





Power Systems  Welcome to the Waitless World 

The MAGiC of Open Source on IBM i

Jesse R. Gorzinski, MBA
Business Architect
jgorzins@us.ibm.com



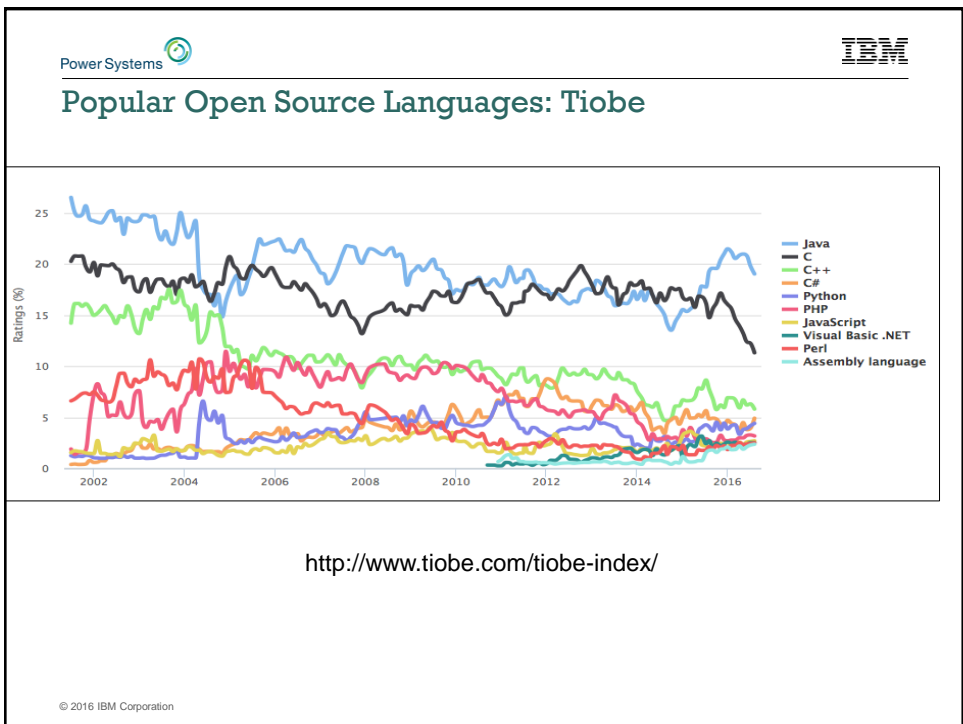
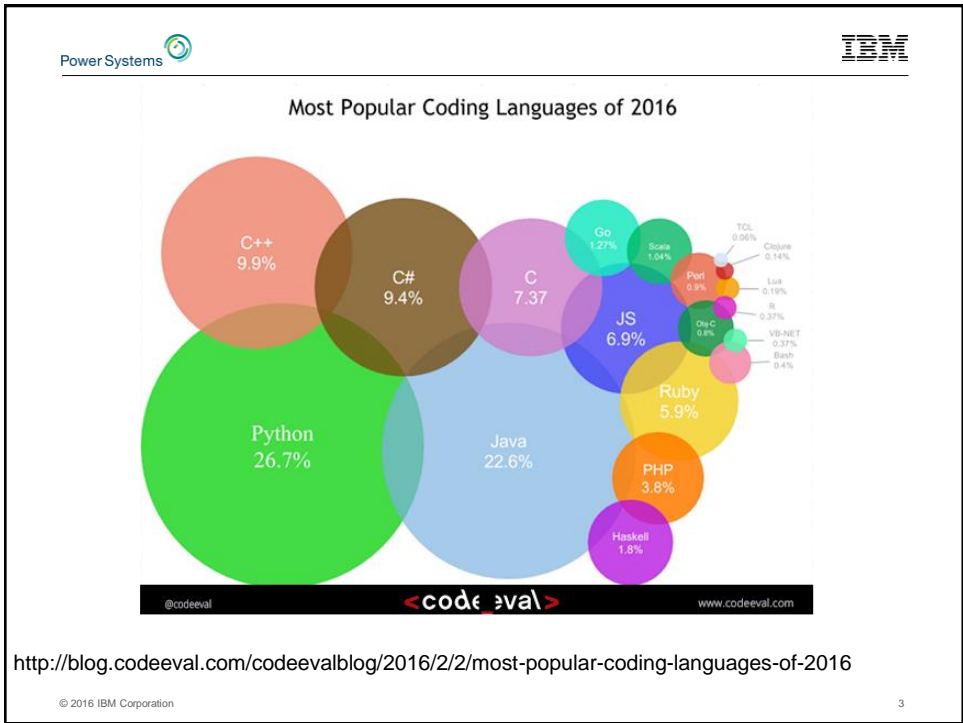
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Agenda

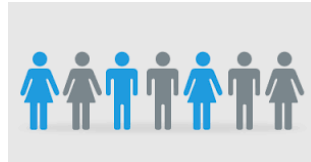
- Open Source Overview
- 2016 – Year in review
- A call to action

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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?




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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
 
- Apache HTTP server shipped since 2002
 

- Also shipped in the past/present:
 - OpenSSL
 
 - OpenSSH
 
 - Apache Tomcat
 
 - Samba
 



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Enabling software engineering on open source languages/runtimes

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




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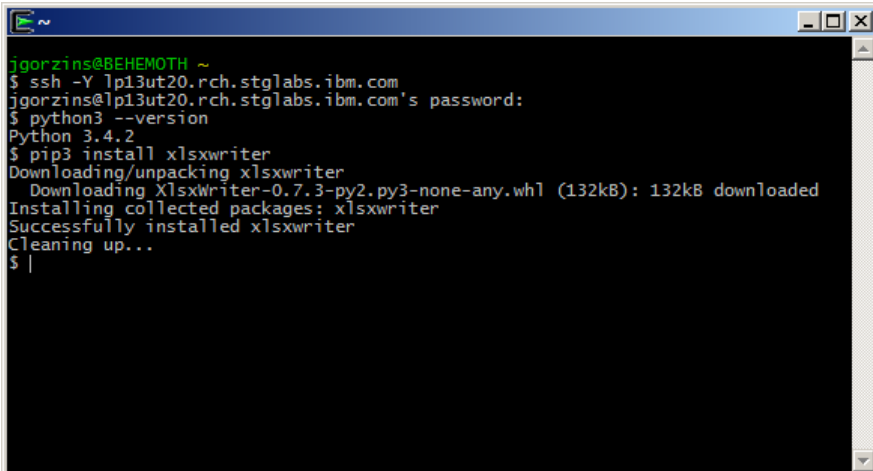
8

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
```

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

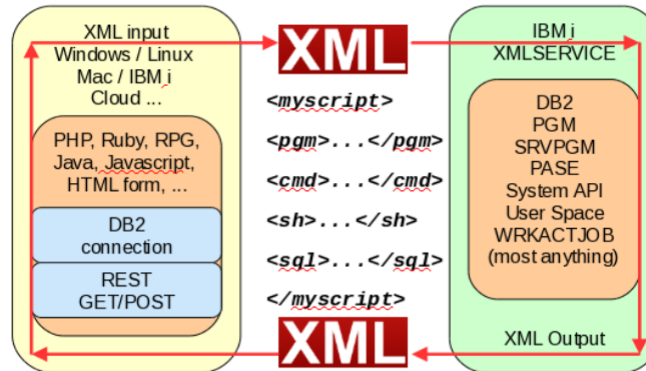


```
jgorzins@BEHEMOTH ~
$ ssh -Y lp13ut20.rch.stglabs.ibm.com
jgorzins@lp13ut20.rch.stglabs.ibm.com's password:
$ python3 --version
Python 3.4.2
$ pip3 install xlswriter
Downloading/unpacking xlswriter
  Downloading xlswriter-0.7.3-py2.py3-none-any.whl (132kB): 132kB downloaded
Installing collected packages: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

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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!



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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

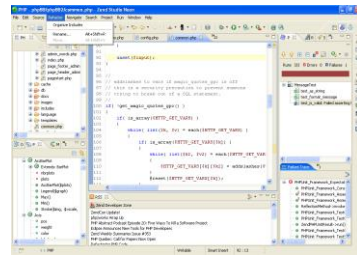


<http://ibm.biz/DB2foriServices>

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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 DB2



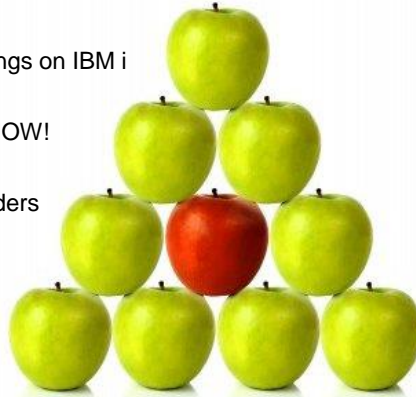
Partnership with PowerRuby

- 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



5733-OPS: a bit unconventional?

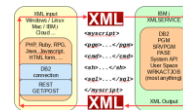
- New LPO – 5733OPS Open Source for IBM i
 - New license program option
 - Designed for Open Source offerings on IBM i
- 5733-OPS has 15 options available NOW!
- The options themselves are placeholders
- Function will be delivered via PTF
- We now have a PTF group for each IBM i release!!





SF99123 (7.1)
SF99223 (7.2)
SF99225 (7.3)

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





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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>

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
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 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
- [cpytoxlsx.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 (libb400.a)
- [FFEDIT](#) - Simple source code editor for IBM i
- [FTPCPLNT](#) - 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 Perzi](#) - Before IBM i Chroot there was IBM i Perzi.
- [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/IC open source tools from Bob Cozzi
- [iSeries_python27](#) - Source code for independent (non-IBM) port of Python to QSYS.LIB (see [iSeriesPython](#))
- [iSphere](#) - RD plug-in with enhanced search and many other features.
- [iRPGEditor](#) - Graphical RPG source editor
- [iXMLService](#) - .Net XMLSERVICE wrapper
- [loopback](#) - LoopBack connector for DB2 for i
- [lstfdd](#) - 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

Sails/Waterline ORM for DB2 for i

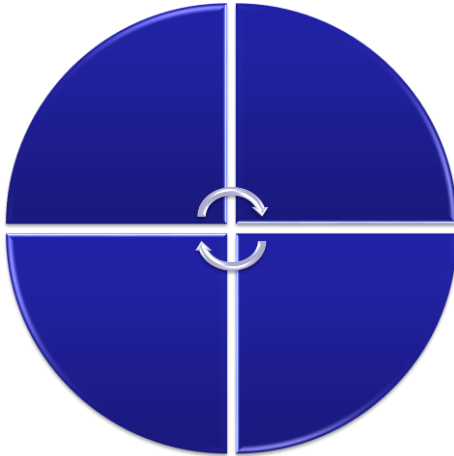
- <https://bitbucket.org/litmis/sails-db2fori/>
- Will allow more Sails.js features to run on IBM i while utilizing DB2
- Pure community project, just recently started
- Looking for volunteers!
 - Developers
 - Secondary maintainers
 - QA/Evaluators
 - Publicists

Is IBM i contributing to open source projects? YES!!



- | | |
|------------------|-----------------------------|
| • GNU tar | • Python-ibm-db |
| • OpenSSL | • swift-itookit |
| • OpenSSH | • portlibfori |
| • git | • ibmiperzl |
| • Bottle.py | • ruby-itookit |
| • PumpkinLB | • nodejs-itookit |
| • python-itookit | • ruby-ibm_db |
| • Dash for IBM i | • xmlservice_examples |
| • db2sock | • OSSILE |
| • ibmichroot | • -ibmi_netstat_py |
| • db2util | • python-for-IBM-i-examples |
| • Python | • shellinabox |
| | • vlang_rpg |

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Open Source on IBM i




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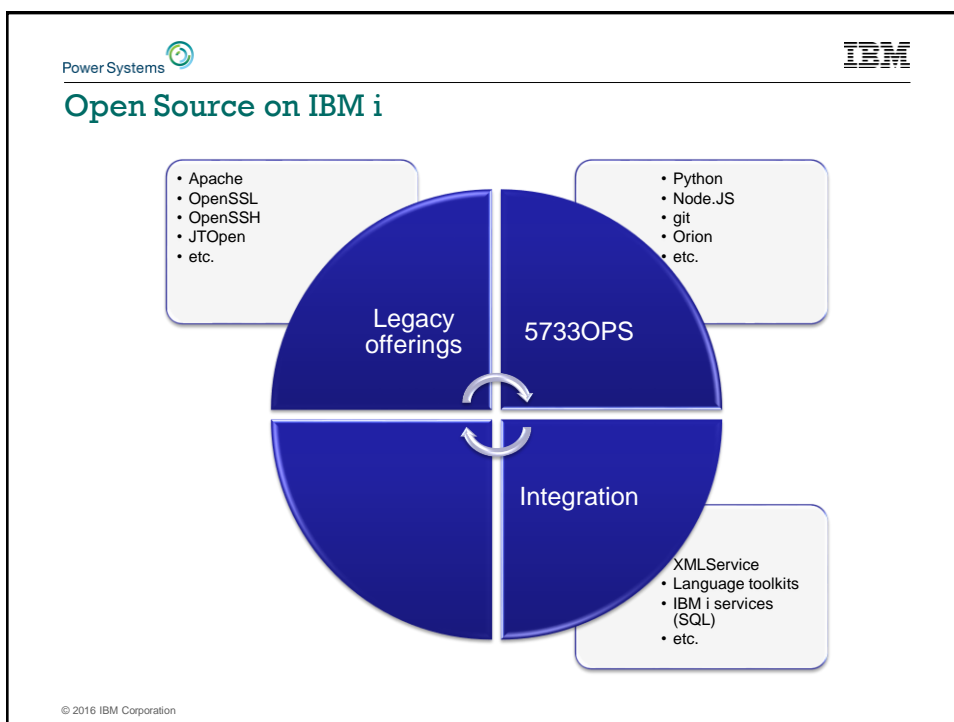
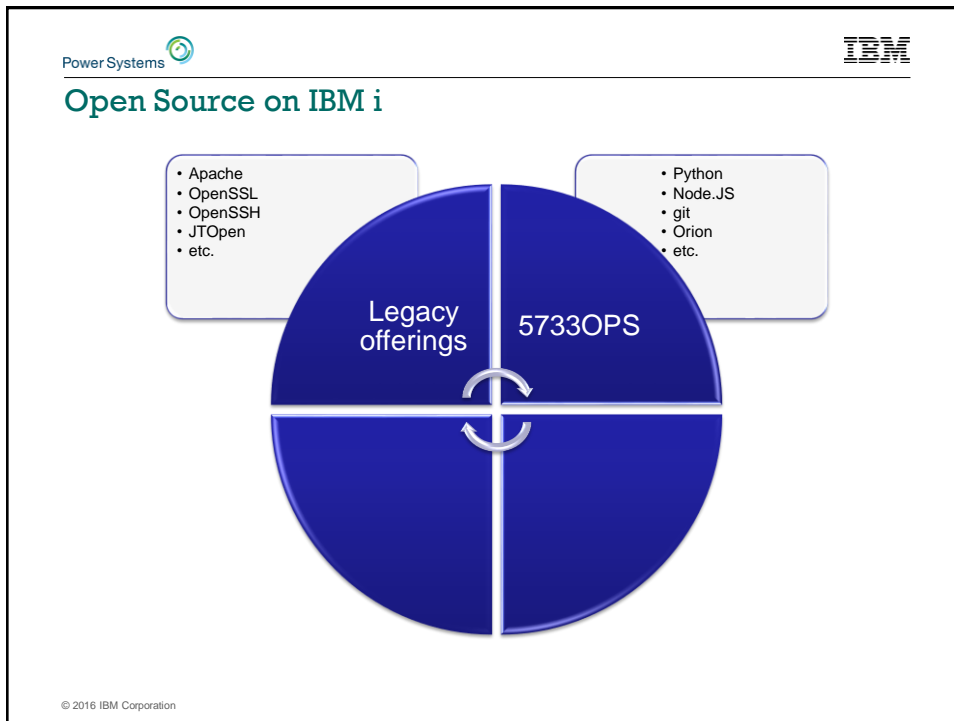
Open Source on IBM i

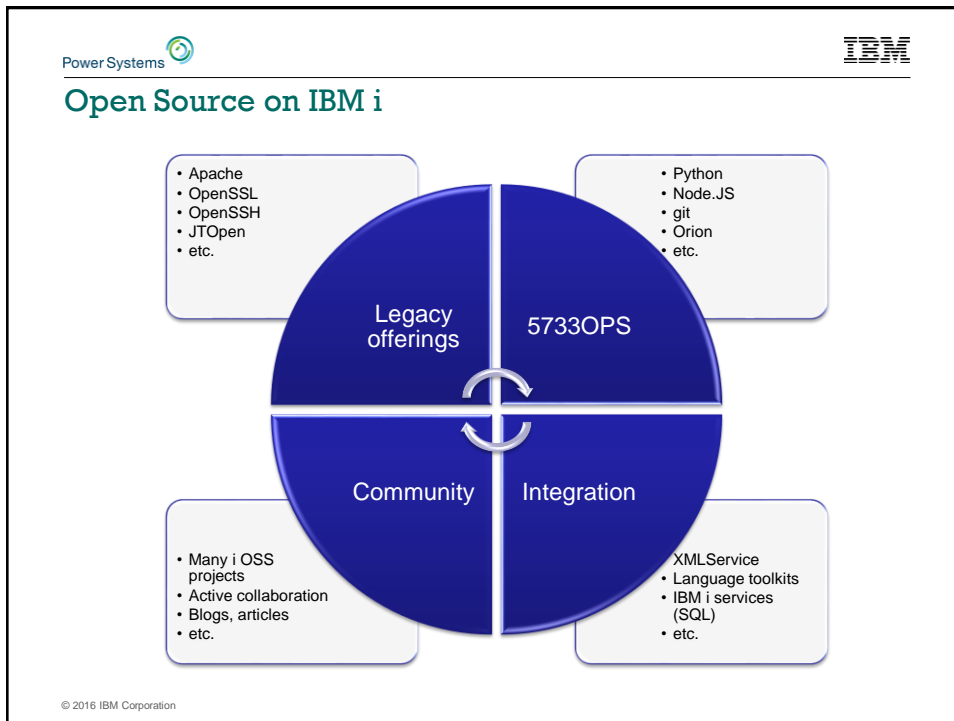
- Apache
- OpenSSL
- OpenSSH
- JTOpen
- etc.

Legacy offerings



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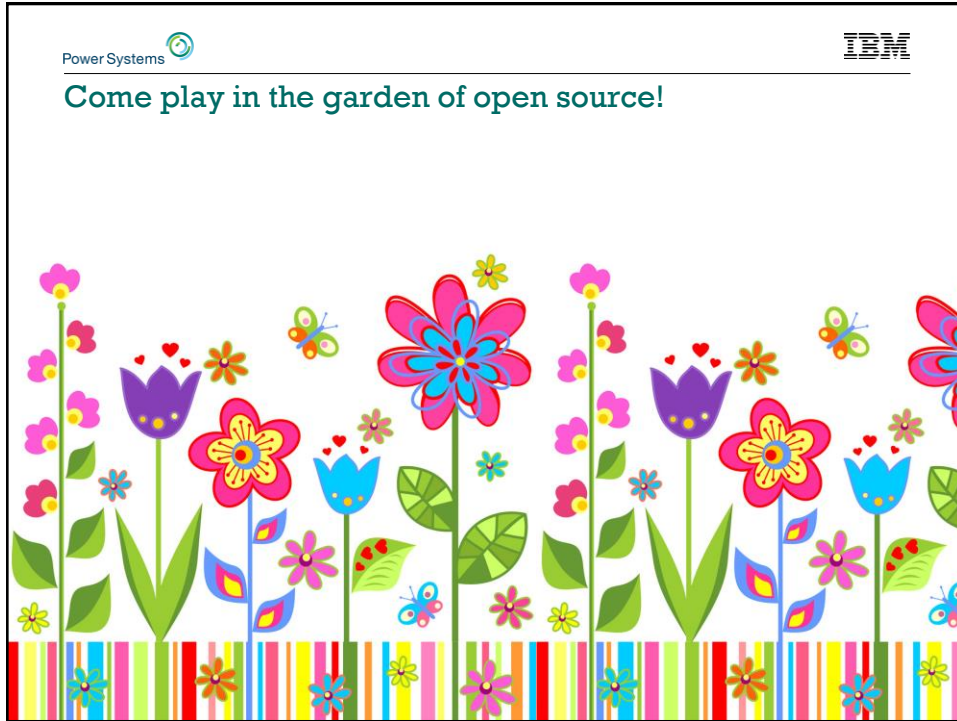




Little-known facts about Jesse Gorzinski

- Jesse likes hot peppers and spicy foods (has eaten 8 of the 10 hottest peppers in the world)
- Whenever Jesse goes to Aldi's, his goal is to leave with a better quarter than he came with
- If you plant one of Jesse's toenail clippings and water it, a new Jesse will grow

Theme of 2016 - Growth





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February - Ublu

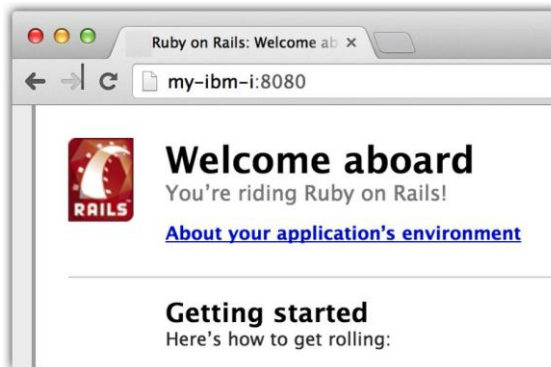
- New language for IBM i tasks, created by Jack Woehr
- A programming language, made for IBM i!
- An "object-disoriented" language
- implemented in Java, so runs anywhere with Java runtime
- <https://github.com/jwoehr/ublu>

```
# 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
  ]$
] $
```

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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>



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April - vlang-rpg

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

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



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
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!

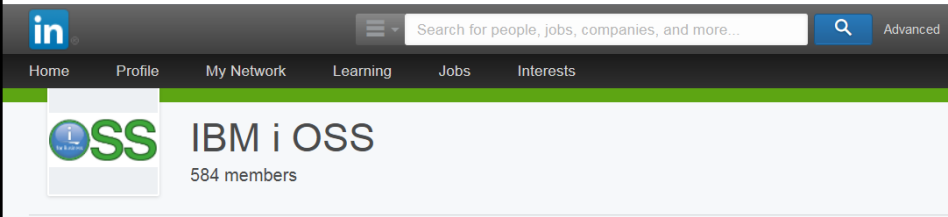
<http://archive.midrange.com/opensource/>

midrange.com

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May - LinkedIn IBM i OSS group

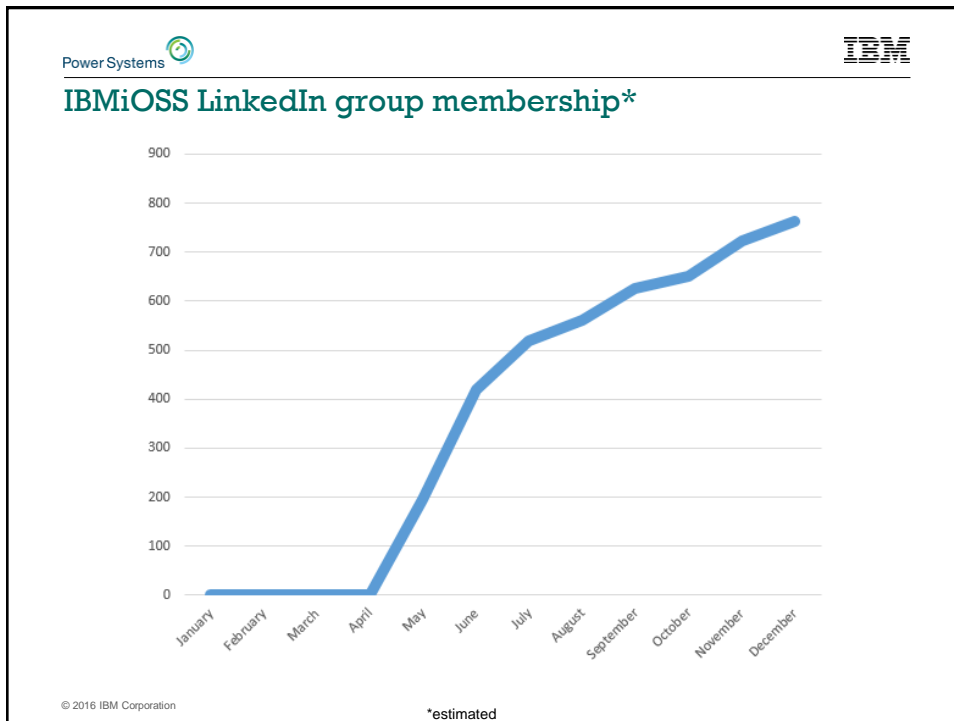




The screenshot shows the LinkedIn interface for the 'IBM i OSS' group. At the top, there is a search bar with the text 'Search for people, jobs, companies, and more...' and an 'Advanced' search option. Below the search bar are navigation tabs: 'Home', 'Profile', 'My Network', 'Learning', 'Jobs', and 'Interests'. The group's profile card is visible, featuring a logo with 'i' and 'SS' and the text 'IBM i OSS' and '584 members'.

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

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

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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



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


COMMON (May) – open source "round table"





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June – Ryver IBM i OSS team

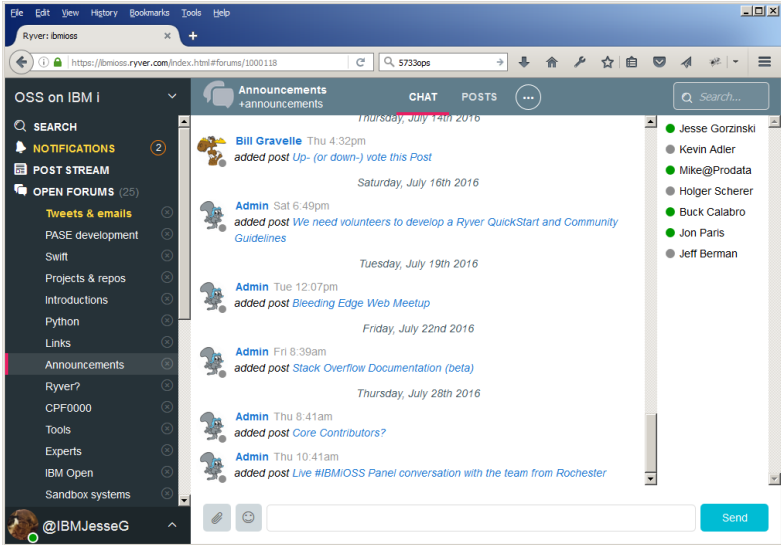
- Forums, chat, links to social media
- Invite only!!
- Invite link (here you go):
https://ibmiOSS.ryver.com/application/signup/members/9tJsXDG7_iSSi1Q



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Ryver IBM i OSS team



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June – we open-sourced the Python toolkit for i



- Built on top of XMLService, like the other "toolkit" offerings
- Many other subcomponents of 5733OPS are open source (like the Python DB2 connector!)
- <https://bitbucket.org/litmis/python-itoolkit>

```

1 import config
2 from itoolkit import *
3 # modify iToolkit not include row node
4 itool = iToolkit(iparm=0, iret=0, ids=1, irow=0)
5 itool.add(iCmd('rtvjoba', 'RTVJOBA USRLIBL(?) SYSLIBL(?) CCSID(?N) OUTQ(?)'))
6 # xmlservice
7 itool.call(config.itransport)
8 # output
9 rtvjoba = itool.dict_out('rtvjoba')
10 if 'error' in rtvjoba:
11     print (rtvjoba['error'])
12 else:
13     print('USRLIBL = ' + rtvjoba['USRLIBL'])
14     print('SYSLIBL = ' + rtvjoba['SYSLIBL'])
15     print('CCSID = ' + rtvjoba['CCSID'])
16     print('OUTQ = ' + rtvjoba['OUTQ'])

```


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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





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June – Major enhancement to Python 3.4!

- Python v3.4 was initially delivered June 2015
- Key updates in June
 - Wheel (updated packaging mechanism)
 - Package add-ons as wheels
 - Rebuild with gcc technology to allow easier integration with community
 - Better support for Django, a powerful web framework for Python
 - Django requires a database
 - Only solution previously was to use Zend DBi (out of process), PyMySQL, and a spec of MySQL that doesn't meet Django requirements
 - Now we have a solution that goes straight to DB2

 python™



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June - Python 2.7 (5733OPS option 4)

- Why?
 - o Python 2 and Python 3 are not fully compatible
 - o Python 3 not fully accepted by the Python community
 - o 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)

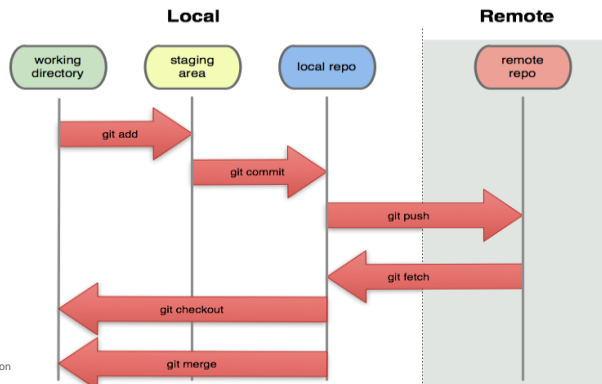
```

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

```

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



50

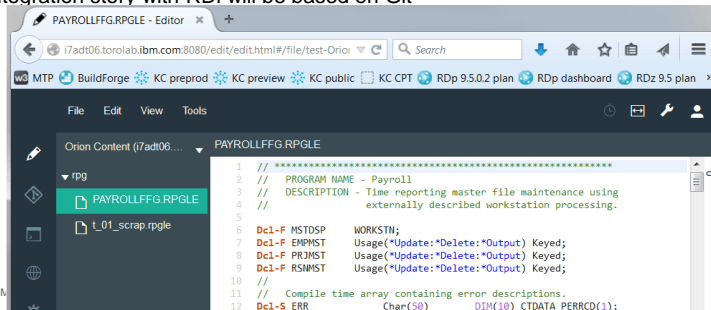
June – Tools (5733OPS option 7)

- 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)

- Provides a web enabled editor interface
- Rich git integration
- BlueMix integration
- Targeting Node, Python and Modern RPG developers
- Not meant to compete with RDi, more complementary
 - Hope to attract and supplant more green screen SEU users
- Contains base open source Orion with a RPG syntax highlighter supporting Fully Free Form RPG only (along with an SQL subset)
- Integration story with RDi will be based on Git



The screenshot shows a web browser window displaying the Eclipse Orion editor. The browser address bar shows the URL: `17adt06.torolab.ibm.com:8080/edit/edit.html#/file/test-Orion`. The editor interface includes a menu bar (File, Edit, View, Tools), a toolbar, and a sidebar with a file explorer. The main editor area displays the following code:

```

1 // *****
2 // PROGRAM NAME - Payroll
3 // DESCRIPTION - Time reporting master file maintenance using
4 // externally described workstation processing.
5
6 Dc1-F MSTDSP      WORKSTN;
7 Dc1-F EMPHST      Usage(*Update:*Delete:*Output) Keyed;
8 Dc1-F PRJMST      Usage(*Update:*Delete:*Output) Keyed;
9 Dc1-F RSNMST      Usage(*Update:*Delete:*Output) Keyed;
10 //
11 // Compile time array containing error descriptions.
12 Dc1-S ERR         Char(30)      DTM(10)  CTDATA  PERRCD(1);

```


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





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IBM

August - Swift toolkit for i

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

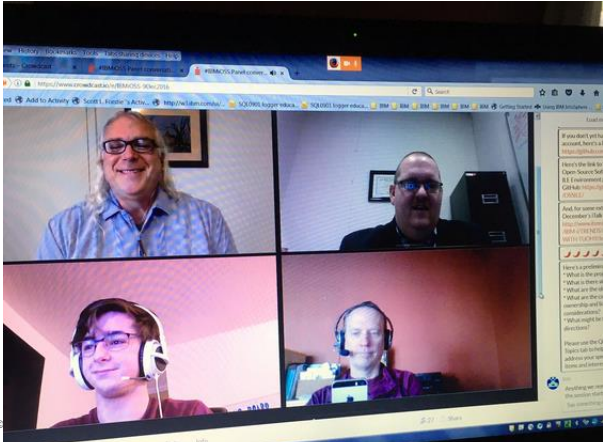





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August – First crowdcast.io discussions

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

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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>

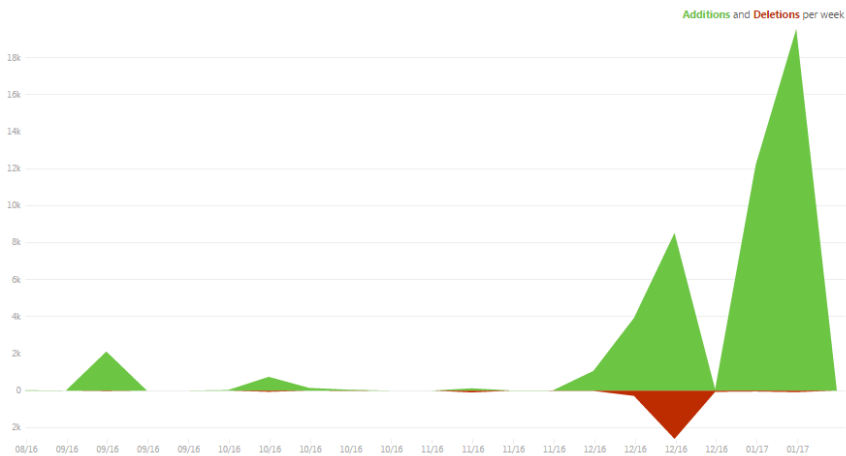
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August - OSSILE

- 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

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OSSILE



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September – Announced "yum" beta

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

yum
yellowdog updater modified

October – New Position: Business Architect of Open Source!



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
 - bzip2
 - GNU tar
 - perl

Bash
zip unZip



 gzip
bzip2 tar

Power Systems  Welcome to the Waitless World 

.... and into 2017....




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rsync

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



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wget

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





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curl

- Both a command and a shared library
- Robust interaction with HTTP or FTP URL's
- Supports
 - HTTP, HTTPS, and FTP protocols
 - proxies
 - non-interactive use
 - advanced HTTP operations like HTTP POST and GET requests
 - FTP upload
 - user authentication
 - much more!




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
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SQLite

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




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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

 **Liam** @de__barry · Jan 17
@IBMJesseG praise the lord

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"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

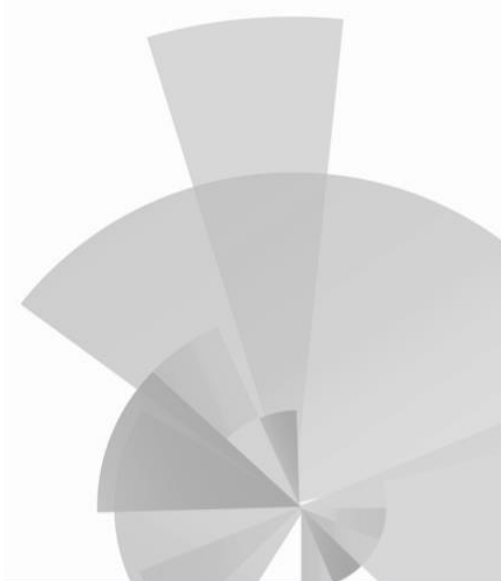
```

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

```

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How can I contribute?



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Use it!



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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!



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Spread the word!

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

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Power Systems  **Some useful links** 

- IBM Systems Mag blog ("Open your i")
 - <http://www.ibmssystemsmag.com/Blogs/>
- 5733OPS offering (Open Source for i)
 - <http://ibm.co/2jgNvhY>
- IBM i Open Source wiki (community-managed)
 - <https://bitbucket.org/ibmi/opensource/wiki/>
- #IBMiOSS on Twitter
 - <https://twitter.com/hashtag/ibmiOSS?f=tweets>
- IBM i OSS on LinkedIn
 - <https://www.linkedin.com/groups/8531863>
- Join us on Ryver
 - https://ibmiOSS.ryver.com/application/signup/members/9tJsXDG7_iSSi1Q

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