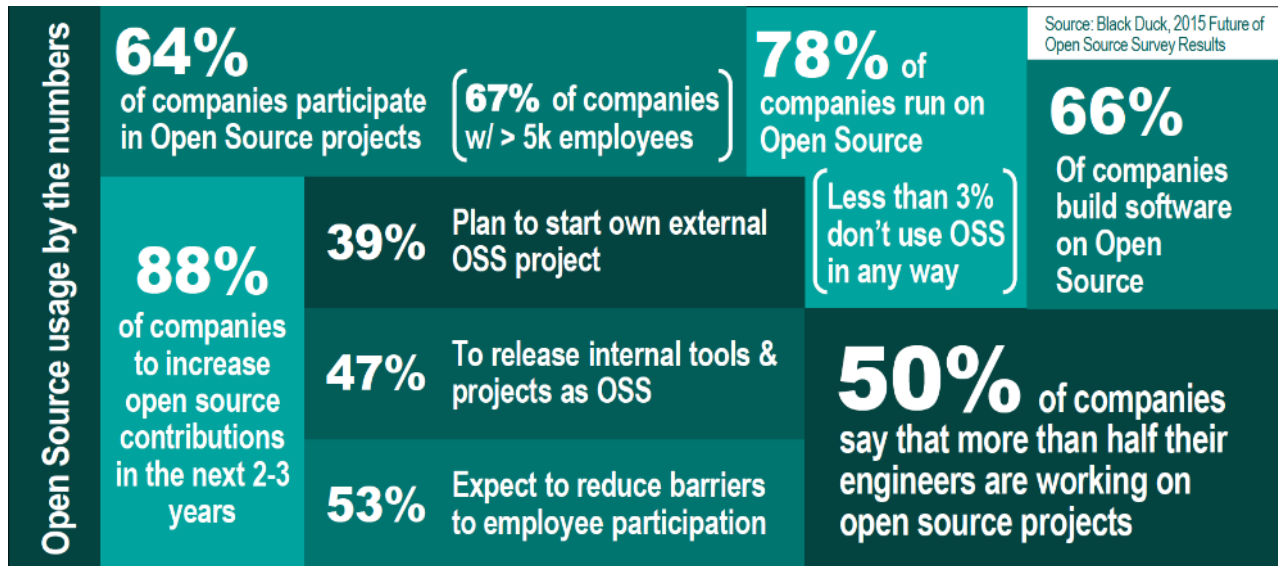
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Microsoft about Linux / open source

- 2000 : « Linux is communism »
- 2001 : « Linux is a cancer »
- 2007 : « I would love to see all open source innovation happen on Windows »
- 2010 : « We love open source »
- 2014 : « I don't want to fight old battles »
- 2016 : « Linux no longer a cancer »
- TODAY :
 - .Net open sourced
 - MS SQL on Linux
 - Bash in Windows 10
 - Ubuntu in Windows 10
 - Linux, Docker, Puppet, Chef, Kubernetes,... on Azu



Open Source Software guiding the Digital Transformation



Ed Boyajian,
President and CEO of [EDB](#)

"If 80 % to 90 % of your IT spend is on **maintenance** (such as proprietary software licensing and such), that **leaves very little budget for innovation.**"

Kelly Stirman, VP, [MongoDB](#)

Open source undoubtedly speeds the digital transformation for most companies. Open source software **allows companies to derive benefit** not only from their own IT employees, or from the employees of proprietary software vendors, but **from the whole open source community**. "For example,...Apache Spark has emerged very quickly as a faster successor to Hadoop's MapReduce, and I'm sure there will be a new generation coming soon. You don't see that speed of innovation in proprietary software..

<http://www.cmswire.com/digital-experience/how-open-source-guides-digital-transformation/>

Top innovative technologies in 2017

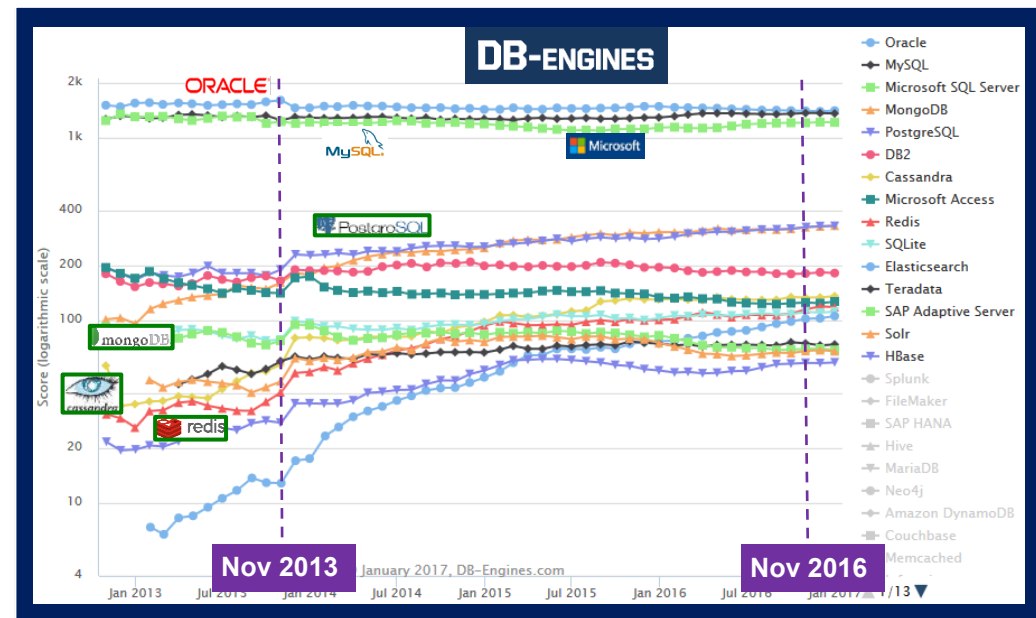
Cloud	OpenStack, Cheff, Puppet, Juju, Kubernetes,...
Big data	Hadoop, Spark, HortonWorks, Cloudera,...
NoSQL DBs	MongoDB, Neo4J, REDIS, Cassandra,...
Blockchain	Hyperledger, Bitcoin, Ethereum, Counterparty,...
HPC/HPDA	OpenFoam, Fluent, Murex, BLAST,...
Cognitive	Caffe, Torch, TensorFlow, Theano,...
IOT	Contiki, Arduino, Zetta, OpenIoT,...

What's going on in the DB market?

Open Source applications and databases are changing the enterprise

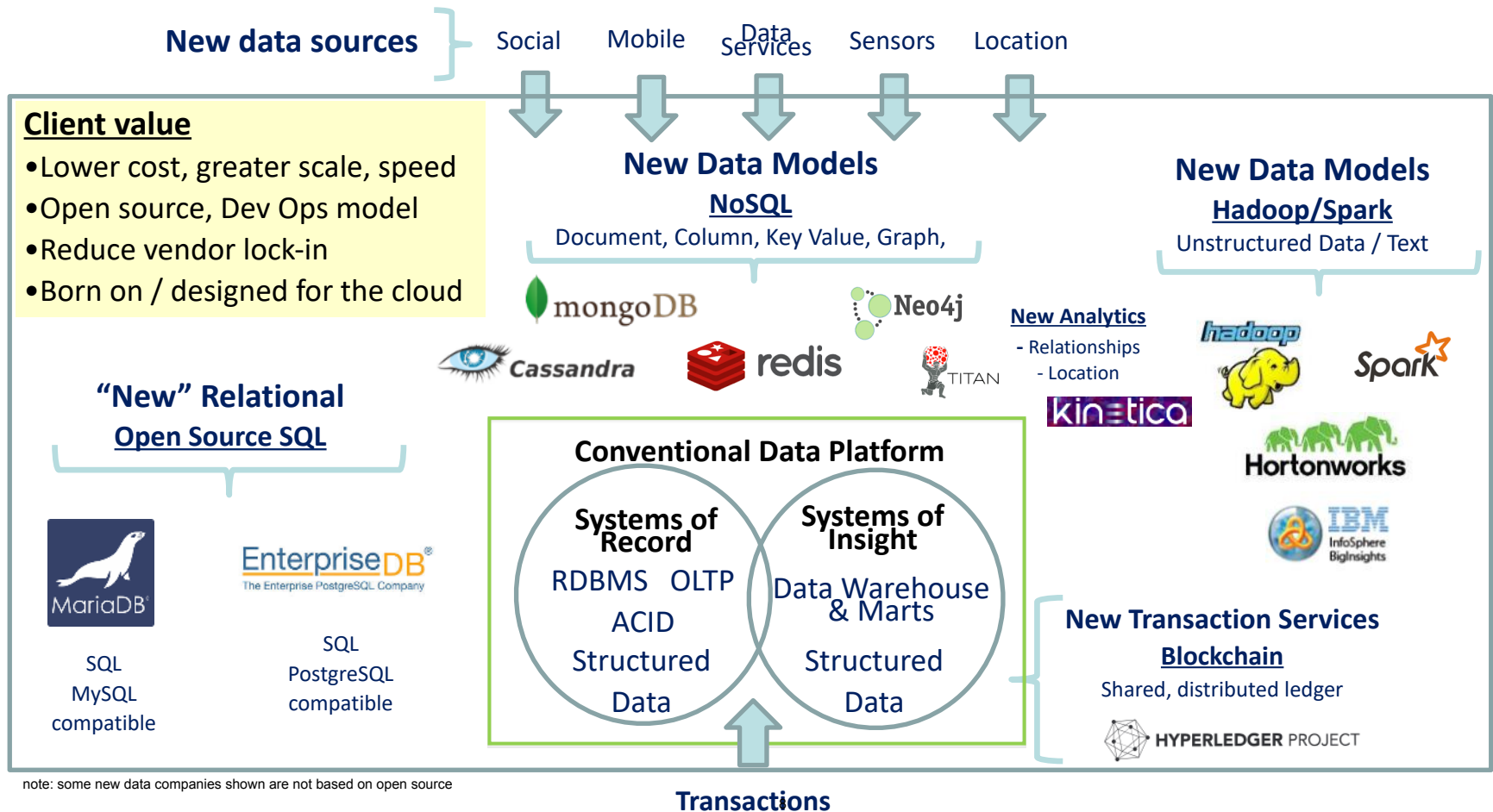
Database Popularity

Rank (01/2017)	DBMS	Growth (11/2013 - 11/2017)
1	Oracle	-13%
2	MySQL	10%
3	MS SQL Server	-2%
4	MongoDB	101%
5	PostgreSQL	71%
6	DB2	9%
7	Cassandra	131%
8	MS Access	-11%
9	Redis	183%
10	SQLite	42%



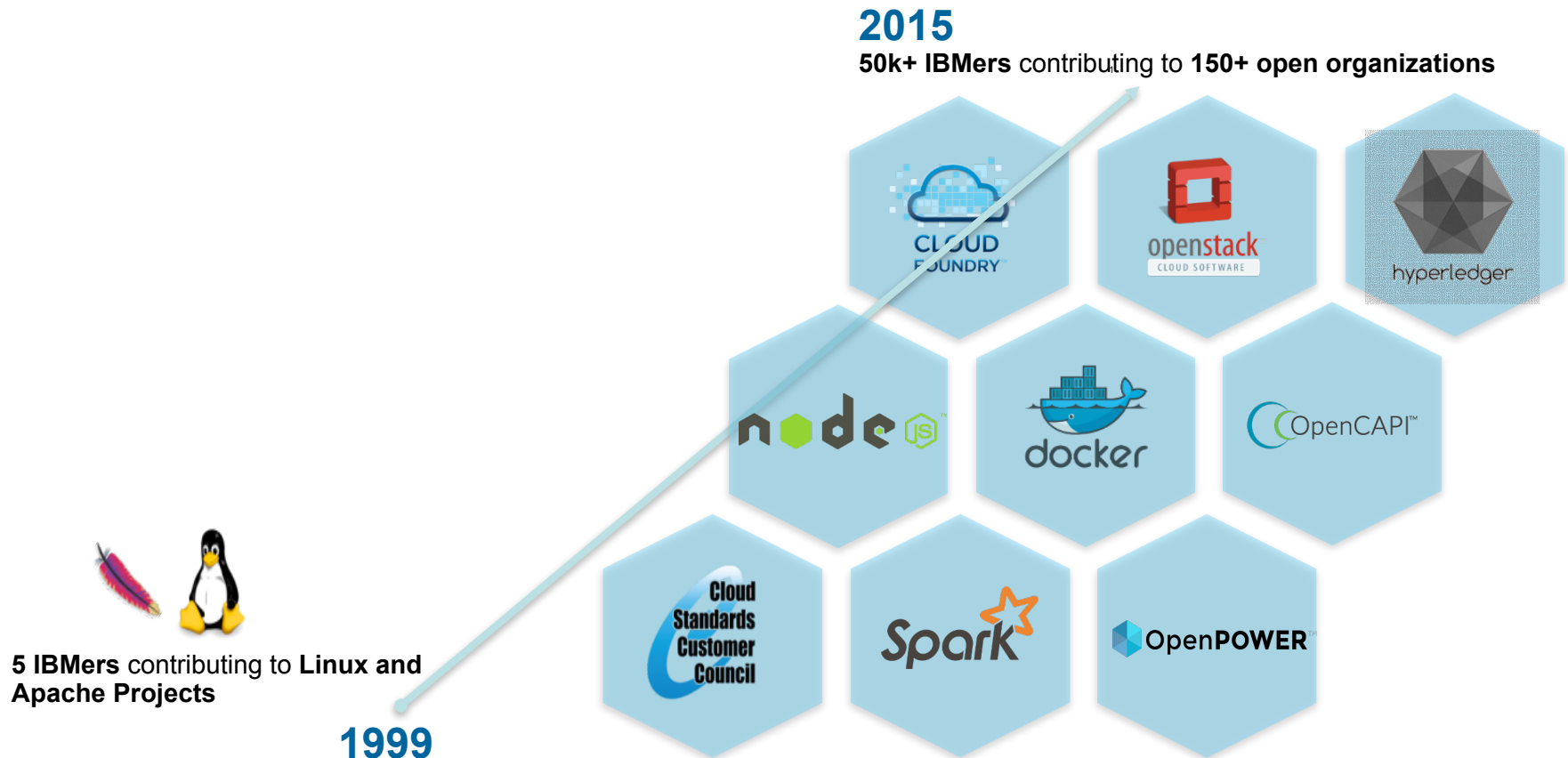
http://db-engines.com/en/ranking_trend

The Modern Data Platform Emerges



note: some new data companies shown are not based on open source

IBM is investing in ecosystems and Open innovation



1. Source: <https://developer.ibm.com/start/>

Leading Next Gen DBs Available & Optimized for Linux on Power

- | | |
|----------------|-------------------|
| ✓ MongoDB | ✓ Redis Labs |
| ✓ EnterpriseDB | ✓ PostgreSQL |
| ✓ Neo4j | ✓ Cassandra |
| ✓ MariaDB | ✓ MySQL |
| ✓ Spark | ✓ IBM BigInsights |
| ✓ Hadoop | ✓ Hortonworks |



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OpenPOWER Foundation : from 5 to 300 members in 3 years

New Chips & Components



DMI connection between an Altera Stratus V FPGA accelerator and a POWER8 CPU



Convey's CAPI developer kit based on the company's Xilinx-based co-processors



First China "local" POWER derivative chip, CP1

Components & Systems



First commercially available OpenPOWER third-party server



New CAPI-based solution: the ConnectX-4 adapter card by Mellanox



Nallatech's OpenPOWER CAPI Developer Kit

New Systems & Platforms



First Open server specification and motherboard combining OpenPOWER, Open Compute and OpenStack (mock-up)



First GPU-accelerated OpenPOWER developer platform



Prototype of a new high-performance server on the path to exascale



First commercially available OpenPOWER server



RedPower, the first China OpenPOWER 2-socket system coming in 2015



Inspur 2-socket POWER8 Server



ChuangHe China-branded OpenPOWER system with POWER8

Bringing It All Together



Data Engine for NoSQL with 40TB CAPI-attached flash



24:1 Server consolidation for 3x lower cost per user

Complete list on <http://openpowerfoundation.org/membership/current-members/>

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+ Add A
Comment

[Home](#) » [HPC Hardware](#) » [Compute](#) » E4 Computer Engineering Rolls Out GPU-accelerated OpenPOWER server

E4 Computer Engineering Rolls Out GPU-accelerated OpenPOWER server

September 28, 2016 by [Rich Brueckner](#) [Leave a Comment](#)

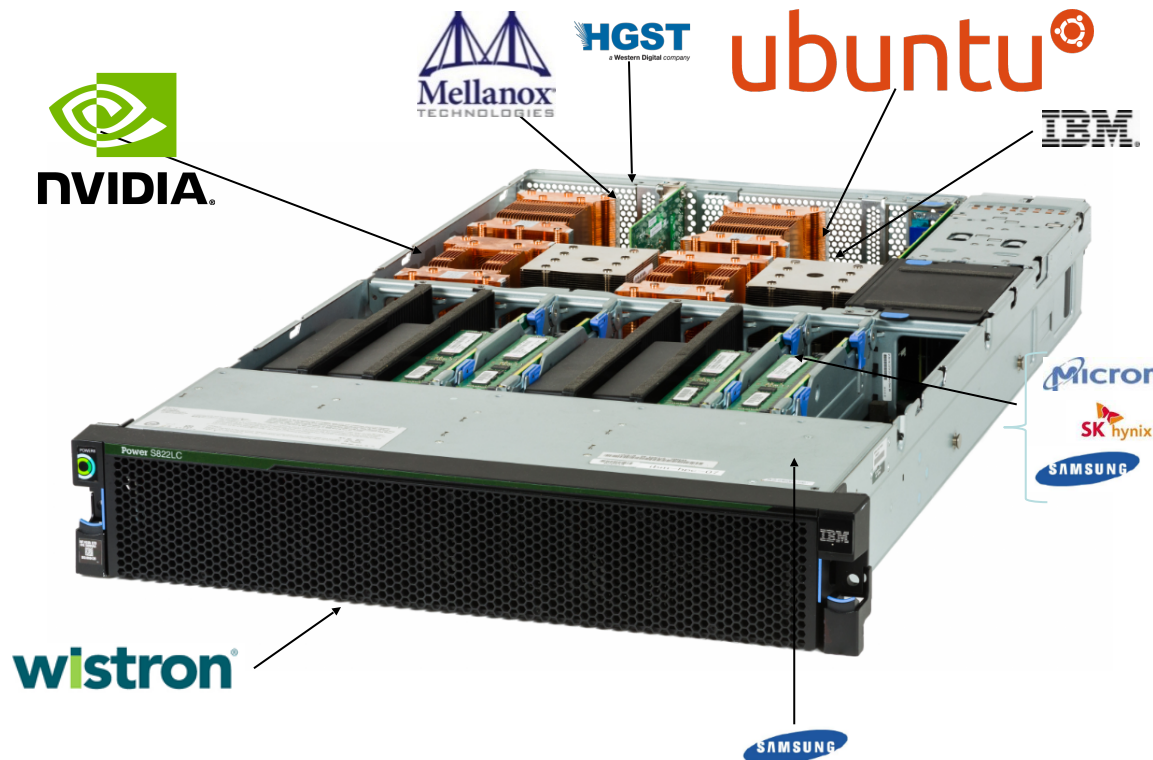
Today Italy's E4 Computer Engineering announced general availability of the [E4 OP206](#), a GPU-accelerated OpenPOWER system designed to propel deep learning, artificial intelligence, high performance data analytics and other data intensive workloads.

“The POWER8 with NVIDIA NVLink processor enables incredible speed of data transfer between CPUs and GPUs ideal for emerging workloads like AI, machine learning



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Magna
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g
proved serviceability.

POWER S822LC for high performance computing



NVIDIA:

Tesla P100 GPU with NVLink Interface

Ubuntu : NVLink compatible OS

Wistron: Platform co-design

Mellanox: InfiniBand/Ethernet Connectivity in and out of server

Samsung: 2.5" SSDs

HGST: Optional NVMe Adapters

Hynix, Samsung, Micron: DDR4

IBM: POWER8 CPU

100% open ecosystem

Posted on 17/07/2014 by Stewart Smith

[← Previous](#) [Next →](#)

OpenPower firmware up on github!

With the whole [OpenPower](#) thing, a lot of low level firmware is being open sourced, which is really exciting for the platform – the less proprietary code sitting in memory the better in my books.

If you go to <https://github.com/open-power> you'll see code for a bunch of the low level firmware for OpenPower and POWER8.

Hostboot is the bit of code that brings up the CPU and skiboot both sets up hardware and provides runtime services to Linux (such as talking to the service processor, if one is present).

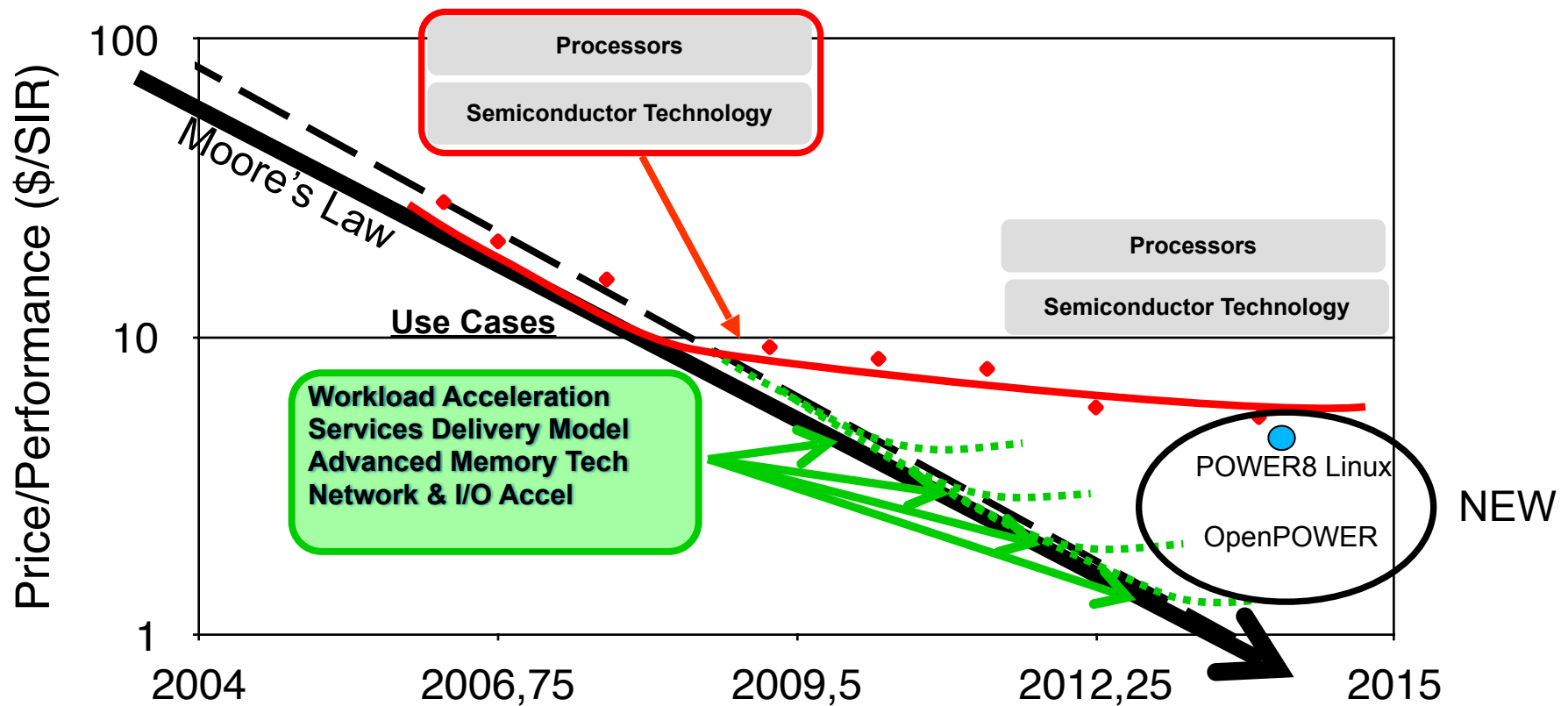
Patches to <https://github.com/open-power/skiboot/blob/master/doc/overview.txt> are (of course) really quite welcome. It shouldn't be too hard to get your head around the basics.

To see the Linux side of the OPAL interface, go check out [linux/arch/powerpc/platforms/powerenv](#) -there you can see how we ask OPAL to do things for us.

If you buy a POWER8 system from IBM running PowerKVM you're running this code.

Unparalleled acceleration

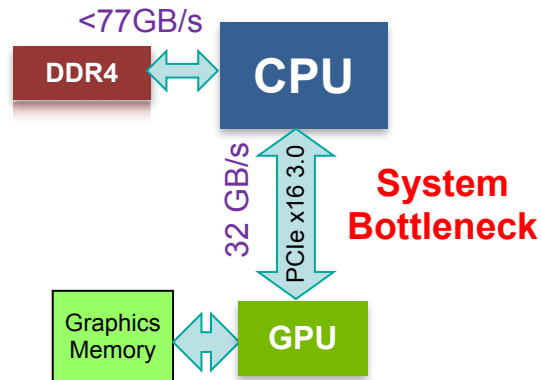
Microprocessors alone no longer drive sufficient Cost/Performance improvements



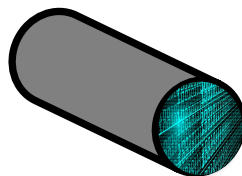
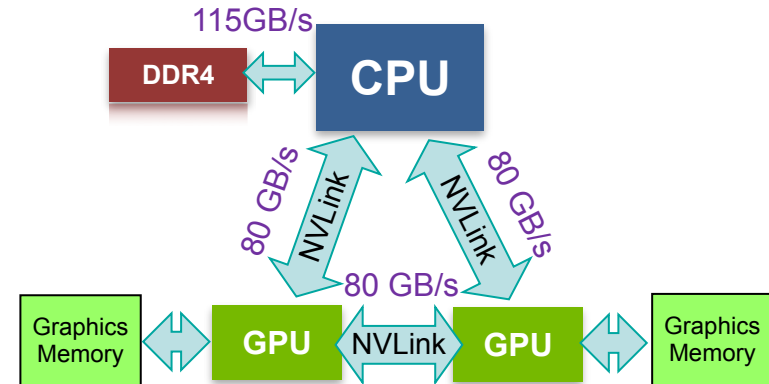
System stack innovations are required to drive Cost/Performance

Unparalleled acceleration : NVLink

Current CPU to GPU PCIe Attachment

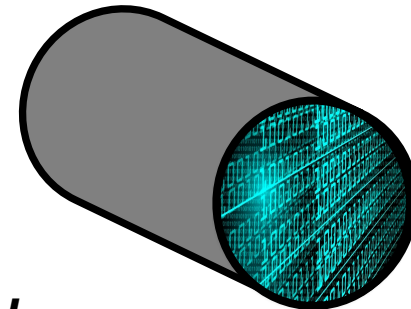


POWER8 with NVLink Technology



PCIe Data Pipe

**POWER8 with NVLink
delivers >2.5X the
bandwidth**



POWER8 with NVLink
Data Pipe

***THE platform for applications utilizing CPU-GPU
bandwidth!***

OpenCAPI Consortium

“To create an Open, Coherent, High Performance bus interface based on a new bus standard called Open Coherent Accelerator Processor Interface (OpenCAPI) and grow the ecosystem that utilises this interface.”

- Supports accelerators, network controllers, new memory technologies, storage controllers
- High bandwidth, low latency
- Extends capability and reach of existing CAPI architecture design



Founding Members



[View All Members](#)

Rackspace and Google and the OpenCompute Platform

- Rackspace are now selling OCP servers based on POWER8
- “Barreleye” model available through solution providers
- Further work ongoing with Google for next generation
- POWER9 system designs already seen, codenamed “Zaius”
- Partnering to build the data centre infrastructure of the future



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Linux Distributions on Power Systems

Full Enterprise Support



Community Supported distributions

Linux Distributions on Power Systems

Full Enterprise Support



Now available
with
Enterprise
Support!



Community Supported distributions

Robust solutions from IBM, ISVs & the Open Source Community

IBM Software Solutions



Power ISVs



Linux Open Source



Linux Distributions (with KVM)



Open Source Databases

- New Database models are coming to market
- Standard relational databases are no longer the only option

NoSQL Databases



Relational Databases



1.8x better performance
60% lower transaction cost



Web Databases



1.87x better performance per core
40% better price performance



6.4x more users
per hour
65% less cost per
user per hour



New kid in town



- In-memory GPU accelerated database
- Incorporates spatial (location) and temporal (time) data
- 100x – 1000x faster than other in-memory databases

S822LC for High Performance Computing with NVLink & 4 x P100 GPUs :



- Custom-built GPU Accelerator Server
- High-Speed NVLink Connections between CPUs & GPUs and among GPUs
- Features novel NVIDIA P100 Pascal GPU accelerator

AIX Open Source announcements in 2016

Open source cloud automation and configuration tooling for AIX

IBM expanded commitment to **keep key packages updated** and provide timely **security fixes** – enabling clients to leverage open source skills

Cloud Automation

chef automation for configuration, deployment, and management. Chef-client for AIX is now enhanced with new recipes in the AIX cookbook.
<https://supermarket.chef.io/cookbooks/aix/>



yum package management now available, with repository access from both ftp and https protocols. rpm is also updated to allow automatic dependency discovery.
New ability to automate installation and updates.



cloud-init and all dependencies now available in the repository, and support for licensed AIX users.
Easy virtual machine customization for the cloud.



Development Packages and Utilities

Languages, Compiler, debugger, etc.

Open source package repository for AIX
<http://www.ibm.com/systems/power/software/aix/linux/toolbox/>

80+ packages
updated this year

github community to create and collaborate on open source projects for AIX
<http://github.org/aioxss>



node.js popular event driven Javascript, optimized for Power Systems on AIX
<https://nodejs.org/en/download/>



New AIX Toolbox for Linux Applications Updates

Recent updates to key packages of the AIX Toolbox since 03/2016:

- <ftp://ftp.software.ibm.com/aix/freeSoftware/aixtoolbox/RPMS/ppc/>

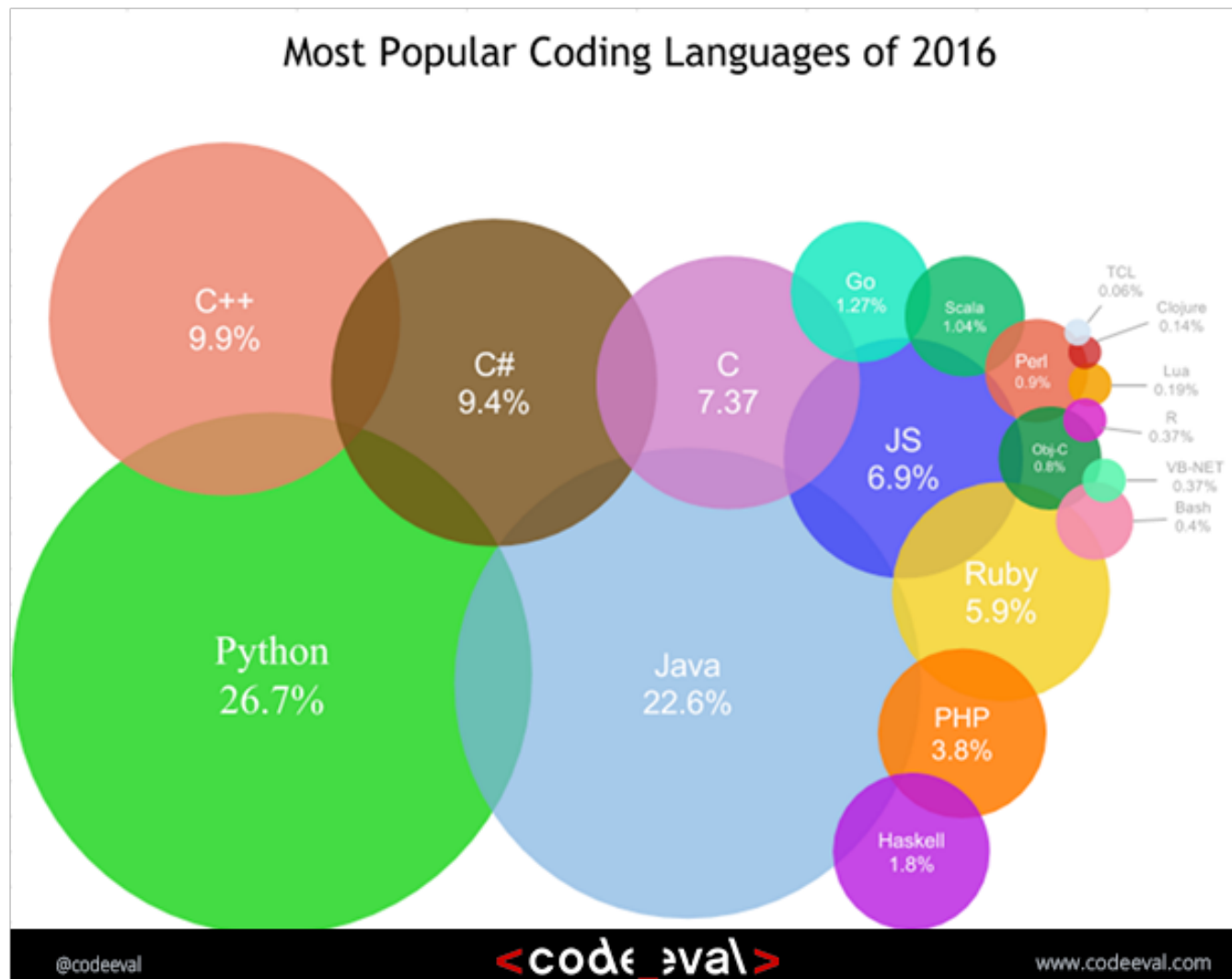
- | | | | |
|--------------|--------------------|--------------|---------------|
| ▪ autoconf | ▪ gcc | ▪ libX11 | ▪ ptpd |
| ▪ automake | ▪ gdb | ▪ libXau | ▪ python |
| ▪ bash | ▪ gettext | ▪ libxcb | ▪ randrproto |
| ▪ binutils | ▪ git | ▪ libXdmcp | ▪ renderproto |
| ▪ bzip2 | ▪ glib2 | ▪ libXft | ▪ rsync |
| ▪ coreutils | ▪ gmp | ▪ libxml2 | ▪ ruby |
| ▪ cups | ▪ gnuit | ▪ libXrandr | ▪ sqlite |
| ▪ curl | ▪ grep | ▪ libXrender | ▪ subversion |
| ▪ dbus | ▪ gzip | ▪ libyaml | ▪ sudo |
| ▪ deltarpm | ▪ httpd | ▪ logrotate | ▪ tcpdump |
| ▪ diffutils | ▪ jbigkit | ▪ lsof | ▪ tightvnc |
| ▪ emacs | ▪ less | ▪ make | ▪ unzip |
| ▪ expat | ▪ libmpc | ▪ mpfr | ▪ vim |
| ▪ fdupes | ▪ libpaper | ▪ ncurses | ▪ wget |
| ▪ file | ▪ libpcap | ▪ openldap | ▪ xcb-proto |
| ▪ findutils | ▪ libpng | ▪ pcre | ▪ xz |
| ▪ fontconfig | ▪ libpthread-stubs | ▪ perl | ▪ yum |
| ▪ freetype2 | ▪ libtool | ▪ php | ▪ zip |
| | ▪ libusb | ▪ pixman | ▪ zlib |

Open source repositories for AIX

- [AIX Toolbox for Linux Applications](#)
- [Bull's continued version of the AIX Toolbox for Linux Applications](#)
- [Bull open source software archive for AIX](#)
- [Michael Felt's "AIXTOOLS –Open Source Toolbox for AIX"](#)
- [OpenJDKPowerPC/AIX Port](#)
- [Darren Tucker's OpenSSH for AIX](#)

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<http://blog.codeeval.com/codeevalblog/2016/2/2/most-popular-coding-languages-of-2016>

Business value?

- Ease in finding skills
- Time to market
- May not have to change core business! Just use OSS to extend it to web services, mobile, etc.
- It's very easy to enable web and mobile technologies.



What is IBM i doing?



Open Source on i – a new concept?

- First open-source IBM i project was JTOpen (1998)



- People have been using Perl since at least 1998



Perl

- Apache HTTP server shipped since 2002



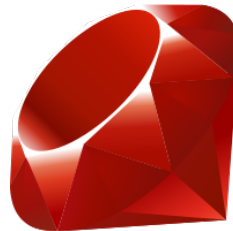
- Also shipped in the past/present:

- OpenSSL
- OpenSSH
- Apache Tomcat
- Samba



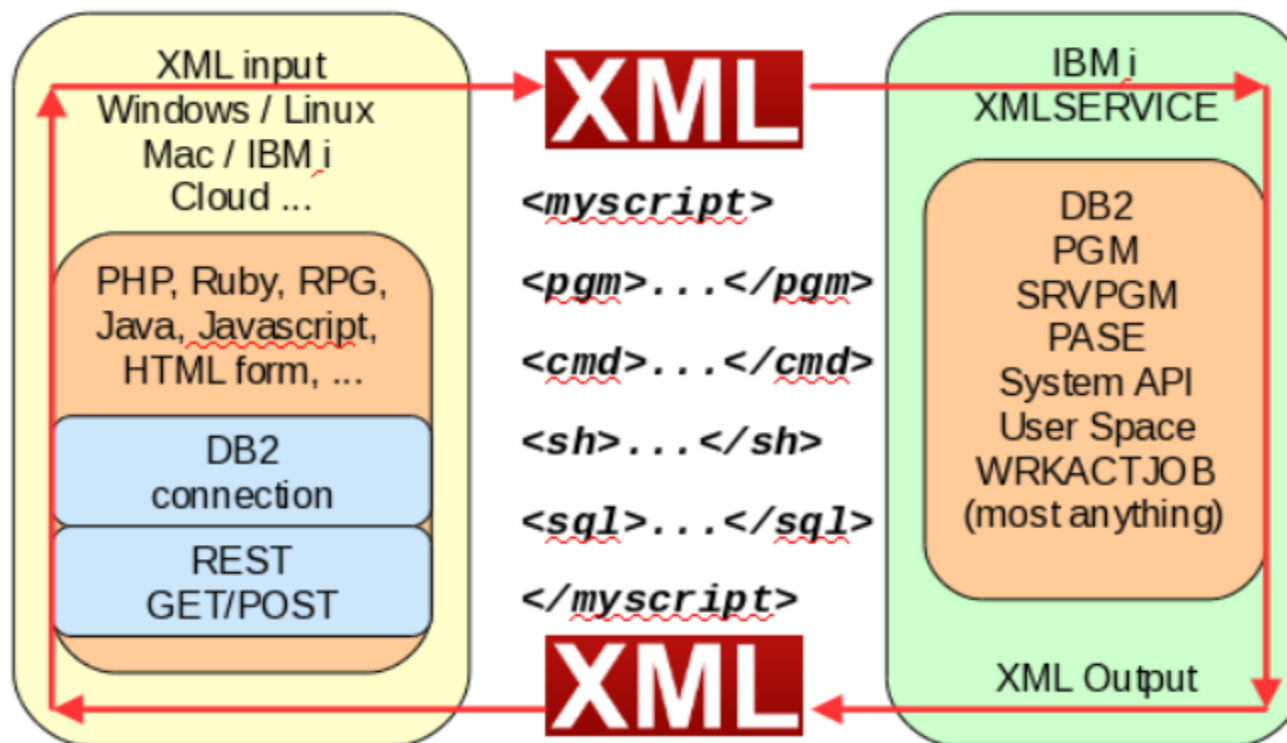
Enabling software engineering on open source languages/runtimes

- Several new languages added. More in the future?
- New tools delivered



Enabling easy extension of OSS for IBM i - XMLService

- Allows access to IBM i programs, service programs, shell commands, and even DB2!
- Can be called locally or remotely, stateful or stateless, very flexible!
- Toolkits are written for several languages, to make it even easier!



Enabling easy extension of OSS for IBM i – IBM i Services

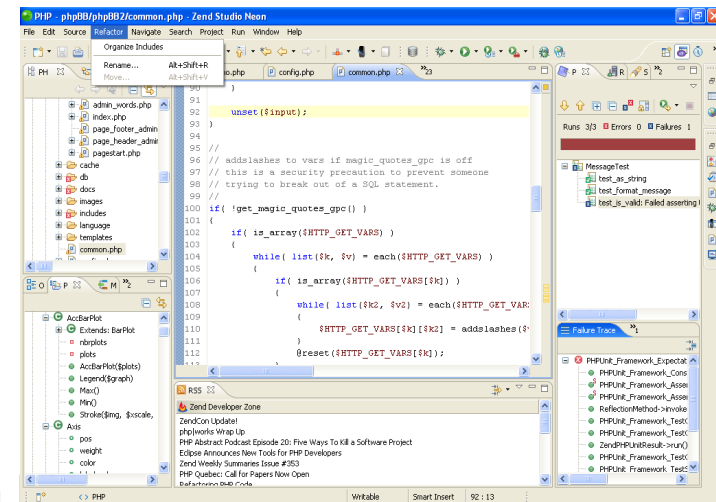
- Access system data through SQL!
 - PTF
 - Security
 - Message Handling
 - Librarian
 - Work Management
 - Communication
 - Storage
 - Product
 - Spool
 - System Health
 - Journal
 - Java
- More being continuously added



<http://ibm.biz/DB2foriServices>

Partnership with Zend (a RogueWave company)

- Zend Server for i
 - Preloaded with IBM i 7.1 and 6.1
 - One year of Silver Support from Zend
- Zend Server Development edition
 - Reduced cost – include Z-Ray and other dev tools
- Zend Server for i
 - Available from Zend
- Zend Studio for i
 - Eclipse-based development environment
 - One year of Silver support from Zend
- Zend DBi
 - MySQL implementation for IBM i
 - DB2 Storage Engine enables data storage in



Partnership with PowerRuby

- What is PowerRuby?
 - Freely available and commercially supported port of the Ruby language
 - Includes supporting infrastructure (i.e. Rails) for running Ruby web applications on IBM i
 - Available for download from PowerRuby.com
 - Includes native DB2 database driver – MySQL not necessary
 - Integrates with XMLSERVICE for access to IBM i programs and objects
- Components
 - Ruby 2.0.0 and 1.9.3 (MRI implementation, a.k.a CRuby)
 - `ibm_db` (IBM supported - <http://rubyforge.org/projects/rubyibm/>)
 - Apache + Thin ← the web server stack (more Ruby app servers options coming)
 - Rails 3.2.x and 4.0.0 (CoffeeScript support in the works)
- Learn more
 - PowerRuby.com for updates and news
 - twitter.com/rubyonpower



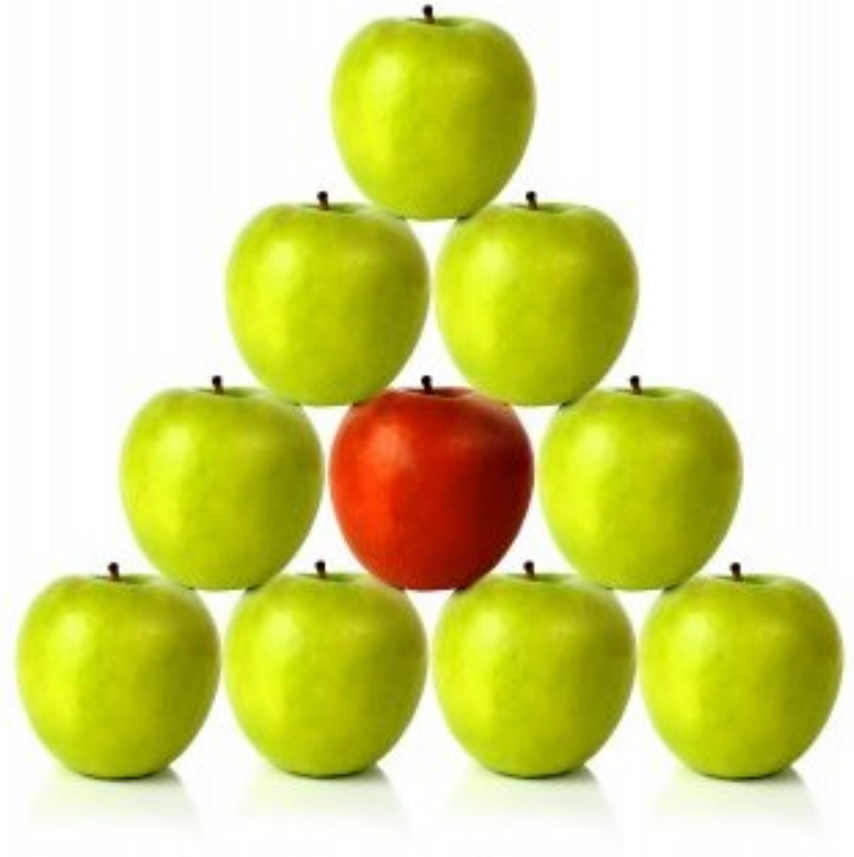
- New LPO – 5733OPS Open Source for IBM i
 - New license program option
 - Designed for Open Source offerings on IBM i
- 5733-OPS has 15 options available NOW!
- The options themselves are placeholders
- Function will be delivered via PTF
- We now have a PTF group for each IBM i release!!

SF99123 (7.1)

SF99223 (7.2)

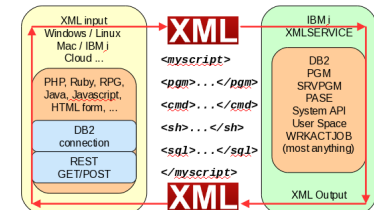
SF99225 (7.3)

- Product web page: <http://ibm.co/2jgNvhY>



Things we deliver with every new language/version

- FastCGI
 - Allows fast connection from HTTP server to backend PASE environment
- ILE Object Toolkit
 - Toolkit for each environment to easily allow connections to ILE objects and information – Built on XMLService
- SQL Connector
 - Easy integrated (from the open source language) way to transfer data to and from DB2 for i leveraging SQL



IBM i chroot (change '/' location), 5733OPS Option 3



Ranger

```
chroot /QOpenSys/ranger /usr/bin/  
bsh
```



Bobby

```
chroot /QOpenSys/bobby /usr/bin/  
bsh
```



Lefty

```
chroot /QOpenSys/lefty /usr/bin/  
bsh
```



Wild Bill

```
chroot /QOpenSys/wildbill /usr/bin/  
bsh
```



admin

No problem, but you are not going to
mess up my system, so chroot you.



'/' is ...
/QOpenSys/ranger/(*)



'/' is ...
/QOpenSys/bobby/(*)



'/' is ...
/QOpenSys/lefty/(*)



'/' is ...
/QOpenSys/wildbill/(*)

No chroot, '/' is ... /(*)

(<http://yips.idevcloud.com/wiki/index.php/PASE/OpenSourceBeta>)

Many, many IBM i Open Source projects.....

- Non-exhaustive list can be found here:

<https://bitbucket.org/ibmi/opensource/wiki/Home#markdown-header-ibm-i-open-source-repos-alphabetical>



opensource

ACTIONS



Clone



Compare



Fork

NAVIGATION



Overview



Source



Commits



Branches



Pull requests



Issues

1



Wiki



Downloads



IBM i Open Source Repos (alphabetical)

IBM i Open Source falls into two broad categories: PASE based, Linux-like software, and QSYS.LIB based, RPG-like software.

- [activerecord-jdbcas400-adapter](#) - JRuby ActiveRecord DB2 for i Adapter
- [api2.py](#) - helper modules for iSeriesPython, primarily to make working with IBM system APIs easier
- [appserver4rpg](#) - Application Server to make Java Components available for IBM i RPG programs, runs on IBM i or any other database using all native SQL interfaces from IBM i.
- [bluepkg](#) - IBM i package manager
- [COMMON](#) - COMMON Open Source Solutions
- [cpytoxlsf.py](#) - iSeriesPython utility to copy physical files to Excel workbooks
- [crtfrmstmf](#) - Compile source from IFS for commands that do not support stream files
- [db2sock](#) - PASE DB2 CLI asynchronous API driver (libdb400.a)
- [FFEDIT](#) - Simple source code editor for IBM i
- [FTPCLNT](#) - FTP client for IBM i
- [ibm_db for Python](#) - API description for the driver
- [IBM i Chroot](#) - Delivered as 5733OPS option 3
- [IBM i Dash](#) - Node.js dashboard web app demonstrating DB2 for i Service usage
- [IBM i Perl](#) - Before IBM i Chroot there was IBM i Perl.
- [ibmitoolkit](#) - PHP XMLSERVICE wrapper
- [ibm-i-enhanced](#) - Adds the AIX functionalities to IBM i
- [iiesc](#) - IBM i external storage calculator
- [ILEDocs](#) - Tool which helps software developers to document their programs in a convenient way.
- [ILEUnit](#) - ILE unit testing framework
- [image_catalog_details](#) - A SQL user defined table function to get the details for an image catalog.
- [iOpen](#) - Many RPG/C open source tools from Bob Cozzi
- [iseries_python27](#) - Source code for independent (non-IBM) port of Python to QSYS.LIB (see [iSeriesPython](#))
- [iSphere](#) - RDi plug-in with enhanced search and many other features.
- [iRPGEitor](#) - Graphical RPG source editor
- [iXMLService](#) - .Net XMLSERVICE wrapper
- [loopback](#) - LoopBack connector for DB2 for i
- [lstffd](#) - List File Field Descriptions (LSTFFD)
- [machine_attributes](#) - A SQL user defined table function to get machine attributes like system type, system model number etc
- [openssl-patches](#) - IBM (Kevin Adler) provides info on how to apply patches for OpenSSL for IBM i
- [python-itookit](#) - Python XMLSERVICE adapter
- [Relic Package Manager](#) - Package Manager for the ILE environment (QSYS.LIB)
- [rpg.vim](#) - RPG fixed/free vim syntax highlighting.
- [rpgleparser](#) - rpgleparser is an ANTLR v4 grammar for IBM's ILE RPG, capable of parsing both fixed- and free-format syntax.

2016

YEAR IN REVIEW

February - Ublu

- New language for IBM i tasks, created by Jack Woehr
- A programming language, made for IBM i!
- An "object-disoriented" language
- implemented in Java, so runs anywhere with Java runtime
- <https://github.com/jwoehr/ublu>

```
# Show all jobs in a joblist
FUNC showJobs ( joblist ) $[
    LOCAL @j LOCAL @subsys LOCAL @type
    FOR @j in @@joblist $[
        put -n -s ${ job }$
        put -n -s -from @j
        job -job @j -get subsystem -to @subsys
        job -job @j -get type -to @type
        put -n -s -from @subsys put -n -s -from @type
        put -n -s ${ is owned by }$ job -job @j -get user
    ]$
] $
```

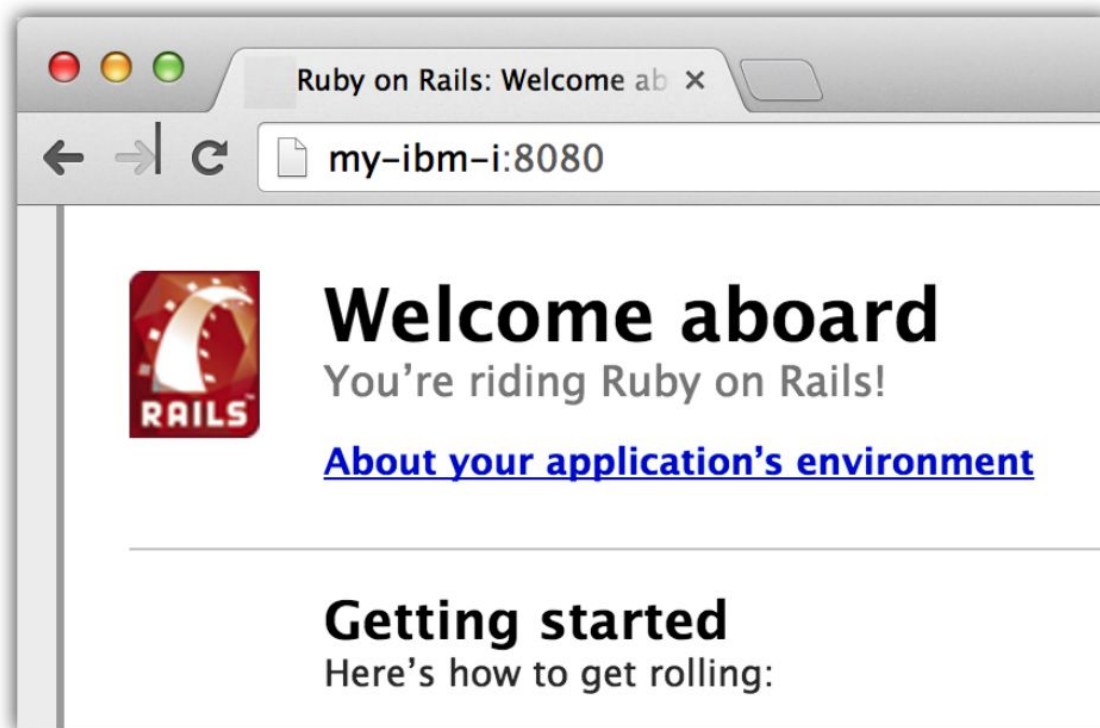
March – Finished Ruby series "Riding the Rails"

- Published by community player Aaron Bartell

<http://www.mcpressonline.com/programming/scripting/techtip-riding-the-rails-part-1>

<http://www.mcpressonline.com/programming/scripting/techtip-riding-the-rails-part-2>

<http://www.mcpressonline.com/programming/scripting/techtip-riding-the-rails-part-3>

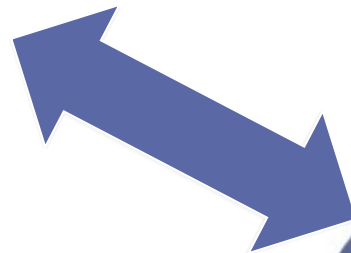


April - vlang-rpg

- Embed PHP within RPG
- Allow PHP to access and manipulate RPG variables!

<https://bitbucket.org/inext/vlang-rpg>

RPG



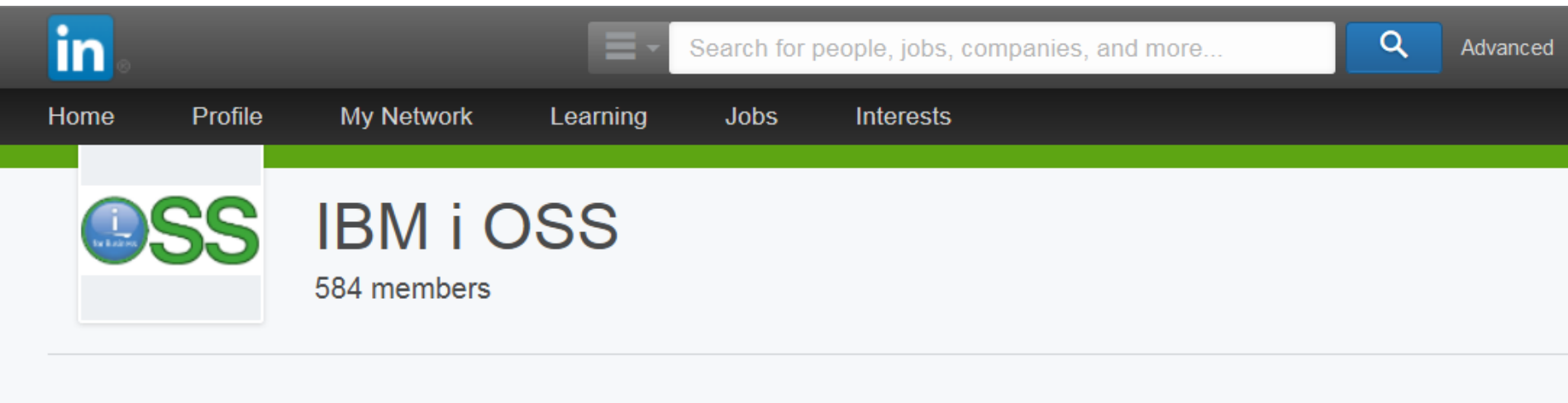
May - OPENSOURCE mailing list at Midrange

- midrange.com hosts a very well-established community covering a wide array of IBM i topics. There's an open source one!

<http://archive.midrange.com/opensource/>

midrange.com

May - LinkedIn IBM i OSS group



- Great starting point for the latest news and events.
- Large member base

<https://www.linkedin.com/groups/8531863>

COMMON (May)

- More OSS hands-on labs than ever before
- New IBM-sponsored OSS Speaker: Kevin Adler
- Started a social media campaign focused around the #IBMiOSS hashtag



- For the latest news:
 - watch **#IBMiOSS**
 - Follow @IBMJesseG and other community members
- Information or questions, just tweet with #IBMiOSS!

June – Ryver IBM i OSS team

- Forums, chat, links to social media
- Invite only!!
- Invite link (here you go):
https://ibmiooss.ryver.com/application/signup/members/9tJsXDG7_iSSi1Q



June - LOTS more for 5733 OPS!!

- Option 1 – Node.JS 2.x
- Option 2 – Python 3.4
- Option 3 – GCC / chroot
- Option 4 – Python 2.7
- Option 5 – Node.JS 4.x
- Option 6 – Git
- Option 7 – Tools
- Option 8 – Orion
- Option 9 – cloud-init

New



June - Python 2.7 (5733OPS option 4)

- Why?
 - Python 2 and Python 3 are not fully compatible
 - Python 3 not fully accepted by the Python community
 - Many applications still built on Python 2



June – Node v4 (option 5)



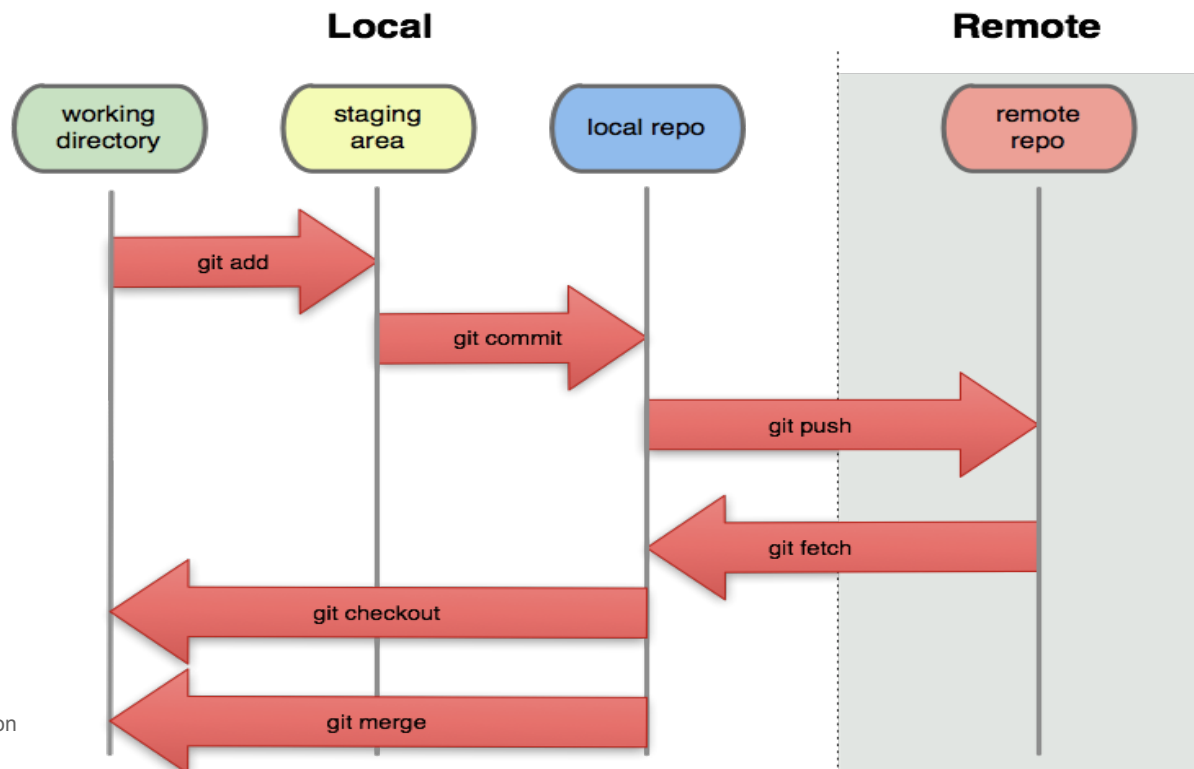
- Previously shipped Node.js v0.x (option 1)
- Node v4 move is important
 - New Javascript engine (much better performance)
 - New Javascript language features (classes, among other things)

```
1 var Greeter = (function () {  
2     function Greeter(message) {  
3         this.greeting = message;  
4     }  
5     Greeter.prototype.greet = function () {  
6         return "Hello" + this.greeting;  
7     };  
8     return Greeter;  
9 })();  
10 var greeter = new Greeter("world");  
11 var button = document.createElement('button');  
12 button.innerText = "Say Hello";  
13 button.onclick = function () {  
14     alert(greeter.greet());  
15 };  
16 document.body.appendChild(button);  
17
```

[Why Node.js?](#)

June – Git (5733OPS option 6)

- Open Source distributed version control system
- Source control for virtually any language
- Powerful and flexible
- Can have hooks to perform custom actions when new code is integrated
- Already in use in the IBM i community

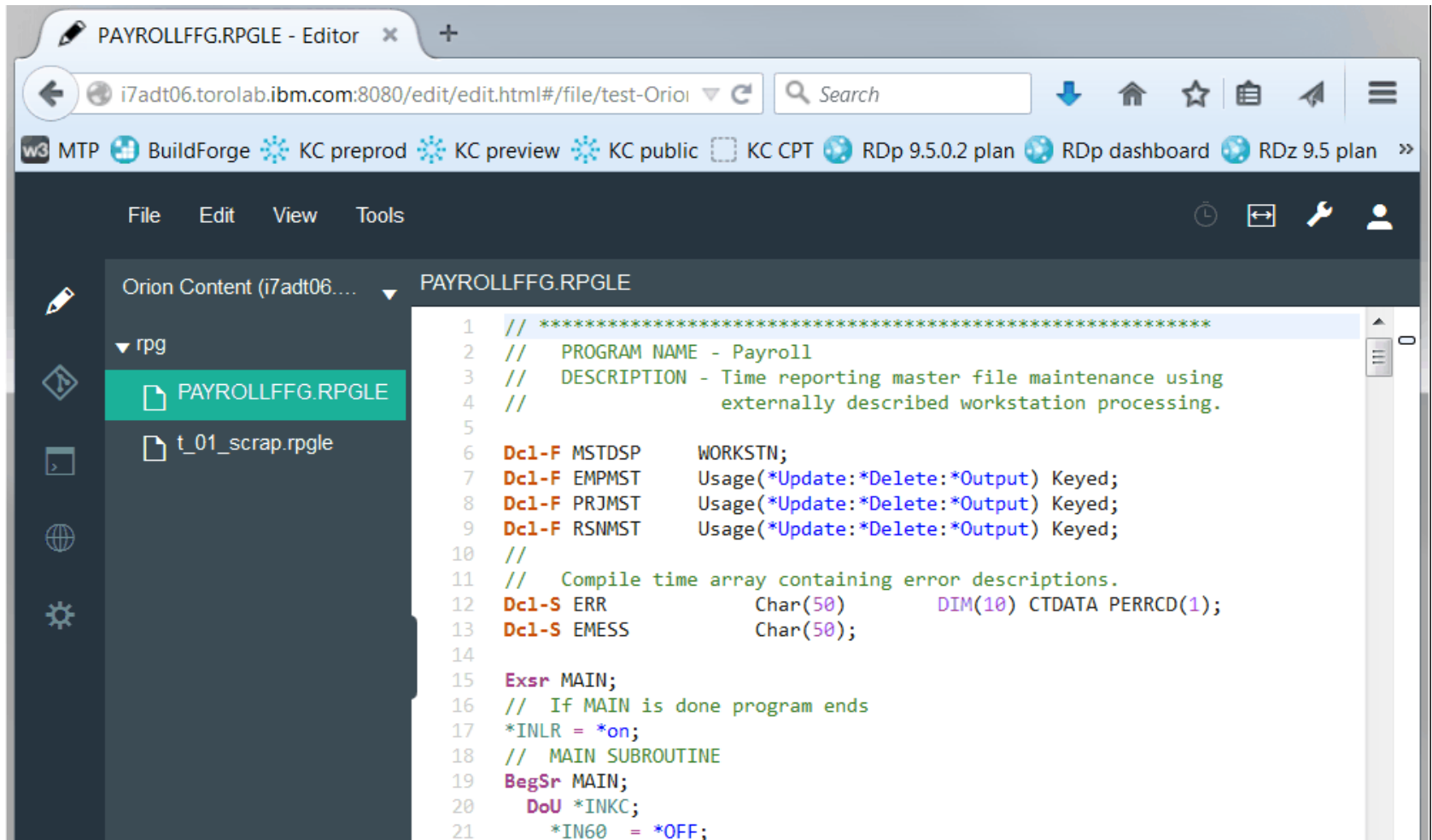


June – Tools (5733OPS option 7)

- Some of the packages downloaded via GCC tool kit are core to the success of Open Source development for IBM i
- In June, we shipped key packages
 - bash
 - zip
 - unzip

Bash
zip **unZip**

June – Eclipse Orion (5733OPS option 8)



The screenshot shows the Eclipse Orion IDE interface. The top toolbar includes a search bar with the text "i7adt06.torolab.ibm.com:8080/edit/edit.html#/file/test-Orion" and a search icon. Below the toolbar is a navigation bar with links for MTP, BuildForge, KC preprod, KC preview, KC public, KC CPT, RDp 9.5.0.2 plan, RDp dashboard, and RDz 9.5 plan. The main editor area displays the file "PAYROLLFFG.RPGLE" with the following code:

```
1 // *****  
2 // PROGRAM NAME - Payroll  
3 // DESCRIPTION - Time reporting master file maintenance using  
4 // externally described workstation processing.  
5  
6 Dcl-F MSTDSP      WORKSTN;  
7 Dcl-F EMPMST      Usage(*Update:*Delete:*Output) Keyed;  
8 Dcl-F PRJMST      Usage(*Update:*Delete:*Output) Keyed;  
9 Dcl-F RSNMST      Usage(*Update:*Delete:*Output) Keyed;  
10 //  
11 // Compile time array containing error descriptions.  
12 Dcl-S ERR          Char(50)          DIM(10) CTDATA PERRCD(1);  
13 Dcl-S EMESS        Char(50);  
14  
15 Exsr MAIN;  
16 // If MAIN is done program ends  
17 *INLR = *on;  
18 // MAIN SUBROUTINE  
19 BegSr MAIN;  
20   DoU *INKC;  
21     *IN60 = *OFF;
```

June – Cloud-init for IBM i (option 9)

- Cloud-init is a script that enables virtual machine activation and initialization
- Additive to the PowerVC/PowerVM offering

[http://www.ibm.com/support/knowledgecenter/SSXK2N_1.3.1/
com.ibm.powervc.standard.help.doc/powervc_install_cloudinit_ibmi_hmc.html](http://www.ibm.com/support/knowledgecenter/SSXK2N_1.3.1/com.ibm.powervc.standard.help.doc/powervc_install_cloudinit_ibmi_hmc.html)

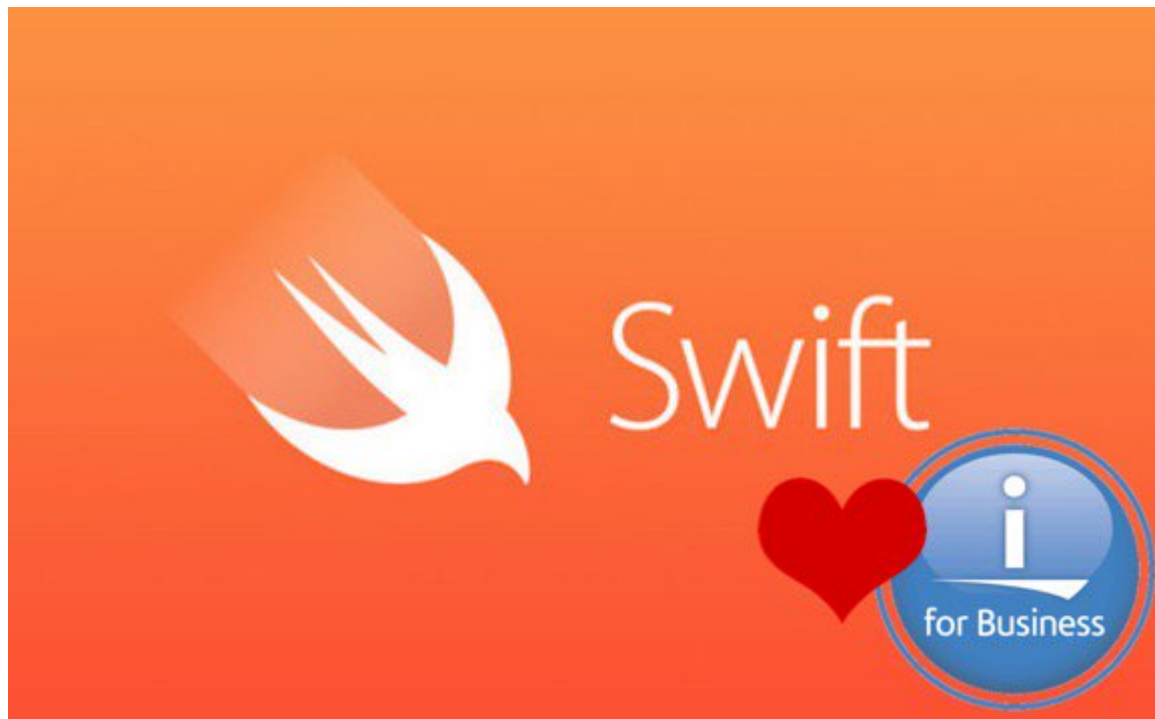




July

August - Swift toolkit for i

- Talk to IBM i directly from Swift applications (yes, even your iPhone!)
- <https://t.co/RyCoQHT6ft>



August – First crowdcast.io discussions

- Live audio and webcam
- Live chat
- Live Q&A with voting system



August - OSSILE

- Created with partnership to host more ILE open source code
- Already has:
 - UDTF's for cartridge info, machine info, and more (Christian Jorgenson)
 - CRTFRMSTMF
Allows you to build CL and many others from IFS in one step! (even without STMF support on the CRT___MOD command)
 - GETIPTF
Allows you to fetch fixes from Fix Central, load them into an image catalog
 - A more robust FTP client!
 - Many more!

<https://github.com/OSSILE/OSSILE>

August - OSSILE

- What else is coming?
 - User-defined table functions (UDTF's). Nature of services includes:
 - Process Control Locks
 - Interrogate all kinds of IBM i object types
 - Activation group garbage collector
 - Table Spaces
 - XML Services
 - Block Fetching
 - Other handy utilities
 - **CLRPFMSBX** – Clear a physical file even if it has triggers or referential integrity constraints.
 - **ENDOBJLCK** – An interactive command that collects all the jobs that are holding locks on an object and ends them elegantly
 - **GENSRVLYR** – A template-based code generator that builds a service program for a table, providing all the basic CRUDE operations plus Table Space support

September – Announced "yum" beta

- Open source package management
- Hosted by litmis, yum and rpm created by IBM'ers



November – Node v6 (option 10)



- <https://nodejs.org/en/blog/release/v6.0.0/>
(James N. Snell) :

"This new major version of Node.js delivers significant improvements in performance, reliability, usability and security. Module loading is nearly four times faster than in Node.js v4, tests and documentation have seen significant improvements, usability of the Buffer and File System APIs have been improved, and Node.js now supports 93% of ES6 language features, thanks to V8 version 5.0."

```
1 var Greeter = (function () {  
2     function Greeter(message) {  
3         this.greeting = message;  
4     }  
5     Greeter.prototype.greet = function () {  
6         return "Hello" + this.greeting;  
7     };  
8     return Greeter;  
9 })();  
10 var greeter = new Greeter("world");  
11 var button = document.createElement('button');  
12 button.innerText = "Say Hello";  
13 button.onclick = function () {  
14     alert(greeter.greet());  
15 };  
16 document.body.appendChild(button);  
17
```

December – more additions to Tools (5733OPS option 7)

- Some of the packages downloaded via GCC tool kit are core to the success of Open Source development for IBM i
- In June, we shipped key packages
 - bash
 - zip
 - unzip
- Since then in 2016...
 - xz
 - gzip
 - bz2
 - GNU tar
 - perl

Bash
zip **unZip**

 **gzip**
bzip2 **tar**

.... and into 2017....



- Synchronize files and directories between systems
- Cross-platform
- Various techniques for determining if file needs update



wget

- utility that lets you download files from the Internet or intranet locations.
- Supports:
 - HTTP, HTTPS, and FTP protocols
 - proxies
 - non-interactive use



- Zero-configuration SQL database engine
- Easy to use
- Useful for open source software that uses this technology.



Major git enhancement

- Ability to perform a 'git clone' of an HTTP/HTTPS repository
- Makes interacting with GitHub or BitBucket much easier!



Jesse Gorzinski, MBA

@IBMJesseG

wget (SI63051) and curl (SI63134) have been approved. Now I can do a 'git clone' on an http repo on #IBMi! #IBMiOSS roxxors my soxxors!

RETWEETS

9

LIKES

12



8:48 PM - 16 Jan 2017



9



12



Liam @de__barry · Jan 17

@IBMJesseG praise the lord



2

"go licpgm" option 10

```
57330PS    *BASE    IBM i Open Source Solutions
57330PS    1        IBM i Open Source Solutions Option 1
57330PS    2        IBM i Open Source Solutions Option 2
57330PS    3        IBM i Open Source Solutions Option 3
57330PS    4        IBM i Open Source Solutions Option 4
57330PS    5        IBM i Open Source Solutions Option 5
57330PS    6        IBM i Open Source Solutions Option 6
57330PS    7        IBM i Open Source Solutions Option 7
57330PS    8        IBM i Open Source Solutions Option 8
57330PS    9        IBM i Open Source Solutions Option 9
57330PS    10       IBM i Open Source Solutions Option 10
```

"go licpgm" option 10

```
57330PS    *BASE    IBM i Open Source Solutions
57330PS     1        Node.JS v0.x
57330PS     2        Python 3.x
57330PS     3        Chroot with gcc
57330PS     4        Python 2.x
57330PS     5        Node.JS v4.x
57330PS     6        Git
57330PS     7        Tools
57330PS     8        Eclipse Orion
57330PS     9        Cloud-Init for i
57330PS    10        Node.JS v6.x
```

Leverage the community with Node Package Manager (npm)

```
$ npm install jshint
```

```
jshint@2.5.11 node_modules/jshint
```

```
├─ strip-json-comments@1.0.2
├─ underscore@1.6.0
├─ exit@0.1.2
├─ console-browserify@1.1.0 (date-now@0.1.4)
├─ minimatch@1.0.0 (sigmund@1.0.0, lru-cache@2.5.0)
├─ shelljs@0.3.0
├─ cli@0.6.5 (glob@3.2.11)
└─ htmlparser2@3.8.2 (domelementtype@1.1.3, domutils@1.5.0,
entities@1.0.0, domhandler@2.3.0, readable-stream@1.1.13)
```

```
$ ls node_modules/
```

```
jshint
```

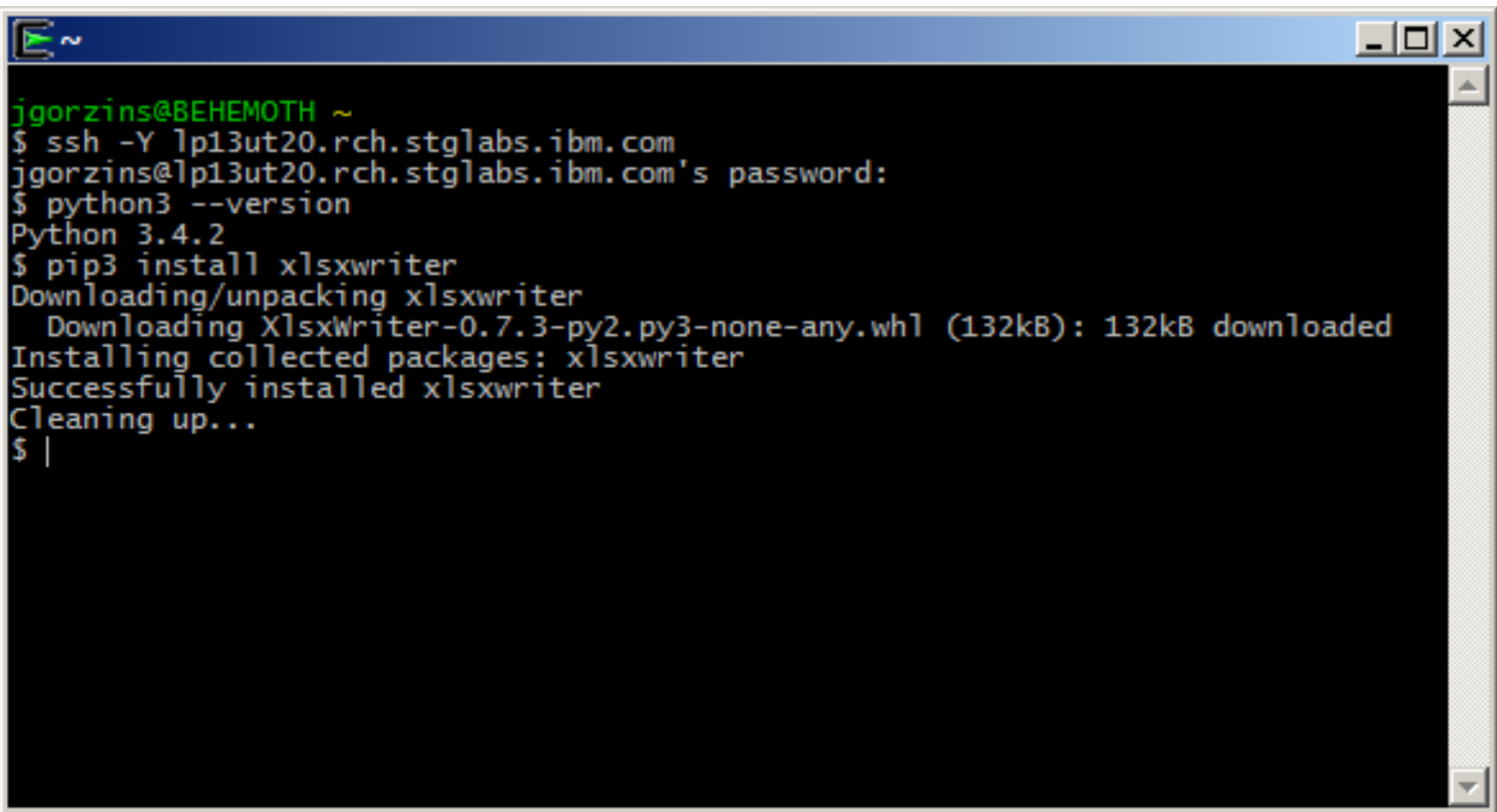
```
$ ls node_modules/jshint/
```

```
README.md  bin  data  dist  node_modules  package.json  src
```

```
$ ls node_modules/jshint/node_modules/
```

```
cli  exit  minimatch  strip-json-comments  console-browserify
htmlparser2  shelljs  underscore
```

Leverage the community with the Preferred Installer for Python (pip/pip3)

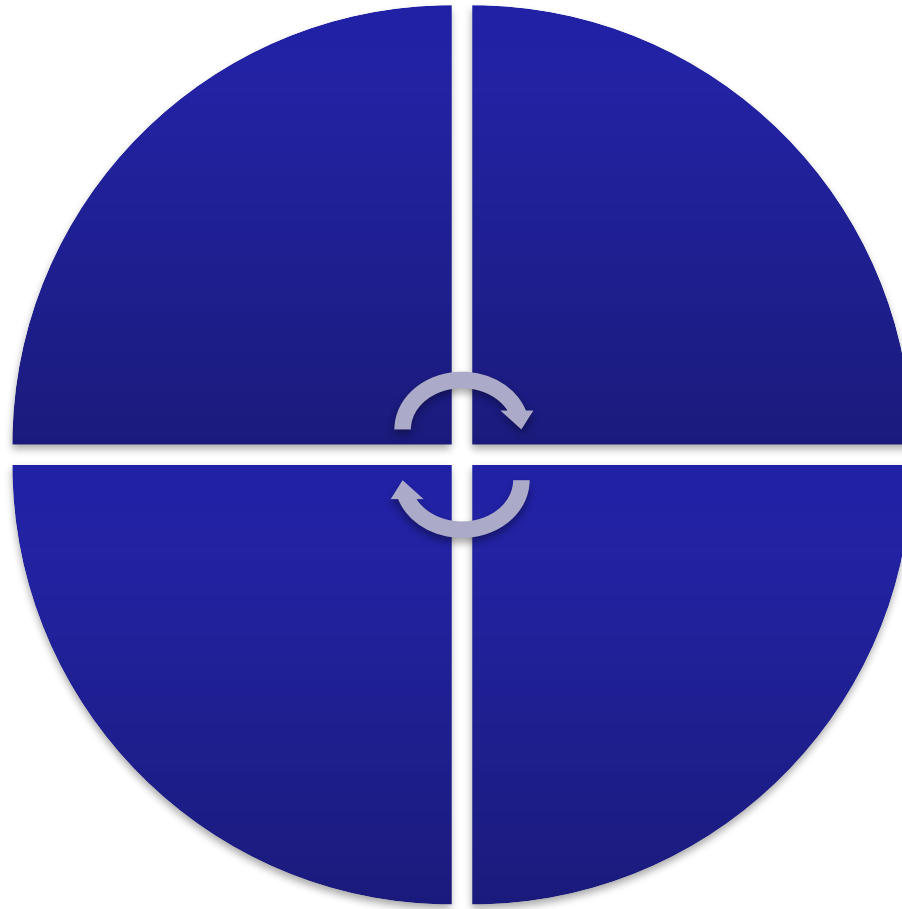


```
jgorzins@BEHEMOTH ~  
$ ssh -Y lp13ut20.rch.stglabs.ibm.com  
jgorzins@lp13ut20.rch.stglabs.ibm.com's password:  
$ python3 --version  
Python 3.4.2  
$ pip3 install xlsxwriter  
Downloading/unpacking xlsxwriter  
  Downloading XlsxWriter-0.7.3-py2.py3-none-any.whl (132kB): 132kB downloaded  
Installing collected packages: xlsxwriter  
Successfully installed xlsxwriter  
Cleaning up...  
$ |
```

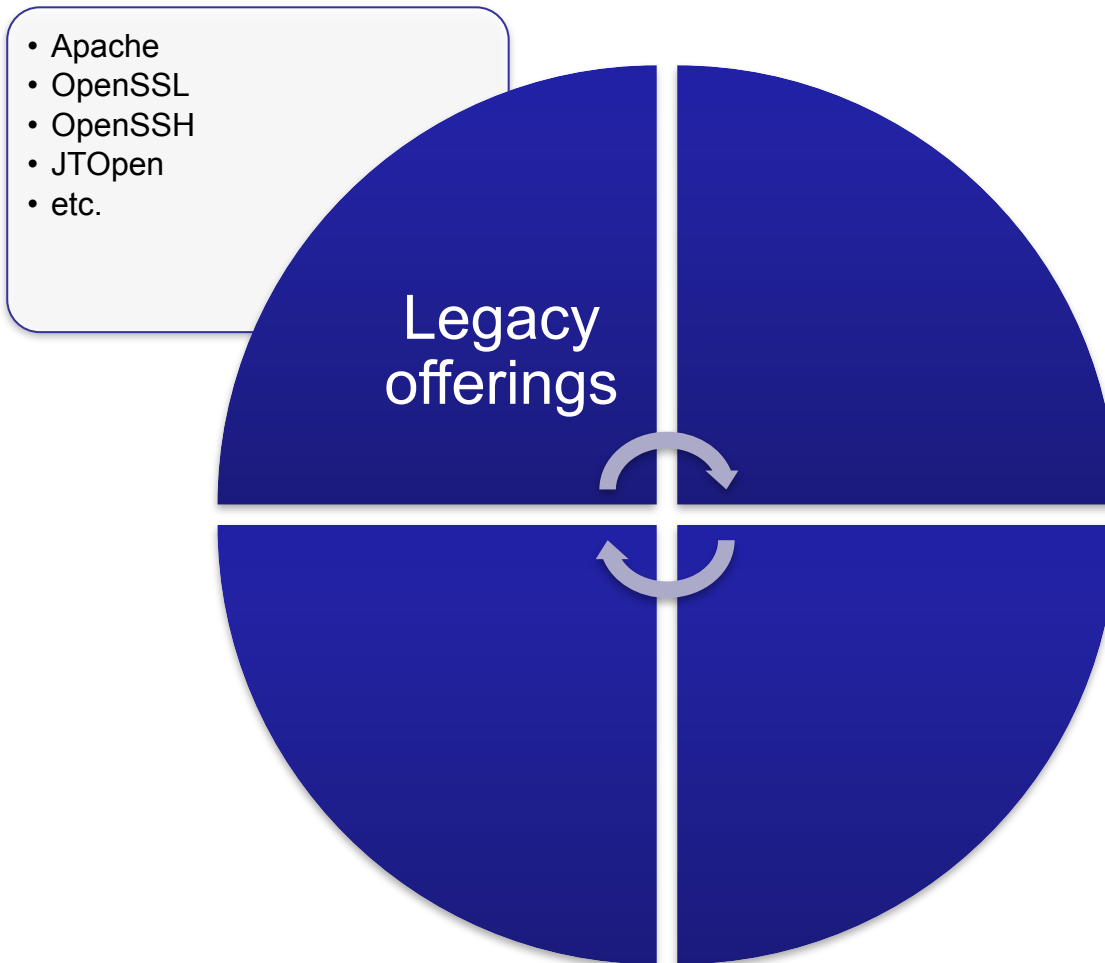

Agenda

- Open Source in the enterprise today
- The OpenPOWER Foundation
- Open source with Unix-based Oss :
 - Linux
 - AIX
- Open source with IBM i
- **Conclusion**

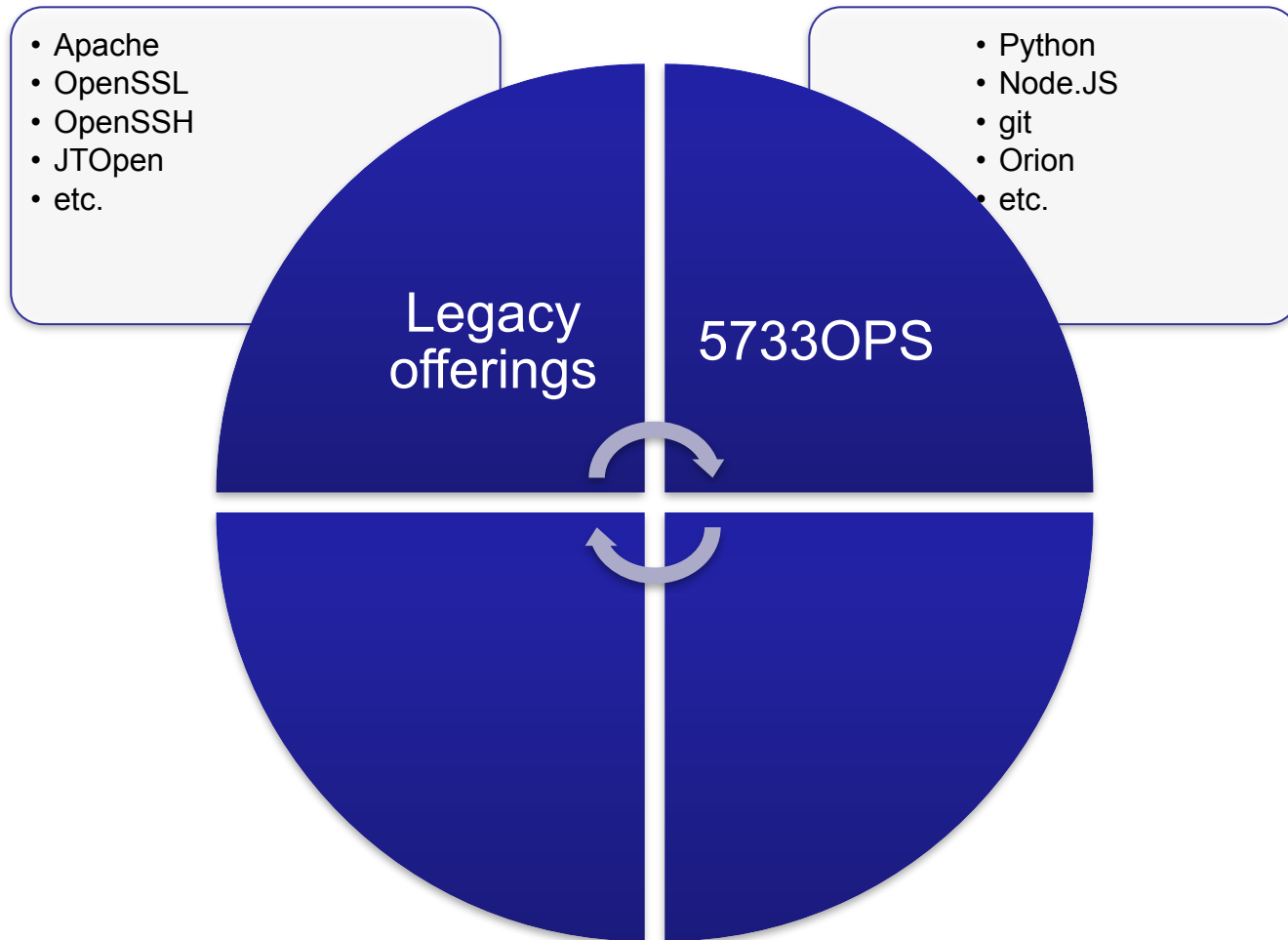
Open Source on IBM i



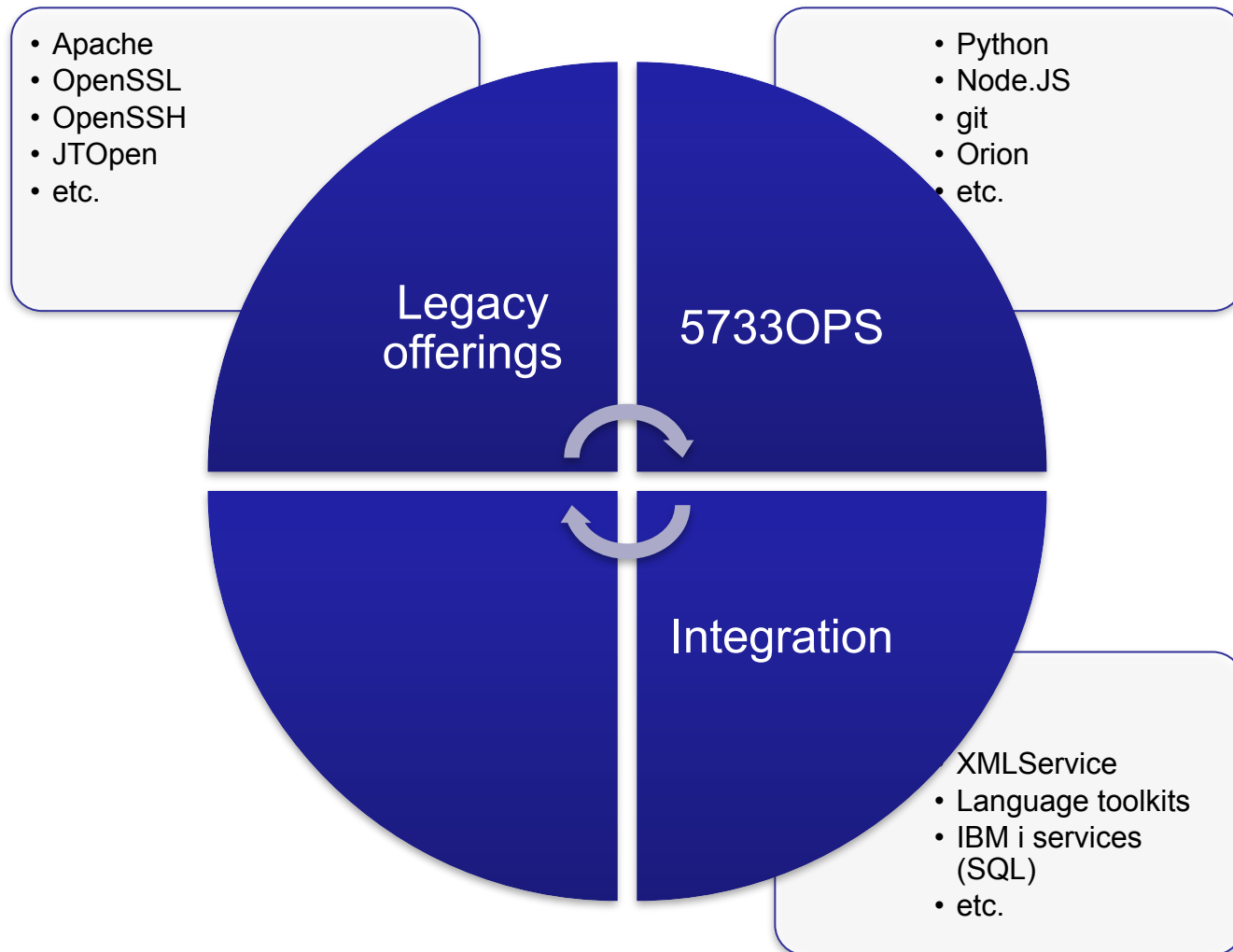
Open Source on IBM i



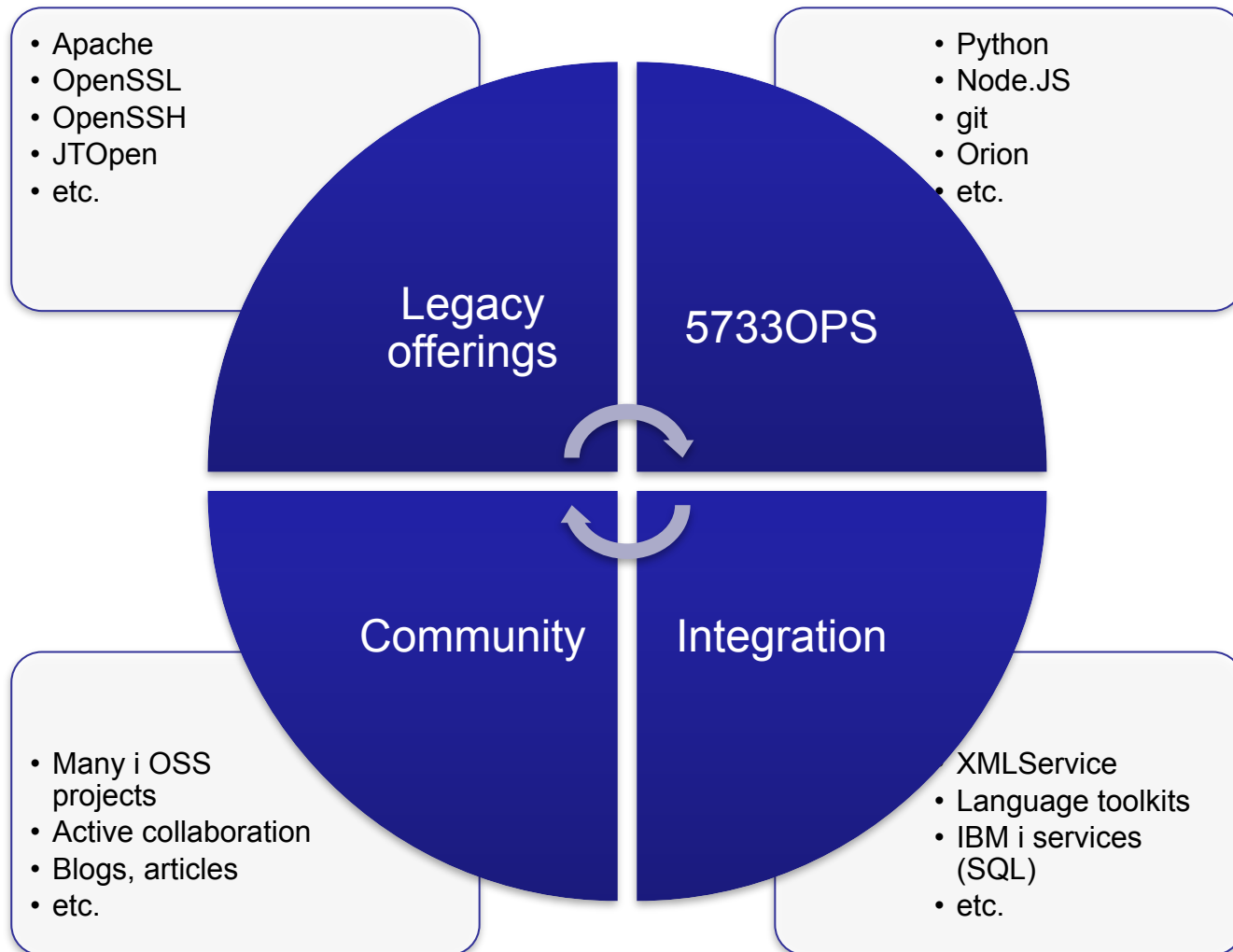
Open Source on IBM i



Open Source on IBM i



Open Source on IBM i



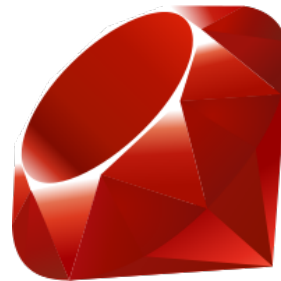
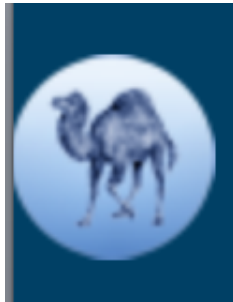
Use it!



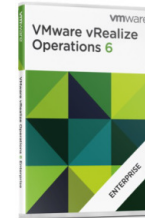
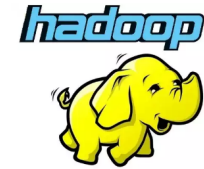
git



python



Even more!



Participate in the community!

- Ask questions
- Give advice
- Share code, tips, tricks, etc!

Where is the Community?

- Twitter
- LinkedIn
- Ryver
- Midrange
- crowdcast.io
- gitter
https://gitter.im/Club-Seiden/IBMiOSS_Public
- Club Seiden forums
<http://club.alanseiden.com/community/>

Community interlocks and panel discussions

- Community-hosted conference calls and panel discussions.
- Most recent used crowdcast.io technology
 - Live audio and webcam
 - Live chat
 - Live Q&A with voting system



Write and contribute code

- Remember: lots of OSS repositories!
- Unsure how to help? Just ask!

Spread the word!

- Write or contribute to articles, blogs, etc.
- Speak at user groups and conferences
- Tweet with the #IBMiOSS hashtag!



Thank you!

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