



Phoenix Software International

Modernizing How You Work with the
Mainframe

December 18, 2019

Objective

- ▶ Discuss how Phoenix Software International is applying the use of present-day tools with the mainframe such as:
 - (E)JES, (E)JES Web and Eclipse – A modern, lightweight browser-based system management tool for users who prefer not to work in a 3270 and for developers who want to leverage the Eclipse IDE for development
 - Zowe – Open source framework for the mainframe that provides solutions that allow development and operations teams to securely manage, control, script, and develop on the mainframe like any other cloud platform
 - z/OSMF Workflow – automation of routine procedures and tasks through the use of a modern interface and Zorow – An open source community dedicated to contributing and collaborating on z/OSMF Workflows


Who We Are

- ▶ Phoenix has been providing enterprise software solutions around the globe since 1979.
- ▶ A privately held corporation not required to provide shareholders with quarterly profits, Phoenix can focus on long-range, customer-oriented projects and goals.
- ▶ Phoenix prides itself in being nimble, able to quickly capitalize on new hardware and software technology with a focus on software modernization, and providing the best possible user experience.



Who We Are

The three pillars that guide our development philosophy



Leveraging the latest hardware/software technology Providing the best possible user experience Software modernization

Why do we focus on leveraging the latest technology?

We care about performance.

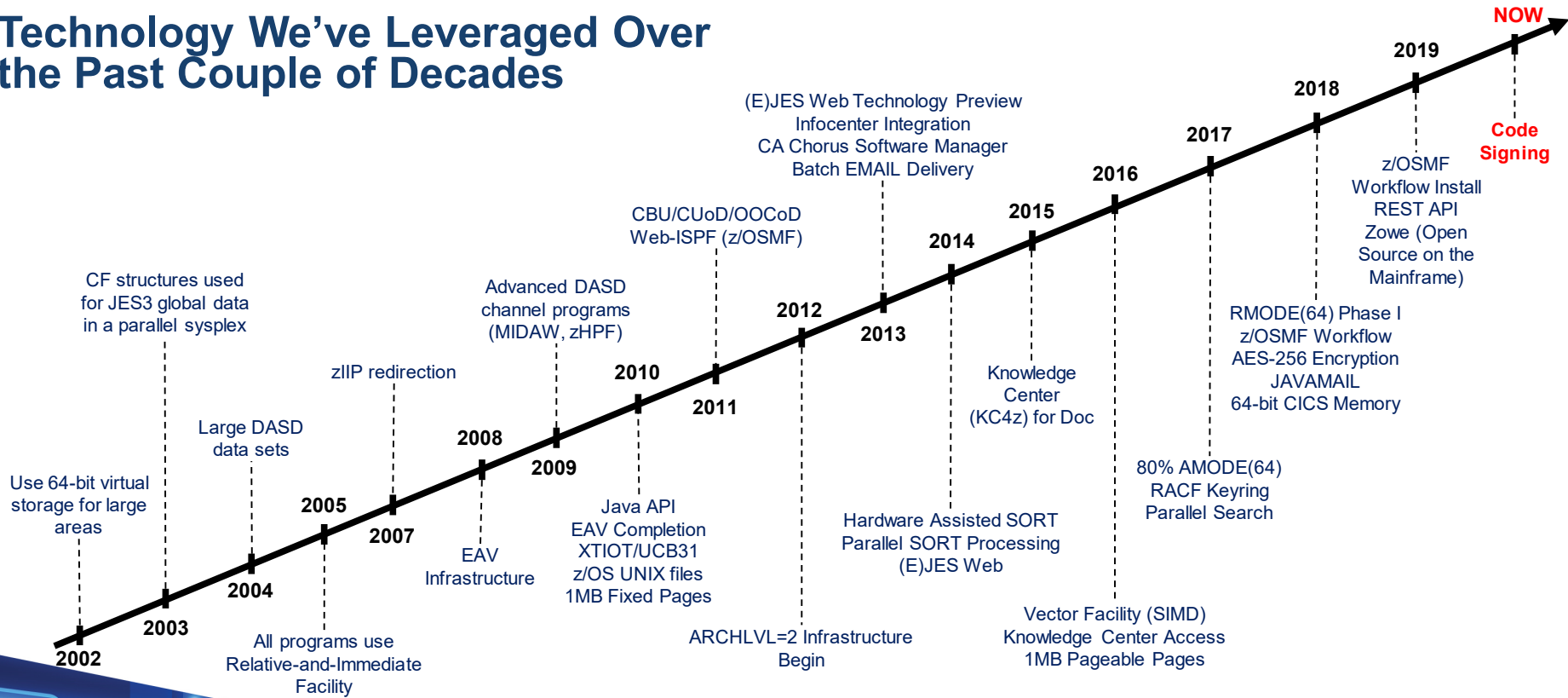
We care about reducing customer costs.

We care about the z/OS platform!

This unique philosophy has kept us in lock-step with IBM Z hardware and the z/OS operating system as they have evolved over time.

Who We Are

Technology We've Leveraged Over the Past Couple of Decades



Phoenix Software JES3^{plus}[™] discussed in this presentation is a derivative work of IBM[®]'s JES3 licensed sourced code.

The logo for JES3^{plus}[™] is centered in a horizontal band. The text is rendered in a bold, white, sans-serif font with a 3D effect, giving it a metallic appearance. The background of this band is a dark, textured surface with a gradient from brown to dark purple. Overlaid on this background are several interlocking gears of different sizes and colors, including gold, pink, and teal. The gears are partially obscured by the text, creating a sense of depth and mechanical complexity.

JES3^{plus}[™]

The Same, Only Better

z/OS JES Management

(E)JES[®]

A modern tool for managing your z/OS JESplex.

Includes cutting-edge components such as a browser based interface, Zowe conformant API and CLI, and guided z/OSMF installation.

The background of the slide features a dark stage with several spotlights. A large green spotlight is centered behind the main title. To the left, a blue spotlight shines from the bottom left. To the right, a red spotlight shines from the top right, and a yellow spotlight shines from the bottom right. The spotlights create a vibrant, multi-colored glow on the dark background.

z/OS Code Analysis

zHISR[®]

Generate reports that help tune applications by locating specific sections of your code that are the biggest CPU consumers.

Objective

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 - Zowe – Open source framework for the mainframe that provides solutions that allow development and operations teams to securely manage, control, script, and develop on the mainframe like any other cloud platform
 - z/OSMF Workflow – automation of routine procedures and tasks through the use of a modern interface and Zorow – An open source community dedicated to contributing and collaborating on z/OSMF Workflows

What is (E)JES?

- ▶ (E)JES is a system management tool that provides information to monitor, manage, and control a z/OS JESplex.
- ▶ (E)JES consists of a series of applications that provide immediate and current information about jobs, devices, queues, and other z/OS system resources.
- ▶ From these applications, you can observe the system's operation, browse data on SPOOL, and securely control its processing.
- ▶ Simple commands and rapid accessibility not only save you time, but also make interacting with z/OS and JES quick and easy.
- ▶ (E)JES can be used interactively via 3270 terminal, Web Browser, Zowe CLI, or programmatically using REST API and procedural APIs using popular mainframe languages.

(E)JES Web

- Implemented in Java
- Nothing is stored on the user's PC
- No Java is run on the PC or in the browser
- Runs under IBM Open Liberty or Apache Tomcat
- Uses (E)JES Java API on the server side – therefore CPU cycles are redirected to zIIP
- Supports every (E)JES display – not just a convenient subset
- Performance is similar to 3270

The screenshot displays the (E)JES Web interface, which mimics the look of a 3270 terminal. At the top, there's a navigation bar with tabs for Jobs, JES, System, Tools, Filter, View, Options, Help, and Logout. The main area is divided into several sections:

- Activity Summary:** A table showing job activity with columns for JobName, StepName, ProcStep, JobID, ASID, Pos, DP, Real, Paging, ExCP, CPU%, CPU-Utilization-Graph, ACPU%, and zIIP%. The table lists jobs like EJES29, EJES22, EJES28, EJES23, EJES21, EJES20, and FD1XADM.
- Job Details:** A section showing the status of a specific job (32155 0X 83W 6H 0T 2124051) with columns for JobName, JobID, Status, Queue, Ambr, JP, Pos, WPos, MaxComp, Records, Pages, H-JOE, O-JOE, Owner, and SecLabel. It lists jobs like UNTERSE, COPYDUMP, SAMPLE1, and EJES20.
- Job Log:** A detailed log for a specific job (MVS70) showing the sequence of events, including job initialization, allocation, and execution steps. The log includes timestamps and job IDs.

The interface is designed to provide a comprehensive view of job execution and system status, allowing users to monitor and manage their jobs effectively.

(E)JES Web

Performance Objective – NO SACRIFICE!

Our goal is to replicate, as closely as possible, the performance experience currently enjoyed by (E)JES 3270 users, while adding the power and flexibility of a modern web interface.

Average Refresh Times in our Environment

z13s 2965-D03 w/zIIP and OSA Express 5 connected (via GbE) to PCs with Intel Core i7 CPUs, running Mozilla Firefox under Microsoft 64-bit Windows 10 Professional.

Average Timings	ACTIVITY 54 jobs	ACTIVITY 5 jobs	STATUS 54 jobs	STATUS 15 jobs
Server	.073	.036	.098	.052
Network	.005	.007	.006	.004
Total	.078	.043	.104	.056

3270 Primary and Line Commands Supported

Most of the familiar mainframe primary and line commands are supported so experienced users feel comfortable.

Familiar 3270 FIND Capabilities

ISPF-like find options such as prefix, suffix, word, chars, hex, etc. are all fully supported.

Ultra-thin Client Model

(E)JES Web is an “ultra-thin” – fully virtualized – client with an intelligent server. Sorting, filtering, searching, etc. is performed on server – where the data resides. The client is merely a user interface for requesting and viewing the results of these data manipulations.

Time-oriented Log Browsers

System log browsers are naturally oriented by date and time. The title line shows the date/time, associated with the top line, rather than line/record number.

Metafilters Management

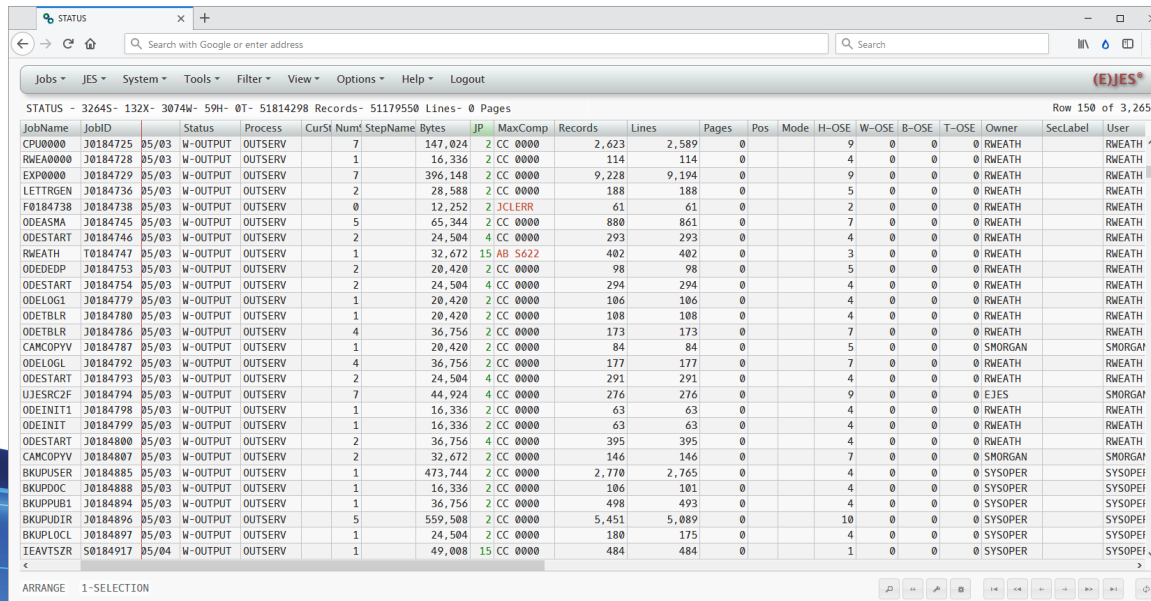
A virtually unlimited number of complex metafilter sets can be created, named and saved so you can apply them as needed simply by clicking on the name of the set.

Download as Text or PDF

Automatic carriage control conversion for local printing. Full-featured PDF document creation.

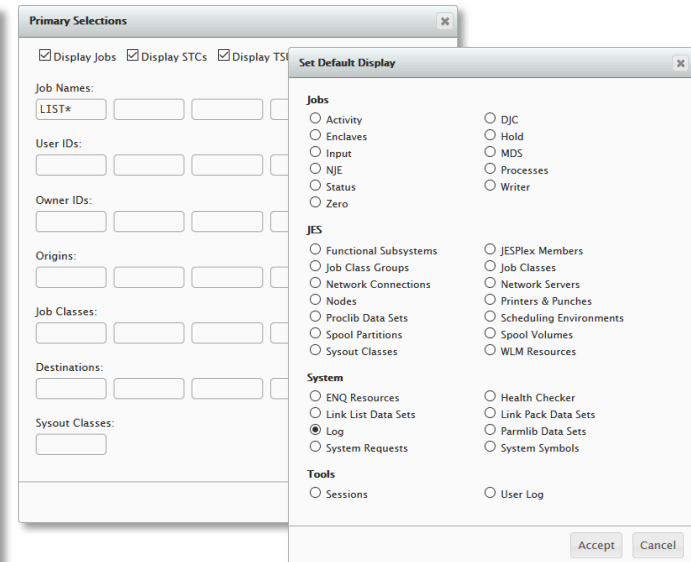
(E)JES Web

- ▶ When you log in for the first time, the default display is the Status display. It is filtered by your Owner ID.
- ▶ You can change your filters and default display via dialog boxes. Your preferences are stored on the host and are used even when you log in from a different device or browser.



The screenshot shows the (E)JES Web interface with the 'STATUS' tab selected. The main display is a table of job details. The table has columns for JobName, JobID, Status, Process, CurSt Num, StepName, Bytes, JP, MaxComp, Records, Lines, Pages, Pos, Mode, H-OSE, W-OSE, B-OSE, T-OSE, Owner, and User. The table is filtered by Owner ID '32645' and shows 150 rows out of 3,265. The table is sorted by JobName. The first few rows are:

JobName	JobID	Status	Process	CurSt Num	StepName	Bytes	JP	MaxComp	Records	Lines	Pages	Pos	Mode	H-OSE	W-OSE	B-OSE	T-OSE	Owner	User
CPU0000	J0184725	05/03	W-OUTPUT	OUTSERV	7	147,024	2	CC 0000	2,623	2,589	0			9	0	0	0	RWEATH	RWEATH
RMEA0000	J0184728	05/03	W-OUTPUT	OUTSERV	1	16,336	2	CC 0000	114	114	0			4	0	0	0	RWEATH	RWEATH
EXP0000	J0184729	05/03	W-OUTPUT	OUTSERV	7	396,148	2	CC 0000	9,228	9,194	0			9	0	0	0	RWEATH	RWEATH



The screenshot shows two dialog boxes. The 'Primary Selections' dialog box has the following options:

- ☒ Display Jobs
- ☒ Display STCs
- ☒ Display TS

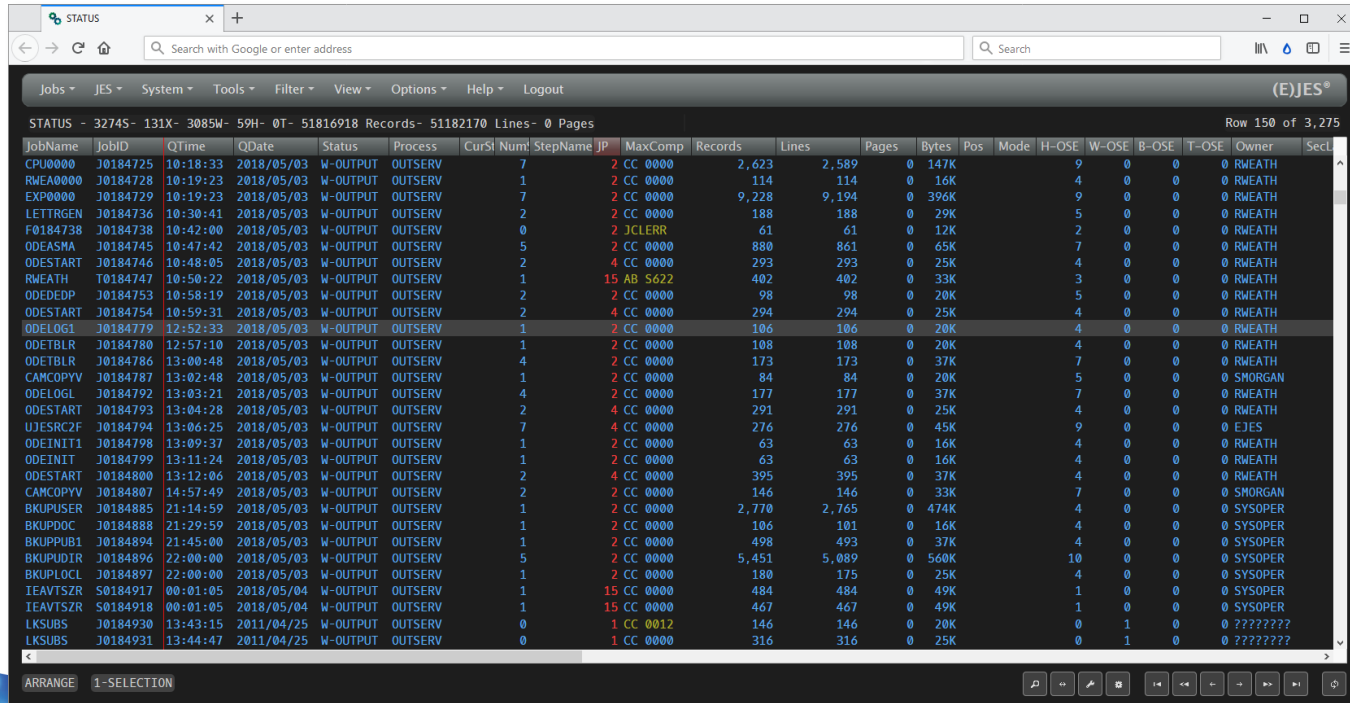
The 'Set Default Display' dialog box has the following options:

- Jobs**
 - ☐ Activity
 - ☐ Enclaves
 - ☐ Input
 - ☐ NJE
 - ☐ Status
 - ☐ Zero
 - ☐ DJC
 - ☐ Hold
 - ☐ MDS
 - ☐ Processes
 - ☐ Writer
- JES**
 - ☐ Functional Subsystems
 - ☐ Job Class Groups
 - ☐ Network Connections
 - ☐ Nodes
 - ☐ Proclib Data Sets
 - ☐ Spool Partitions
 - ☐ Sysout Classes
 - ☐ JESplex Members
 - ☐ Job Classes
 - ☐ Network Servers
 - ☐ Printers & Punches
 - ☐ Scheduling Environments
 - ☐ Spool Volumes
 - ☐ WLM Resources
- System**
 - ☐ ENQ Resources
 - ☐ Link List Data Sets
 - ☒ Log
 - ☐ System Requests
 - ☐ Health Checker
 - ☐ Link Pack Data Sets
 - ☐ Parmlib Data Sets
 - ☐ System Symbols
- Tools**
 - ☐ Sessions
 - ☐ User Log

Buttons: Accept, Cancel

(E)JES Web

- ▶ A number of different color schemes and other display options are supported. This color scheme approximates the colors use on a 3270 terminal.

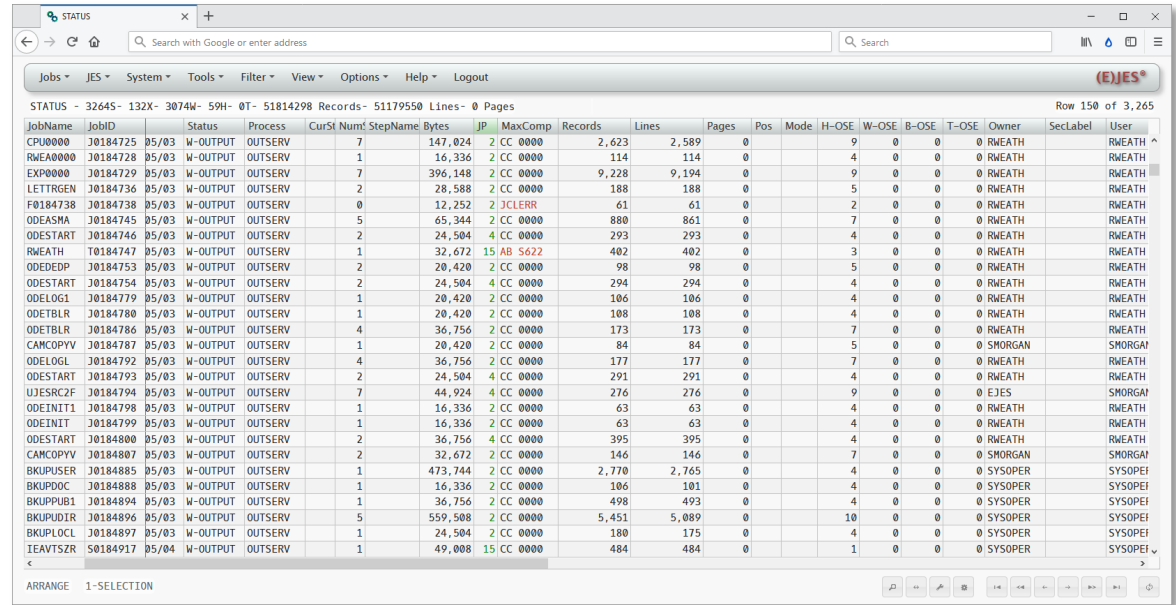


The screenshot displays the (E)JES Web interface in a browser window. The interface includes a top navigation bar with menus for Jobs, JES, System, Tools, Filter, View, Options, Help, and Logout. Below the navigation bar is a search bar and a status bar indicating 'Row 150 of 3,275'. The main content area is a table with columns for JobName, JobID, QTime, QDate, Status, Process, CurSI, Num, StepName, JP, MaxComp, Records, Lines, Pages, Bytes, Pos, Mode, H-OSE, W-OSE, B-OSE, T-OSE, Owner, and Sect. The table lists various jobs and their details, including CPU0000, RMEA0000, EXP0000, LETTRGEN, F0184738, ODEASMA, ODESTART, RWEATH, ODEDEDP, ODESTART, ODELOGL, ODETLR, CAMCOPYV, ODELOGL, ODESTART, UJESRC2F, ODEINIT1, ODEINIT, ODESTART, CAMCOPYV, BKUPUSER, BKUPDOC, BKUPPUB1, BKUPUDIR, BKUPLCL, IEAVTSZR, IEAVTSZR, LKSUBS, and LKSUBS. The table is sorted by JobName, and the status bar indicates '1-SELECTION'.

JobName	JobID	QTime	QDate	Status	Process	CurSI	Num	StepName	JP	MaxComp	Records	Lines	Pages	Bytes	Pos	Mode	H-OSE	W-OSE	B-OSE	T-OSE	Owner	Sect
CPU0000	J0184725	10:18:33	2018/05/03	W-OUTPUT	OUTSERV	7		2 CC 0000		2,623	2,589	0	147K				9	0	0	0	RWEATH	
RMEA0000	J0184728	10:19:23	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		114	114	0	16K				4	0	0	0	RWEATH	
EXP0000	J0184729	10:19:23	2018/05/03	W-OUTPUT	OUTSERV	7		2 CC 0000		9,228	9,194	0	396K				9	0	0	0	RWEATH	
LETRGEN	J0184736	10:30:41	2018/05/03	W-OUTPUT	OUTSERV	2		2 CC 0000		188	188	0	29K				5	0	0	0	RWEATH	
F0184738	J0184738	10:42:00	2018/05/03	W-OUTPUT	OUTSERV	0		2 JCLERR		61	61	0	12K				2	0	0	0	RWEATH	
ODEASMA	J0184745	10:47:42	2018/05/03	W-OUTPUT	OUTSERV	5		2 CC 0000		880	861	0	65K				7	0	0	0	RWEATH	
ODESTART	J0184746	10:48:05	2018/05/03	W-OUTPUT	OUTSERV	2		4 CC 0000		293	293	0	25K				4	0	0	0	RWEATH	
RWEATH	J0184747	10:50:22	2018/05/03	W-OUTPUT	OUTSERV	1		15 AB 5622		402	402	0	33K				3	0	0	0	RWEATH	
ODEDEDP	J0184753	10:58:19	2018/05/03	W-OUTPUT	OUTSERV	2		2 CC 0000		98	98	0	20K				5	0	0	0	RWEATH	
ODESTART	J0184754	10:59:31	2018/05/03	W-OUTPUT	OUTSERV	2		4 CC 0000		294	294	0	25K				4	0	0	0	RWEATH	
ODELOGL	J0184779	12:52:33	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		106	106	0	20K				4	0	0	0	RWEATH	
ODETLR	J0184780	12:57:10	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		108	108	0	20K				4	0	0	0	RWEATH	
ODETLR	J0184786	13:00:48	2018/05/03	W-OUTPUT	OUTSERV	4		2 CC 0000		173	173	0	37K				7	0	0	0	RWEATH	
CAMCOPYV	J0184787	13:02:48	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		84	84	0	20K				5	0	0	0	SMORGAN	
ODELOGL	J0184792	13:03:21	2018/05/03	W-OUTPUT	OUTSERV	4		2 CC 0000		177	177	0	37K				7	0	0	0	RWEATH	
ODESTART	J0184793	13:04:28	2018/05/03	W-OUTPUT	OUTSERV	2		4 CC 0000		291	291	0	25K				4	0	0	0	RWEATH	
UJESRC2F	J0184794	13:06:25	2018/05/03	W-OUTPUT	OUTSERV	7		4 CC 0000		276	276	0	45K				9	0	0	0	EJES	
ODEINIT1	J0184798	13:09:37	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		63	63	0	16K				4	0	0	0	RWEATH	
ODEINIT	J0184799	13:11:24	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		63	63	0	16K				4	0	0	0	RWEATH	
ODESTART	J0184800	13:12:06	2018/05/03	W-OUTPUT	OUTSERV	2		4 CC 0000		395	395	0	37K				4	0	0	0	RWEATH	
CAMCOPYV	J0184807	14:57:49	2018/05/03	W-OUTPUT	OUTSERV	2		2 CC 0000		146	146	0	33K				7	0	0	0	SMORGAN	
BKUPUSER	J0184885	21:14:59	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		2,770	2,765	0	474K				4	0	0	0	SYSDPER	
BKUPDOC	J0184888	21:29:59	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		106	101	0	16K				4	0	0	0	SYSDPER	
BKUPPUB1	J0184894	21:45:00	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		498	493	0	37K				4	0	0	0	SYSDPER	
BKUPUDIR	J0184896	22:00:00	2018/05/03	W-OUTPUT	OUTSERV	5		2 CC 0000		5,451	5,089	0	560K				10	0	0	0	SYSDPER	
BKUPLCL	J0184897	22:00:00	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		180	175	0	25K				4	0	0	0	SYSDPER	
IEAVTSZR	S0184917	00:01:05	2018/05/04	W-OUTPUT	OUTSERV	1		15 CC 0000		484	484	0	49K				1	0	0	0	SYSDPER	
IEAVTSZR	S0184918	00:01:05	2018/05/04	W-OUTPUT	OUTSERV	1		15 CC 0000		467	467	0	49K				1	0	0	0	SYSDPER	
LKSUBS	J0184930	13:43:15	2011/04/25	W-OUTPUT	OUTSERV	0		1 CC 0012		146	146	0	20K				0	1	0	0	????????	
LKSUBS	J0184931	13:44:47	2011/04/25	W-OUTPUT	OUTSERV	0		1 CC 0000		316	316	0	25K				0	1	0	0	????????	

(E)JES Web

- ▶ Full featured browser-based application – not just a viewer
- ▶ Column reorder via drag and drop
- ▶ Column resizing
- ▶ Sort data by clicking column headers – up to four sort keys are supported

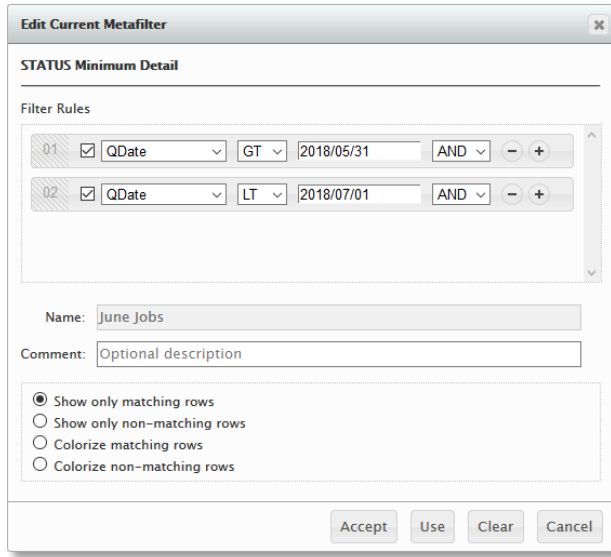


The screenshot displays the (E)JES Web application interface. At the top, there's a navigation bar with tabs for Jobs, JES, System, Tools, Filter, View, Options, Help, and Logout. Below this is a search bar and a status bar indicating 'STATUS - 32645 - 132X - 3074W - 59H - 0T - 51814298 Records - 51179550 Lines - 0 Pages'. The main area contains a table with columns for JobName, JobID, Status, Process, CurSt, Num, StepName, Bytes, JP, MaxComp, Records, Lines, Pages, Pos, Mode, H-OSE, W-OSE, B-OSE, T-OSE, Owner, SecLabel, and User. The table is sorted by JobID in descending order. The bottom of the interface shows a pagination control with 'ARRANGE 1-SELECTION' and navigation buttons.

JobName	JobID	Status	Process	CurSt	Num	StepName	Bytes	JP	MaxComp	Records	Lines	Pages	Pos	Mode	H-OSE	W-OSE	B-OSE	T-OSE	Owner	SecLabel	User
CPU0000	J0184725	05/03	W-OUTPUT	OUTSERV	7		147,024	2	CC 0000	2,623	2,589	0			9	0	0	0	RWEATH	RWEATH	
RWEA0000	J0184728	05/03	W-OUTPUT	OUTSERV	1		16,336	2	CC 0000	114	114	0			4	0	0	0	RWEATH	RWEATH	
EXP0000	J0184729	05/03	W-OUTPUT	OUTSERV	7		396,148	2	CC 0000	9,228	9,194	0			9	0	0	0	RWEATH	RWEATH	
LETTGEN	J0184736	05/03	W-OUTPUT	OUTSERV	2		28,588	2	CC 0000	188	188	0			5	0	0	0	RWEATH	RWEATH	
F0184738	J0184738	05/03	W-OUTPUT	OUTSERV	0		12,252	2	JCLERR	61	61	0			2	0	0	0	RWEATH	RWEATH	
ODEASMA	J0184745	05/03	W-OUTPUT	OUTSERV	5		65,344	2	CC 0000	880	861	0			7	0	0	0	RWEATH	RWEATH	
ODESTART	J0184746	05/03	W-OUTPUT	OUTSERV	2		24,504	4	CC 0000	293	293	0			4	0	0	0	RWEATH	RWEATH	
RWEATH	J0184747	05/03	W-OUTPUT	OUTSERV	1		32,672	15	AB 5622	402	402	0			3	0	0	0	RWEATH	RWEATH	
ODEEDP	J0184753	05/03	W-OUTPUT	OUTSERV	2		20,420	2	CC 0000	98	98	0			5	0	0	0	RWEATH	RWEATH	
ODESTART	J0184754	05/03	W-OUTPUT	OUTSERV	2		24,504	4	CC 0000	294	294	0			4	0	0	0	RWEATH	RWEATH	
ODELOG1	J0184779	05/03	W-OUTPUT	OUTSERV	1		20,420	2	CC 0000	106	106	0			4	0	0	0	RWEATH	RWEATH	
ODETBLR	J0184780	05/03	W-OUTPUT	OUTSERV	1		20,420	2	CC 0000	108	108	0			4	0	0	0	RWEATH	RWEATH	
ODETBLR	J0184786	05/03	W-OUTPUT	OUTSERV	4		36,756	2	CC 0000	173	173	0			7	0	0	0	RWEATH	RWEATH	
CANCOPIV	J0184787	05/03	W-OUTPUT	OUTSERV	1		20,420	2	CC 0000	84	84	0			5	0	0	0	SMORGAN	SMORGAN	
ODEOGL	J0184792	05/03	W-OUTPUT	OUTSERV	4		36,756	2	CC 0000	177	177	0			7	0	0	0	RWEATH	RWEATH	
ODESTART	J0184793	05/03	W-OUTPUT	OUTSERV	2		24,504	4	CC 0000	291	291	0			4	0	0	0	RWEATH	RWEATH	
UJESRCZF	J0184794	05/03	W-OUTPUT	OUTSERV	7		44,924	4	CC 0000	276	276	0			9	0	0	0	EJES	SMORGAN	
ODEINIT1	J0184798	05/03	W-OUTPUT	OUTSERV	1		16,336	2	CC 0000	63	63	0			4	0	0	0	RWEATH	RWEATH	
ODEINIT	J0184799	05/03	W-OUTPUT	OUTSERV	1		16,336	2	CC 0000	63	63	0			4	0	0	0	RWEATH	RWEATH	
ODESTART	J0184800	05/03	W-OUTPUT	OUTSERV	2		36,756	4	CC 0000	395	395	0			4	0	0	0	RWEATH	RWEATH	
CANCOPIV	J0184807	05/03	W-OUTPUT	OUTSERV	2		32,672	2	CC 0000	146	146	0			7	0	0	0	SMORGAN	SMORGAN	
BKUPUSER	J0184885	05/03	W-OUTPUT	OUTSERV	1		473,744	2	CC 0000	2,770	2,765	0			4	0	0	0	SYSOPER	SYSOPER	
BKUPDOC	J0184888	05/03	W-OUTPUT	OUTSERV	1		16,336	2	CC 0000	106	101	0			4	0	0	0	SYSOPER	SYSOPER	
BKUPPUB1	J0184894	05/03	W-OUTPUT	OUTSERV	1		36,756	2	CC 0000	498	493	0			4	0	0	0	SYSOPER	SYSOPER	
BKUPDIR	J0184896	05/03	W-OUTPUT	OUTSERV	5		559,508	2	CC 0000	5,451	5,089	0			10	0	0	0	SYSOPER	SYSOPER	
BKUPLOCL	J0184897	05/03	W-OUTPUT	OUTSERV	1		24,504	2	CC 0000	180	175	0			4	0	0	0	SYSOPER	SYSOPER	
IEAVTSZR	J0184917	05/04	W-OUTPUT	OUTSERV	1		49,008	15	CC 0000	484	484	0			1	0	0	0	SYSOPER	SYSOPER	

(E)JES Web

- ▶ (E)JES Web supports metafilters, which are customized column-based filters for tabular displays. Users can save multiple metafilters.
- ▶ Metafilters are stored on the host and can be used even when you log in from a different device or browser.



Edit Current Metafilter

STATUS Minimum Detail

Filter Rules

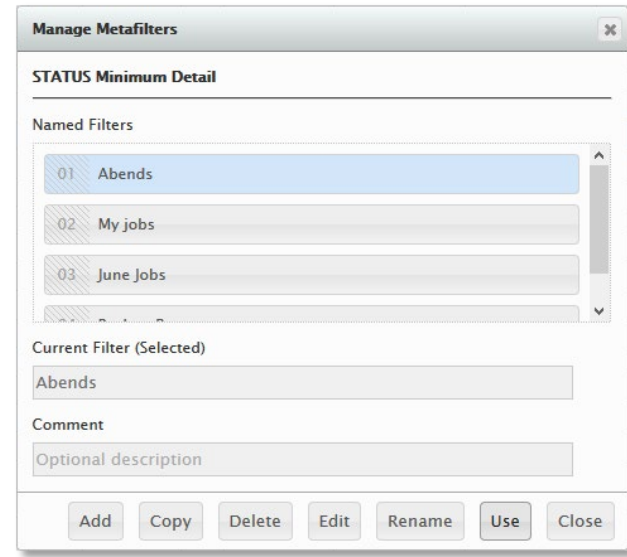
01	<input checked="" type="checkbox"/>	QDate	GT	2018/05/31	AND	-	+
02	<input checked="" type="checkbox"/>	QDate	LT	2018/07/01	AND	-	+

Name: June Jobs

Comment: Optional description

☒ Show only matching rows
☐ Show only non-matching rows
☐ Colorize matching rows
☐ Colorize non-matching rows

Accept Use Clear Cancel



Manage Metafilters

STATUS Minimum Detail

Named Filters

01	Abends
02	My jobs
03	June Jobs

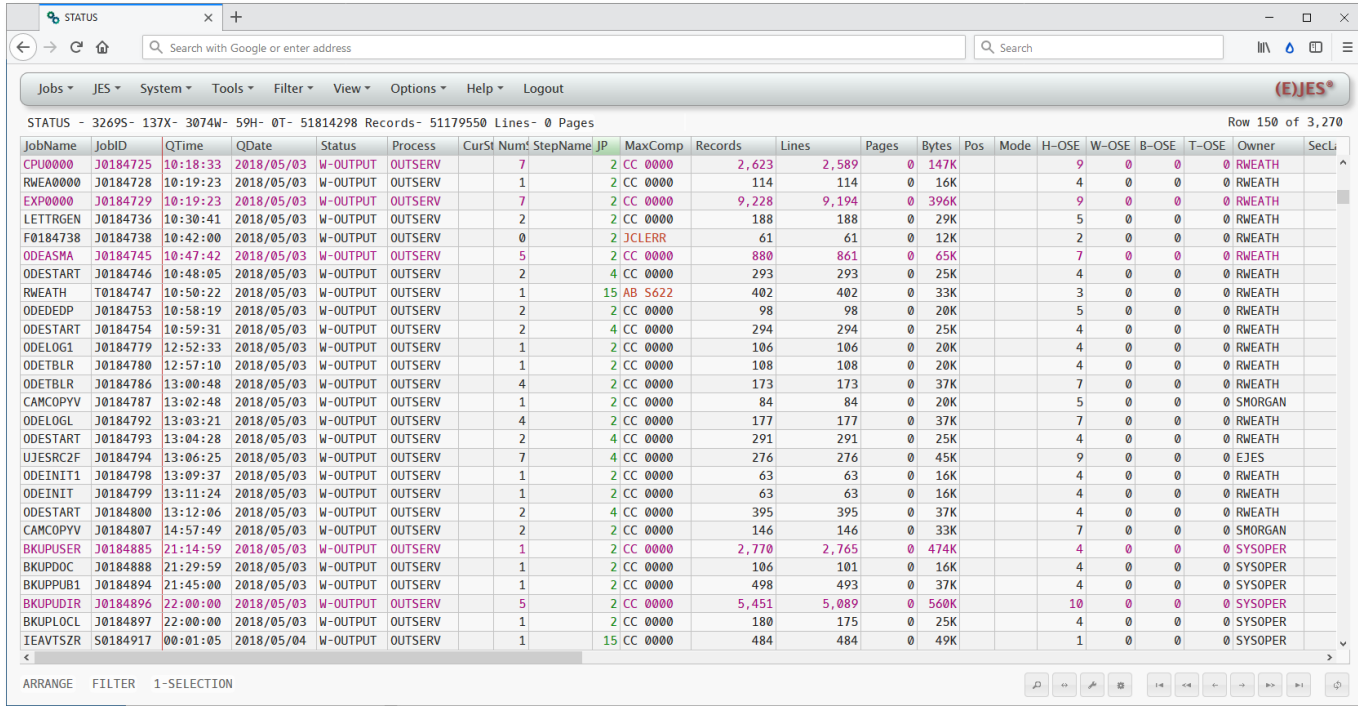
Current Filter (Selected)
Abends

Comment
Optional description

Add Copy Delete Edit Rename Use Close

(E)JES Web

- ▶ You can have (E)JES Web colorize the records that match your filter



STATUS - 32695- 137X- 3074W- 59H- 0T- 51814298 Records- 51179550 Lines- 0 Pages Row 150 of 3,270

JobName	JobID	QTime	QDate	Status	Process	CurSt	Num	StepName	JP	MaxComp	Records	Lines	Pages	Bytes	Pos	Mode	H-OSE	W-OSE	B-OSE	T-OSE	Owner	SecL
CPU0000	J0184725	10:18:33	2018/05/03	W-OUTPUT	OUTSERV		7		2	CC 0000	2,623	2,589	0	147K			9	0	0	0	RWEATH	
RWEA0000	J0184728	10:19:23	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	114	114	0	16K			4	0	0	0	RWEATH	
EXP0000	J0184729	10:19:23	2018/05/03	W-OUTPUT	OUTSERV		7		2	CC 0000	9,228	9,194	0	396K			9	0	0	0	RWEATH	
LETTGEN	J0184736	10:30:41	2018/05/03	W-OUTPUT	OUTSERV		2		2	CC 0000	188	188	0	29K			5	0	0	0	RWEATH	
F0184738	J0184738	10:42:00	2018/05/03	W-OUTPUT	OUTSERV		0		2	JCLERR	61	61	0	12K			2	0	0	0	RWEATH	
ODEASHA	J0184745	10:47:42	2018/05/03	W-OUTPUT	OUTSERV		5		2	CC 0000	880	861	0	65K			7	0	0	0	RWEATH	
ODESTART	J0184746	10:48:05	2018/05/03	W-OUTPUT	OUTSERV		2		4	CC 0000	293	293	0	25K			4	0	0	0	RWEATH	
RWEATH	J0184747	10:50:22	2018/05/03	W-OUTPUT	OUTSERV		1		15	AB S622	402	402	0	33K			3	0	0	0	RWEATH	
ODEDEP	J0184753	10:58:19	2018/05/03	W-OUTPUT	OUTSERV		2		2	CC 0000	98	98	0	20K			5	0	0	0	RWEATH	
ODESTART	J0184754	10:59:31	2018/05/03	W-OUTPUT	OUTSERV		2		4	CC 0000	294	294	0	25K			4	0	0	0	RWEATH	
ODELOG1	J0184779	12:52:33	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	106	106	0	20K			4	0	0	0	RWEATH	
ODETBLR	J0184780	12:57:10	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	108	108	0	20K			4	0	0	0	RWEATH	
ODETBLR	J0184786	13:00:48	2018/05/03	W-OUTPUT	OUTSERV		4		2	CC 0000	173	173	0	37K			7	0	0	0	RWEATH	
CAMCOPYV	J0184787	13:02:48	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	84	84	0	20K			5	0	0	0	SMORGAN	
ODELOG1	J0184792	13:03:21	2018/05/03	W-OUTPUT	OUTSERV		4		2	CC 0000	177	177	0	37K			7	0	0	0	RWEATH	
ODESTART	J0184793	13:04:28	2018/05/03	W-OUTPUT	OUTSERV		2		4	CC 0000	291	291	0	25K			4	0	0	0	RWEATH	
UJESRC2F	J0184794	13:06:25	2018/05/03	W-OUTPUT	OUTSERV		7		4	CC 0000	276	276	0	45K			9	0	0	0	EJES	
ODEINIT1	J0184798	13:09:37	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	63	63	0	16K			4	0	0	0	RWEATH	
ODEINIT	J0184799	13:11:24	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	63	63	0	16K			4	0	0	0	RWEATH	
ODESTART	J0184800	13:12:06	2018/05/03	W-OUTPUT	OUTSERV		2		4	CC 0000	395	395	0	37K			4	0	0	0	RWEATH	
CAMCOPYV	J0184807	14:57:49	2018/05/03	W-OUTPUT	OUTSERV		2		2	CC 0000	146	146	0	33K			7	0	0	0	SMORGAN	
BKUPUSER	J0184885	21:14:59	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	2,770	2,765	0	474K			4	0	0	0	SYSOPER	
BKUPDOC	J0184888	21:29:59	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	106	101	0	16K			4	0	0	0	SYSOPER	
BKUPPUB1	J0184894	21:45:00	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	498	493	0	37K			4	0	0	0	SYSOPER	
BKUPUDIR	J0184896	22:00:00	2018/05/03	W-OUTPUT	OUTSERV		5		2	CC 0000	5,451	5,089	0	500K			10	0	0	0	SYSOPER	
BKUPLOCL	J0184897	22:00:00	2018/05/03	W-OUTPUT	OUTSERV		1		2	CC 0000	180	175	0	25K			4	0	0	0	SYSOPER	
IEAVTSZR	S0184917	00:01:05	2018/05/04	W-OUTPUT	OUTSERV		1		15	CC 0000	484	484	0	49K			1	0	0	0	SYSOPER	

ARRANGE FILTER 1-SELECTION

(E)JES Web

- ▶ Select rows using your mouse or your keyboard using standard conventions
- ▶ Line commands are accessible via a contextual menu when you right-click

Right-click a row to access commands

The screenshot shows the (E)JES Web application interface. At the top, there's a navigation bar with tabs for Jobs, JES, System, Tools, Filter, View, Options, Help, and Logout. Below this is a search bar and a status bar indicating 'STATUS - 32695- 137X- 3074W- 59H- 0T- 51814298 Records- 51179550 Lines- 0 Pages'. The main area displays a table of job data. A right-click context menu is open over the row for job LOGSAV60, showing options like Browse, Cancel, Data Set Status, Display, DJC, Download As, Extract, Hold, Mail As, Out Desc, Release, Requeue To, Restart, Run, Spin, and Sys Cancel. The table columns include JobName, JobID, QTime, QDate, Status, Process, CurSI Num, StepName, JP, MaxComp, Records, Lines, Pages, Bytes, Pos, Mode, H-OSE, W-OSE, B-OSE, T-OSE, Owner, and SecL.

JobName	JobID	QTime	QDate	Status	Process	CurSI Num	StepName	JP	MaxComp	Records	Lines	Pages	Bytes	Pos	Mode	H-OSE	W-OSE	B-OSE	T-OSE	Owner	SecL
LOGSAV60	J0185457	00:00:59	2018/05/06	W-OUTPUT	OUTSERV	11		4	AB S837	1,778	1,756	0	143K			7	0	0	0	SYSOPER	
LOGSAV70	J0185458	00:00:59	2018/05/06	W-OUTPUT	OUTSERV	11		4	CC 0000	73,428	68,611	0	5M			18	0	0	0	SYSOPER	
LOGSAV80	J0185459	12:59:20	2018/05/06	W-OUTPUT	OUTSERV	0		1	CC 0000	19	19	0	4K			0	1	0	0	SYSOPER	
IEAVTSZR	J0185462	00:01:02	2018/05/06	Activity		1		15	CC 0000	454	454	0	45K			1	0	0	0	SYSOPER	
IEAVTSZR	J0185463	00:01:02	2018/05/06	Alter		1		15	CC 0000	1,465	1,465	0	151K			1	0	0	0	SYSOPER	
EJESXPIR	J0185479	02:00:00	2018/05/06					2	CC 0000	6,482	6,482	0	392K			4	0	0	0	EDJXADM	
DFS	J0185482	02:46:13	2018/05/06					5	CC 0000	84	81	0	12K			3	0	0	0	SYSOPER	
DB8CHSTR	J0185487	02:46:13	2018/05/06					5	JCLERR	14	14	0	8K			3	0	0	0	SYSOPER	
EJESVJ3	J0185488	02:46:13	2018/05/06					5	CC 0000	2	2	0	4K			1	0	0	0	EJES	
FTDRVR	J0185489	02:46:13	2018/05/06					5	AB S222	78	78	0	16K			4	0	0	0	PHOENIX	
ISZSMGR	J0185491	02:46:13	2018/05/06					5	CC 0000	381	381	0	33K			1	0	0	0	SYSOPER	
LOGSAV80	J0185570	12:59:20	2018/05/06					1	CC 0000	200	200	0	12K			0	1	0	0	SYSOPER	
LOGSAV80	J0185571	12:59:25	2018/05/06					1	CC 0000	123,424	111,634	0	8M			0	2	0	0	SYSOPER	
RWEA0571	J0185578	13:06:38	2018/05/06					2	CC 0000	92	92	0	16K			4	0	0	0	RWEATH	
CPU0571	J0185579	13:06:38	2018/05/06					2	CC 0000	1,425	1,391	0	98K			9	0	0	0	RWEATH	
RWEA0571	J0185582	13:07:44	2018/05/06					2	CC 0000	92	92	0	16K			4	0	0	0	RWEATH	
EXP0571	J0185583	13:07:44	2018/05/06					2	CC 0000	1,750	1,716	0	110K			9	0	0	0	RWEATH	
BKUPVM1	J0185590	14:05:32	2018/05/06					8	CC 0004	3,416	3,416	0	486K			64	0	0	0	RWEATH2	
BKUPVM2	J0185591	14:05:32	2018/05/06					8	CC 0000	696	696	0	98K			14	0	0	0	RWEATH2	
MAKEUTL	J0185592	14:05:32	2018/05/06					8	CC 0000	671	671	0	49K			6	0	0	0	RWEATH2	
BKUPUSER	J0185648	21:14:59	2018/05/06					2	CC 3072	59	57	0	16K			4	0	0	0	SYSOPER	
BKUPDOC	J0185652	21:29:59	2018/05/06					2	CC 3072	59	57	0	16K			4	0	0	0	SYSOPER	
BKUPPUB1	J0185658	21:44:59	2018/05/06					2	CC 3072	59	57	0	16K			4	0	0	0	SYSOPER	
BKUPUDIR	J0185661	21:59:59	2018/05/06					2	CC 3072	1,200	1,054	0	102K			10	0	0	0	SYSOPER	
BKUPLOCL	J0185662	21:59:59	2018/05/06					2	CC 3072	59	57	0	16K			4	0	0	0	SYSOPER	
EJESVJ3	J0185709	22:44:39	2018/05/06	W-OUTPUT	OUTSERV	2		15	CC 0000	2	2	0	4K			1	0	0	0	EJES	
CICSA	J0185713	22:46:03	2018/05/06	W-OUTPUT	OUTSERV	5		15	JCLERR	294	294	0	33K			4	0	0	0	CICSA	

(E)JES Web

- ▶ You can also issue line commands by typing a **colon**. An input field appears.
- ▶ Type a **semi-colon** to display a primary command field. Here you can enter a navigation command instead of using the menu.

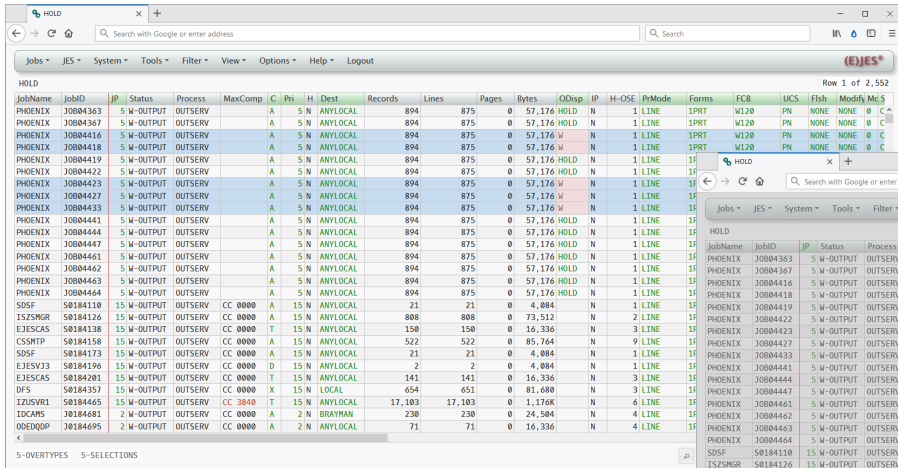
The screenshot shows the (E)JES Web interface. At the top, there's a navigation bar with tabs like 'Jobs', 'JES', 'System', 'Tools', 'Filter', 'View', 'Options', 'Help', and 'Logout'. Below this is a search bar and a status bar indicating 'Row 231 of 3,270'. The main area displays a table with columns for JobName, JobID, QTime, QDate, Status, Process, CurSt, Num, StepName, JP, MaxComp, Records, Lines, Pages, Bytes, Pos, Mode, H-OSE, W-OSE, B-OSE, T-OSE, Owner, and Secl. The table lists various jobs such as LOGSAV60, LOGSAV70, LOGSAV80, IEAVTSZR, IEAVTSZR, EIESXPTR, DFS, DB8GMSTR, EIESVJ3, FTDRVR, ISZSMGR, LOGSAV80, LOGSAV80, RWEA0571, CPU0571, RWEA0571, EXP0571, BKUPVM1, BKUPVM2, MAKEUTIL, BKUPUSER, BKUPDOC, BKUPPUB1, BKUPPUB1, BKUPPUB1, BKUPPUB1, EIESVJ3, and CICSA. At the bottom, there is a 'Command:' field with a prompt 'Enter a line command and press ENTER. Press ESC to dismiss.'

Type your command here.

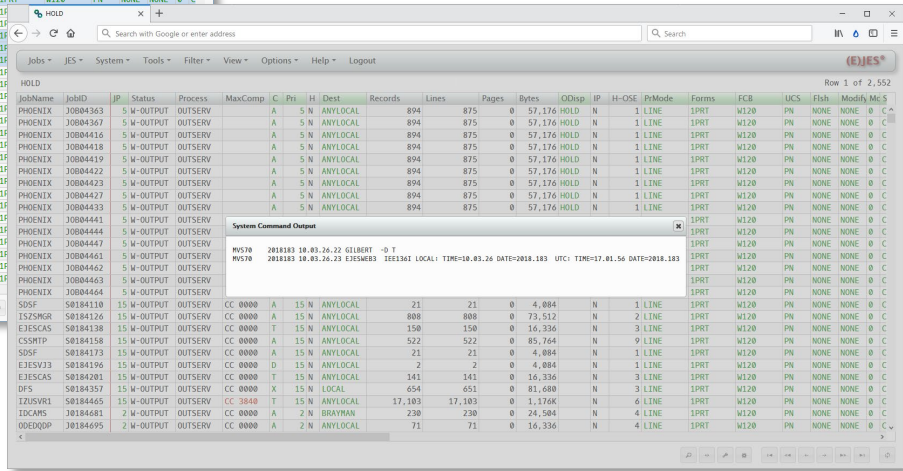
(E)JES Web

- ▶ A green background on a column heading means a column is overtypeable.
- ▶ Propagate overtyped values by selecting multiple rows.

**Press
Enter to
issue the
command
or Esc to
cancel.**



A message pops up with the results of your command.



(E)JES Web

- ▶ You can download and/or email data as text or PDF by right-clicking on a row and choosing **Download as Text**, **Download as PDF**, **Mail as Text**, or **Mail as PDF**.

The workflow consists of the following steps:

- Download As PDF Dialog:** A dialog box with the following options:
 - Amount:** ☒ All Lines, ☐ Current Page, ☐ Range of Lines
 - Carriage Control:** ☐ Discard, ☒ Interpret
 - Font:** ☒ System Font, ☐ Web Page Font
 - Long Lines:** ☒ Truncate, ☐ Wrap
 - Orientation:** ☒ Landscape, ☐ Portrait
 - Page Size:** ☐ A4, ☐ A5, ☐ US Legal, ☒ US Letter
 - Security Options:** ☒ None, ☐ Prompt
- Web Browser:** A screenshot of a web browser displaying a detailed report titled "LISTCAT: Monday July 2, 2018".
- Email Client:** A screenshot of an email client showing an email titled "LISTCAT: Monday July 2, 2018" with a PDF attachment named "LISTCAT J0205754.pdf".

Eclipse-based IDEs

- ▶ Eclipse is an open source framework built on software originally provided by IBM.
- ▶ It can be used to build any user interface, but is most traditionally associated with integrated development environments (IDEs).
- ▶ Eclipse provides the de facto Java IDE and is used by programmers worldwide.
- ▶ Current generation programmers have almost certainly used Eclipse.
- ▶ It's extremely extensible, built on a plug-in architecture that allows features to be created and added on demand.
- ▶ There's a rich set of existing plug-ins available via the Eclipse marketplace, some free and some charged.
- ▶ To truly attract the best and the brightest, a modern, state-of-the-art development environment is a must.
- ▶ Expect your next generation of mainframe programmers to already be familiar with Eclipse.

Eclipse-based IDEs

eclipse-workspace - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer

- Launcher [Launcher master]
- src
- JRE System Library [JavaSE-12]
- Referenced Libraries
- build.xml
- makefile
- Libraries [Libraries master]
- activation.jar
- commons-net-3.3-src.jar
- commons-net-3.3.jar
- EjesApi.jar
- EjesApiDoc.jar
- EjesMail.jar
- ibmjzos.jar
- ibmjzosDoc.jar
- isfjcall.jar
- jCharts-0.7.5.jar
- jst.jar
- Launcher.jar
- libEjesApi.so
- libEjesApi4.so
- libisfjcall.so
- mailapi-1.6.0.jar
- mailapi-1.6.2.jar
- MessageCompiler.jar
- pdfbox-doc.jar
- pdfbox.jar
- RAF.jar

Git Repositories

- Launcher [master] - C:\Users\Ed Jaffe\workspace
- Libraries [master] - C:\Users\Ed Jaffe\workspace
- Branches
- Tags
- References
- Remotes
- Working Tree - C:\Users\Ed Jaffe\workspace

Launcher.java

```
1 package com.phoenixsoftware.util;
2
3 import static com.ibm.jzos.Enqueue.ISGENO_CONTROL_EXCLUSIVE;
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27 public class Launcher {
28
29
30     static Process p;
31     static String pidFile;
32     static String launchFile;
33     static int returnCode = 0;
34
35
36     /**
37      * Operator interaction.
38      */
39     static class CommandCallback implements MvsCommandCallback {
40
41         private class CommandException extends Exception {
42             static final long serialVersionUID = 1L;
43             public CommandException(String s) {
44                 super(s);
45             }
46         }
47         public void handleModify(String s) {
48             String message = "";
49         }
50     }
51 }
```

Task List

Find

Outline

- com.phoenixsoftware.util
- Launcher
- p: Process
- pidFile: String
- launchFile: String
- returnCode: int
- CommandCallback
- CaptureOutput
- ArgumentException
- Documents

Problems

JavaDoc

Declaration

Terminal

Internal Web Browser

History

https://mvs70.phx.phoenixsoftware.com:54762/EjesWeb/

Jobs

JES

System

Tools

Filter

View

Options

Help

Logout

STATUS 24605 68X 2563W 6H 45T 8163919 Records 88 Pages

Row 633 of 2,682

JobName	JobID	Status	Queue	AMbr	JP	Pos	WPos	Pages	MaxComp	O-JOE	Records	H-JOE	Owner	SecLabel	Class	Group	SrvClass	Scheduling-Env	Mode
IEAVTSZR	S0053326	QUEUED	PRINT		1	2K		0	CC 0000	2	394	0	SYSOPER		STC				
EJESVJ2	S0053591	QUEUED	PRINT		1	2K		0	CC 0000	2	394	0	EJES		STC				
SMORGAN	T0051978	QUEUED	PRINT		1	2K		0	AB S622	1	393	0	SMORGAN		TSU				
SMORGAN	T0049901	QUEUED	PRINT		1	982		0	AB S622	1	392	0	SMORGAN		TSU				
SMORGAN	T0054113	QUEUED	PRINT		1	2K		0	AB S622	1	389	0	SMORGAN		TSU				
RWEATH	T0050969	QUEUED	PRINT		1	1K		0	AB S522	1	388	0	RWEATH		TSU				
EDJXADM	T0049079	QUEUED	PRINT		1	664		0	AB S522	1	387	0	EDJXADM		TSU				
DFHSM0	S0051200	QUEUED	PRINT		1	1K		0	CC 0000	1	387	0	DFHSM		STC				
IEAVTSZR	S0049119	QUEUED	PRINT		1	666		0	CC 0000	2	386	0	SYSOPER		STC				
SMORGAN	T0049558	QUEUED	PRINT		1	830		0	AB S622	1	385	0	SMORGAN		TSU				
DFHSM0	S0049436	QUEUED	PRINT		1	869		0	CC 0000	1	385	0	DFHSM		STC				
SMORGAN	T0048976	QUEUED	PRINT		1	560		0	AB U4094	1	382	0	SMORGAN		TSU				

ARRANGE FILTER SORT

Eclipse-based IDEs

Want to learn more about Eclipse: <https://www.eclipse.org/>

Objective

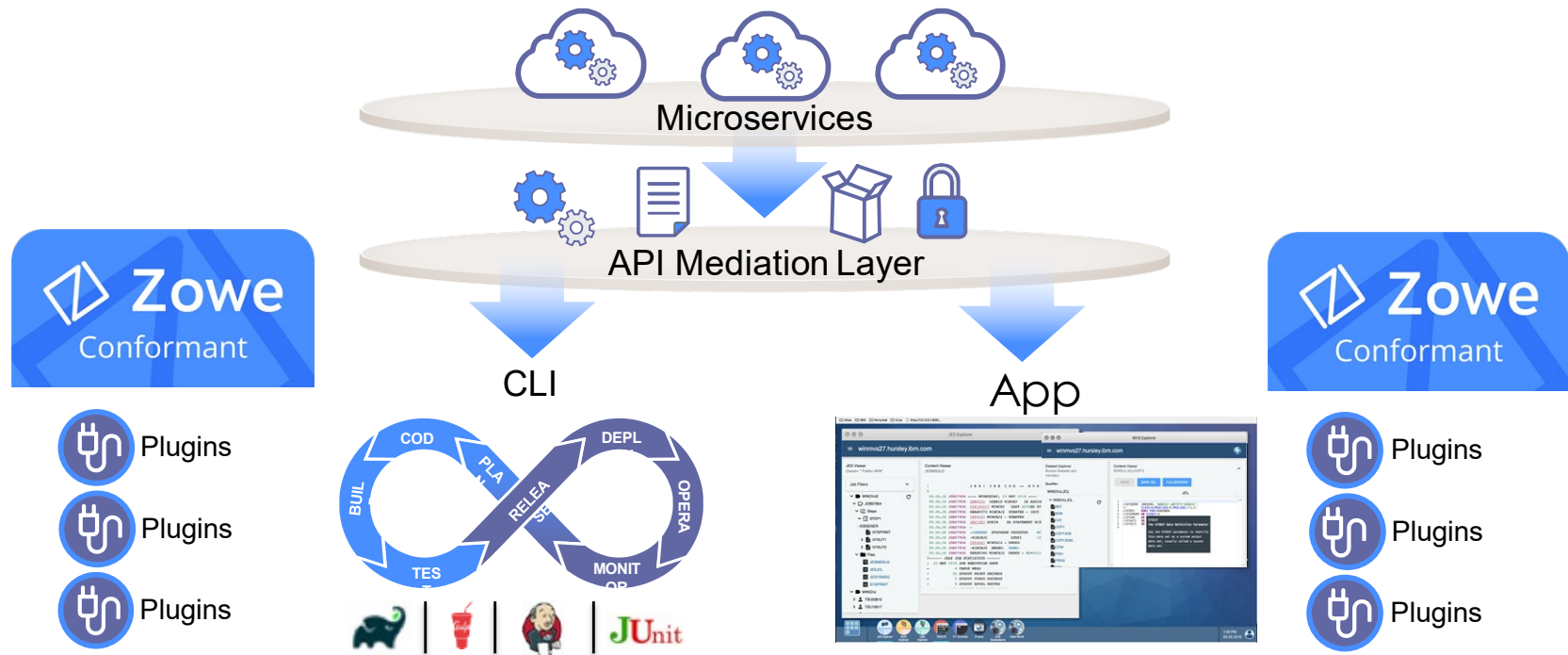
- ▶ Discuss how Phoenix Software International is applying the use of present-day tools with the mainframe such as:
 - (E)JES, (E)JES Web and Eclipse – A modern, lightweight browser-based system management tool for users who prefer not to work in a 3270 and for developers who want to leverage the Eclipse IDE for development
 - **Zowe – Open source framework for the mainframe that provides solutions that allow development and operations teams to securely manage, control, script, and develop on the mainframe like any other cloud platform**
 - z/OSMF Workflow – automation of routine procedures and tasks through the use of a modern interface and Zorow – An open source community dedicated to contributing and collaborating on z/OSMF Workflows

Zowe

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



Framework and Ecosystem at a Glance



Zowe

▶ Anyone can participate

- The Zowe community is vital to driving innovation
- By joining you can become part of the development of a vibrant ecosystem of applications for the mainframe
- Zowe is open to all for participation (contributor, committer, conformant)
- Any mainframe organization, vendor, ISV, consultant, or user in the mainframe community can participate in the development of Zowe

Zowe

▶ Ecosystem enablement thru Zowe Conformance

- Vendors and ISVs are able to build applications that leverage or build on top of the Zowe Framework
- Building on this framework speeds up vendors time to market and enables easier integration with other Zowe Conformant applications



What is Zowe?

Browser-based Web Desktop

The screenshot displays the Zowe web interface. On the left, there's a Swagger-defined REST API for JES job APIs, listing endpoints like `/api/v1/jobs`, `/api/v1/jobs/{jobName}/files`, and `/api/v1/jobs/{jobName}/steps`. The main area shows a JES job log for job `JOB7954`, detailing its execution steps and status. The interface includes a top navigation bar with 'swagger' and 'winmvs27.hursley.ibm.com'.

Swagger-defined z/OS REST APIs

API Mediation Layer (Gateway, Discovery Service, Catalog)

API Mediation Layer API

The API Mediation Layer for z/OS internal API services. The API Mediation Layer provides a single point of access to mainframe REST APIs and offers enterprise cloud-like features such as high-availability, scalability, dynamic API discovery, and documentation.

apicatalog

API Catalog

[API Homepage](#)

API Catalog service to display service details and API documentation for discovered API services.

API Catalog

API Version: 1.0.0

[Base URL: `ca3x.ca.com:10010/api/v1/apicatalog`]

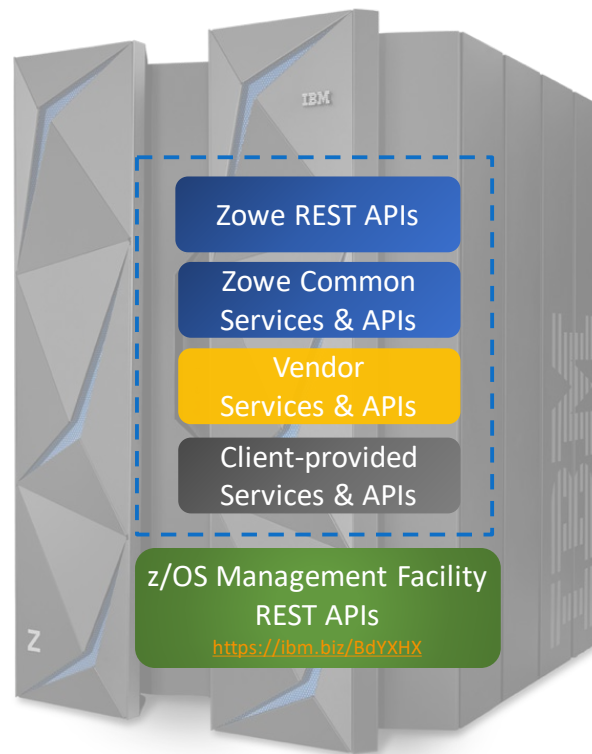
REST API for the API Catalog service which is a component of the API Mediation Layer. Use this API to retrieve information regarding catalog dashboard tiles, tile contents and its status, API documentation and status for the registered services.

The screenshot shows the Zowe CLI interface. It displays a prompt `solsu01@SOLSU01-01 ~/desktop` and a command `$ bright zos-files`. Below the command, there's a section titled 'DESCRIPTION' with the text 'Manage z/OS data sets and USS files'. Another section titled 'USAGE' shows the command `bright zos-files [action] [object] [options]`. The bottom section is titled 'ACTIONS'.

Node.js- based CLI

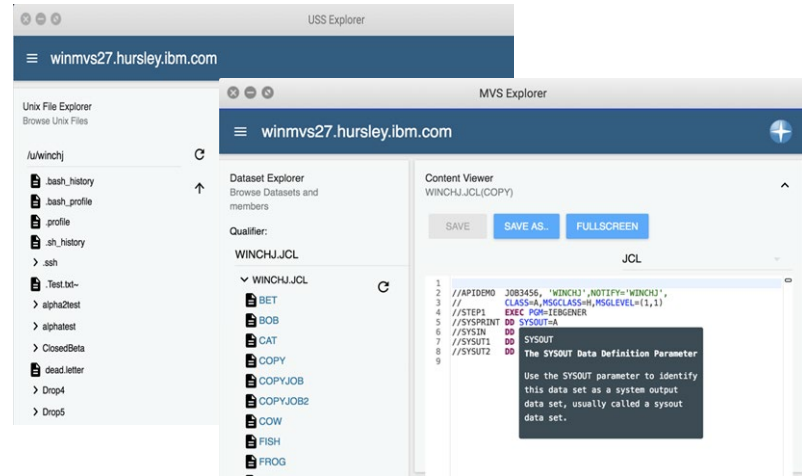
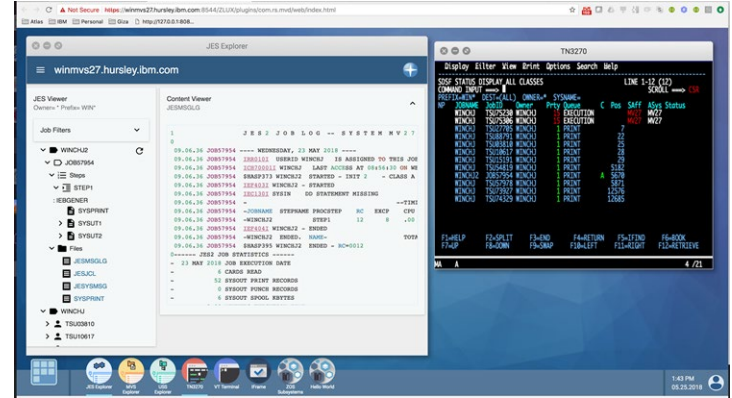
Zowe REST Services

- ▶ Industry standard REST interfaces to z/OS resources that are language and platform neutral, stateless, and scalable
- ▶ Foundational building blocks for system services
 - *Dataset APIs*
 - Create, read, update, delete, and list data sets
 - *JES APIs*
 - View the information and files of jobs, and submit and cancel job
 - *USS APIs*
 - Create, read, update, and delete USS files
 - *System APIs*
 - View information about PARMLIB, SYSPLEX, and USER



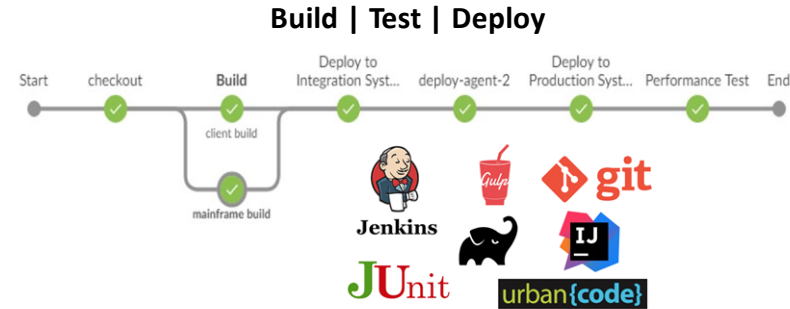
Zowe Web Desktop – an app container in a browser

- Known as zLUX, the Zowe web UI is a virtual desktop system that offers a rich and open platform for a web-based mainframe user experience



Zowe CLI – Enables cloud-like access to mainframe

- ▶ Enables app developers and DevOp engineers to interact with the mainframe easily through a command-line interface (CLI) from any terminal on Windows, MacOS, and Linux
- ▶ Easily integrates with IDEs, shell commands, bash scripts, and build tools; installs using NPM
 - *Interact with mainframe files*
 - Create, edit, download, and upload mainframe files (data sets) directly
 - *Submit jobs*
 - Submit JCL from data sets or local storage, monitor status, view and download output automatically
 - *Issue TSO and z/OS console commands*
 - Issue TSO and console commands to the mainframe directly
 - *Integrate z/OS actions into scripts*
 - Build local scripts that accomplish both mainframe and local tasks
 - *Produce responses as JSON documents*
 - Return data in JSON format on request for consumption in other programming languages
 - *CLI plug-ins*
 - Access to CICS and DB2



```
GROUPS
-----

plugins          Install and manage plug-ins
profiles         Create and manage configuration profiles
provisioning | pv Perform z/OSMF provisioning tasks on Published Templates
                  in the Service Catalog and Provisioned Instances in the
                  Service Registry.

zos-console | console Issue z/OS console commands and collect responses
zos-files | files      Manage z/OS data sets
zos-jobs | jobs        Manage z/OS jobs
zos-tso | tso          Issue TSO commands and interact with TSO address spaces
zosmf            Interact with z/OSMF

OPTIONS
-----

--version | -v (boolean)

    Display the current version of CA Brightside

GLOBAL OPTIONS
-----

--response-format-json | --rfj (boolean)

    Produce the command response as a JSON document

--help | -h (boolean)
```

Zowe API Mediation Layer –Gateway to mainframe APIs

- ▶ Enables a single point of access to mainframe APIs with high-availability, scalability, dynamic API discovery, consistent security, “one-time” sign-on experience, and unified standard API documentation (OpenAPI / Swagger)

- *API catalog*

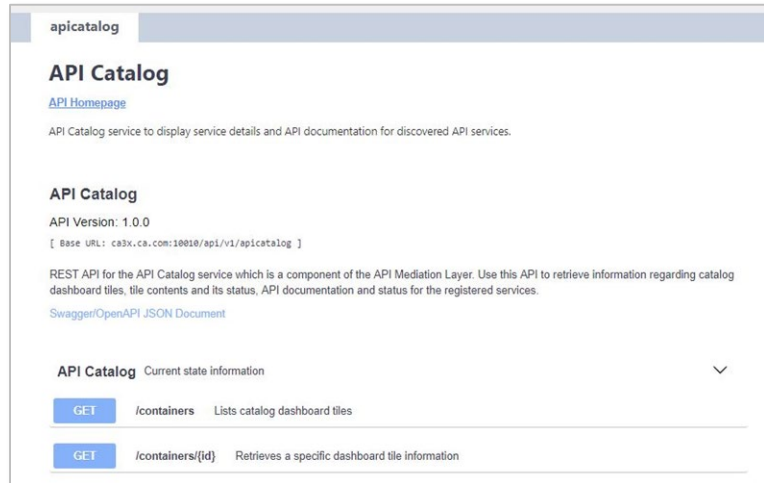
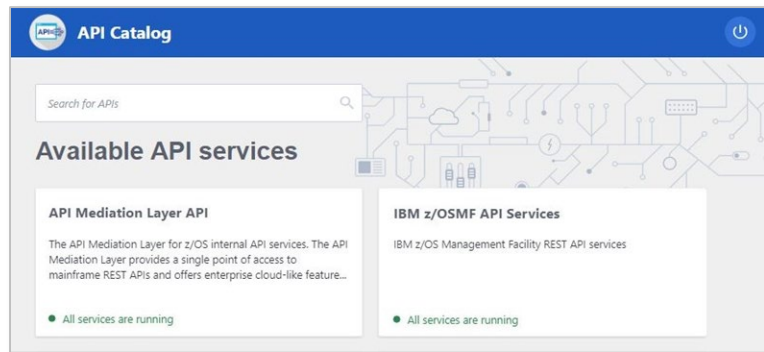
- UI Catalog of available APIs with their Swagger doc and service status

- *Gateway*

- Single secure point of entry to an ecosystem of API services. Hides complexity. Highly available. Based on Netflix Zuul.

- *Discovery service*

- Discover APIs across many applications. Repository of active API services. Based on Netflix Eureka.

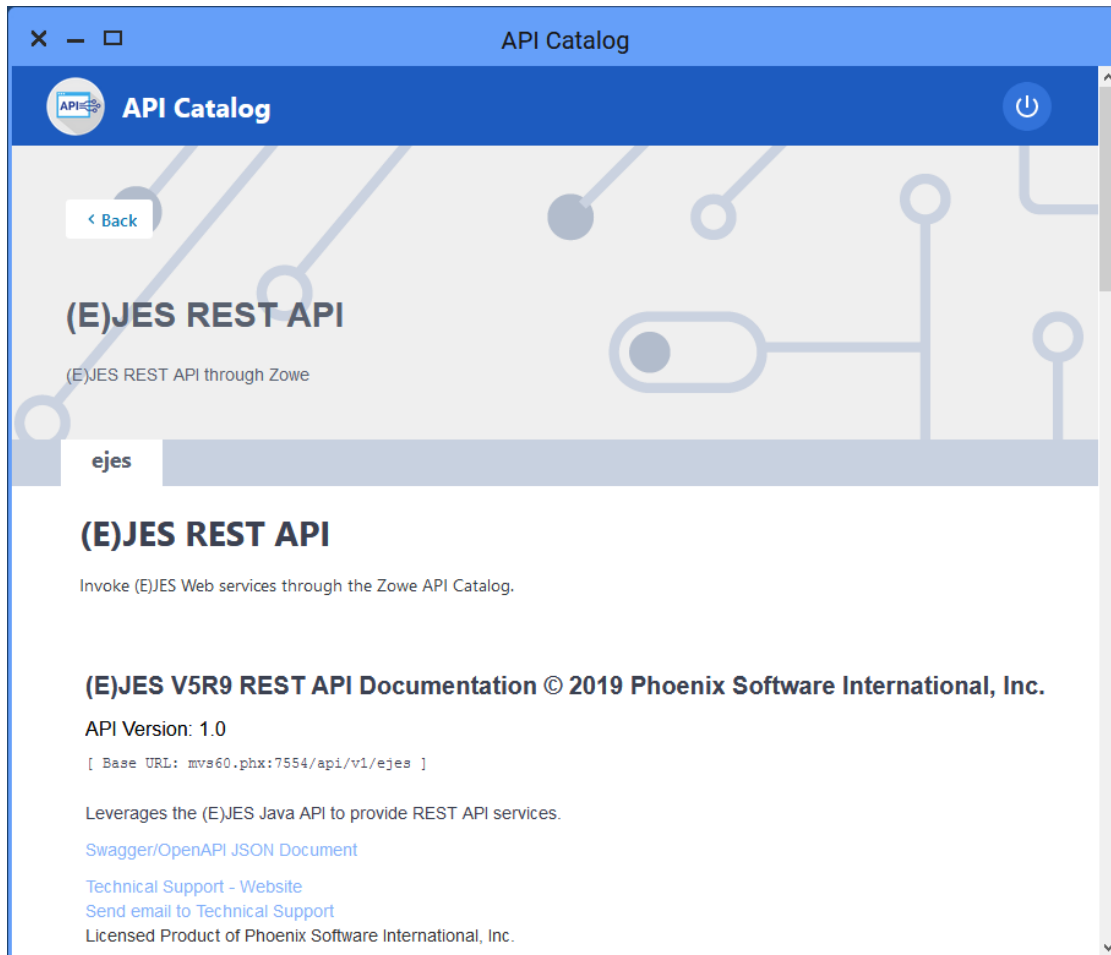


Zowe – New for (E)JES V5R9

- ▶ Our Zowe conformant offering consists of three parts which are delivered and enhanced using a continuous delivery model:
 - A **REST API** (a component of the (E)JES Web server) providing remote users with access to the complete (E)JES API.
 - A **Command Line Interface (CLI)** which leverages the REST API to make accessing (E)JES mainframe resources easy.
 - Currently supports real-time streaming of operlog/syslog and is being enhanced to support accessing all of the information (E)JES provides.
 - The CLI hides the complexities of the REST API and streams the result to STDOUT
 - A **Desktop Application** (planned). This will be an implementation of the existing (E)JES Web interactive browser interface, but will seamlessly integrate with the Zowe Desktop, including look and feel.

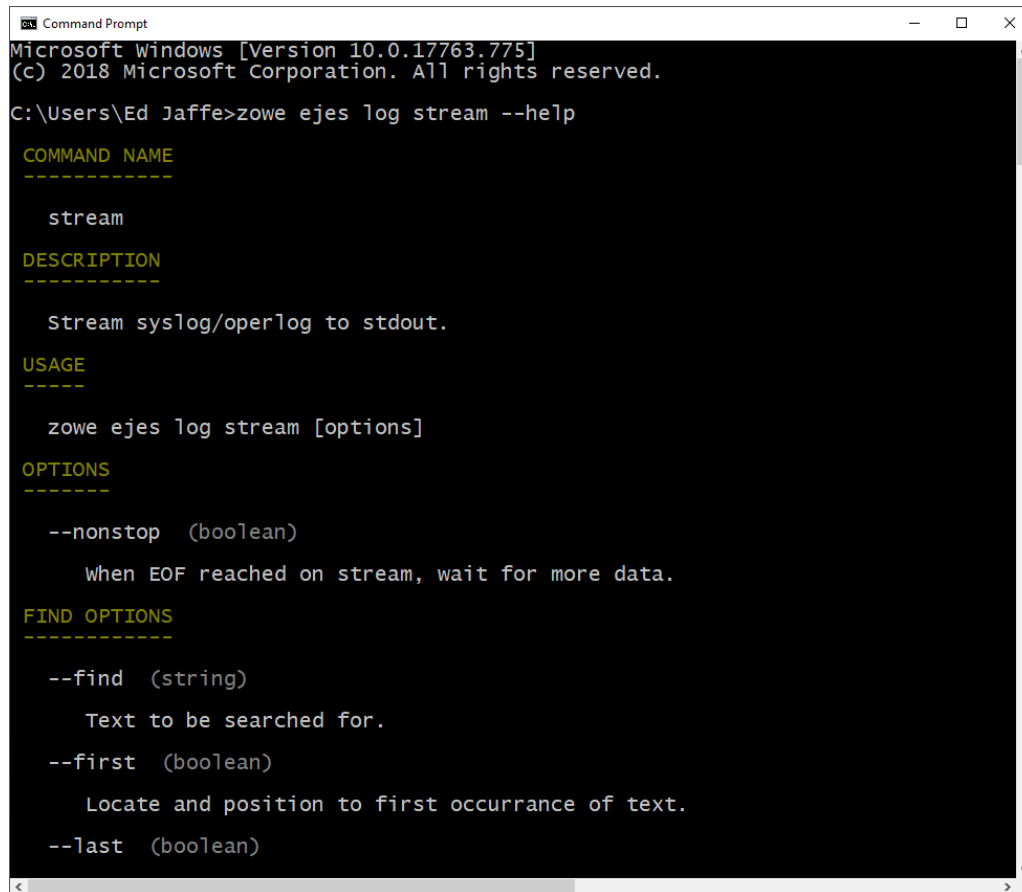
Zowe (E)JES REST API

- ▶ The REST API is a thin layer around the (E)JES Java API.
 - A complete API
- ▶ With only a few specialized exceptions, all responses are JSON objects.
- ▶ Interfaces are documented using Swagger/OpenAPI



Zowe (E)JES Command Line Interface (CLI)

- ▶ The CLI hides REST API complexities behind a simple command line interface.
- ▶ Supports Windows, MacOS and Linux.
- ▶ Output is to STDOUT.
- ▶ Can be used interactively or in a script.
- ▶ Easy to use --help and --help-web options limit the need for written documentation.
- ▶ Roadmap for enhancements



```
Microsoft Windows [Version 10.0.17763.775]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\Ed Jaffe>zowe ejes log stream --help

COMMAND NAME
-----

    stream

DESCRIPTION
-----

    Stream syslog/operlog to stdout.

USAGE
-----

    zowe ejes log stream [options]

OPTIONS
-----

    --nonstop    (boolean)
                  When EOF reached on stream, wait for more data.

FIND OPTIONS
-----

    --find      (string)
                  Text to be searched for.

    --first     (boolean)
                  Locate and position to first occurrence of text.

    --last      (boolean)
```

Zowe (E)JES CLI Query Syntax Roadmap

EJES query

`[--h | --help]`
`[--H | --HELP]`
`[--v | --version]`
`[--n | --dry-run]`
`[[--u | --use] [status | list | table-name]]`
`[[--t | --table] [table-default | default | list]]...`
`[[--r | --report] [browse-default | list]]`
`[[--c | --command] [list | command]]`
`[[--m | --metafilter] [off | list | metafilter_construct...]]...`
`[[--s | --select] [off | list | select_construct]`
`--all`
`[--start [num | first]`
`[--count [num | last]`
`[--cc [discard | keep | interpret]`
`[--header on | off]`

`[[--o | --owner] [logged_on_userid | "ownername..."]]`
`[[--j | --jobname] jobname...]`
`[--user "username..."]`
`[--origin "origin..."]`
`[--class "class..."]`
`[--dest "destination..."]`
`[--sysclass "sysclass..."]]`
`[--job on | off]`
`[--stc on | off]`
`[--tsu on | off]`
`[--atx on | off]`
`[--sort [list | std | sort_construct]`
`[--showcols column-key... | list]`
`[--hidecols column-key... | list]`
`[--rows 60 | num | all]`
`[--lines 1000 | num]`
`[[--maxcommands | -x] 1 | num]`

Objective

- ▶ Discuss how Phoenix Software International is applying the use of present-day tools with the mainframe such as:
 - (E)JES, (E)JES Web and Eclipse – A modern, lightweight browser-based system management tool for users who prefer not to work in a 3270 and for developers who want to leverage the Eclipse IDE for development
 - Zowe – Open source framework for the mainframe that provides solutions that allow development and operations teams to securely manage, control, script, and develop on the mainframe like any other cloud platform
 - **z/OSMF Workflow – automation of routine procedures and tasks through the use of a modern interface and Zorow – An open source community dedicated to contributing and collaborating on z/OSMF Workflows**

What is a z/OSMF Workflow?

- ▶ Workflows first appeared in 2013 with z/OS 2.1.
 - Initially supported instructions and batch job submission only.
 - When immediate execution steps, feedback, and other features were added via continuous delivery late in the z/OS 2.2 timeframe, it started looking interesting.
- ▶ With z/OSMF Workflow, a framework is available to z/OS system programmers to allow them to define a guided flow (workflow) through steps to accomplish a system management or configuration task.
- ▶ z/OSMF Workflow also provides RESTful APIs that allow users to run workflows programmatically

What is a z/OSMF Workflow?

▶ The z/OSMF Workflow is useful to:

- Assist people unfamiliar with how to perform a given task, or a task that they perform rarely
- Ensure that all tasks are performed in the right order and only when their dependencies have been met
- Ensure that all steps are completed
 - Even if many of the tasks have been delegated to a number of different colleagues
- Monitor and track progress toward the completion of the task
- Provide a history (audit trail) of the steps performed for a task
- Perform the same tasks on multiple systems
 - Enabling a function (e.g. zEDC)
 - Upgrading a new release of software (e.g., z/OS)

Current challenges with z/OSMF Workflow adoption

- ▶ z/OS system programmers have historically built their own home grown processes to perform common system management tasks
- ▶ Organizations want to reduce the complexity of their z/OS management processes so they can transfer their knowledge to the early tenure staff
 - Additional skills are needed to create z/OSMF Workflows
- ▶ How can early tenure and more experienced z/OS system programmers share best practices and common workflow patterns?

Zorow (Z Open Repository of Workflows)

- ▶ Provides a repository for z/OS systems programmers and product vendors to contribute and share z/OSMF workflows
 - All workflows made available under an [Apache 2 license](#)
- ▶ Community is led by both vendors along with customers, and open to anyone to participate.
 - [Vendor-neutral open source governance](#) established with the guidance of the Open Mainframe Project.



z/OSFM Workflow Components

- ▶ Prologue
- ▶ Parent steps and leaf steps
- ▶ Content for each step
 - Name, Title & Description
 - Instructions (shown at “Perform” time)
- ▶ Metadata for each step
 - Dependencies (prerequisites and conditions)
 - Weight and various flags
 - Variable names, descriptions, help pop-ups
- ▶ Program templates (support variable substitution)
 - For JCL you have a batch job
 - For TSO-REXX-JCL, TSO-REXX, and TSO-UNIX-REXX you have a REXX exec
 - For shell-JCL and TSO-UNIX-shell you have a shell script



Convert from existing product documentation

Creating a Workflow from Existing Documentation

- ▶ Our existing product documentation lives in Microsoft Word documents.
- ▶ From that base we create and distribute Adobe PDF, Raw HTML, and Eclipse Plug-Ins intended for use with IBM Knowledge Center for z/OS (KC4z).
 - KC4z has been around over four years (since z/OS 2.2).
 - If you haven't deployed it yet, you should!
 - If you're an ISV and you don't provide plug-ins for it, you should!
- ▶ We convert the Word documents to these other formats using helpful software (MadCap Flare) and self-authored scripts.
- ▶ Ideally, our Product Installation Workflow should eventually be able to completely replace our existing installation documentation. Therefore, it should look every bit as good as the other formats. It should support colors, sizeable fonts, embedded graphics, internal links, external links, and everything else that makes modern documentation usable.

Navigation

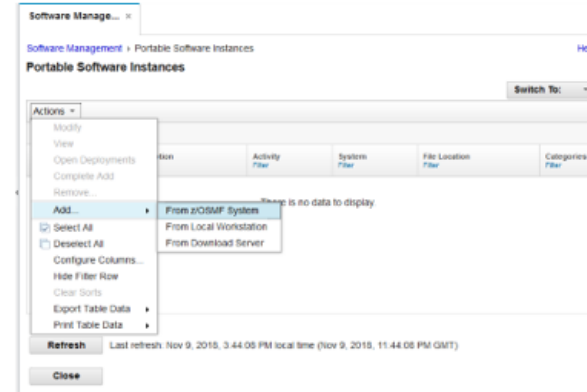
Search document

Headings Pages Results

- Perform APPLY of Product Components
- Allocate Distribution Libraries
- Perform ACCEPT of Product Components
- Chapter 4. Perform Tasks for CSM Installation Path
 - Run the EJESINST Utility
 - Interact with the EJESPIF Utility
 - Add (E)JES Product to the CSM Software Catalog
 - Add (E)JES Install Package to CSM Software Catalog
 - Initiate Product Install
 - Choose Install Type
 - Specify System Data Set Names
 - Extract Customization Library from CSM Package
- Perform Post-CSM Install Product Customization
 - Customization USERMOD/PTF Member Trans...
 - Installing Customization USERMODs/PTFs wit...
- Chapter 5. Perform Tasks for ZMF Installation Path
 - Unlock and Unpack the Portable Software Instan...
 - Add the Portable Software Instance to Software...
 - Deploy the Portable Software Instance

Add the Portable Software Instance to Software Management

From the z/OSMF Software Management main tab select "Portable Software Instances". Then click "Actions" > "Add..." > "From z/OS System" to invoke the "Add Portable Software Instance" dialog.





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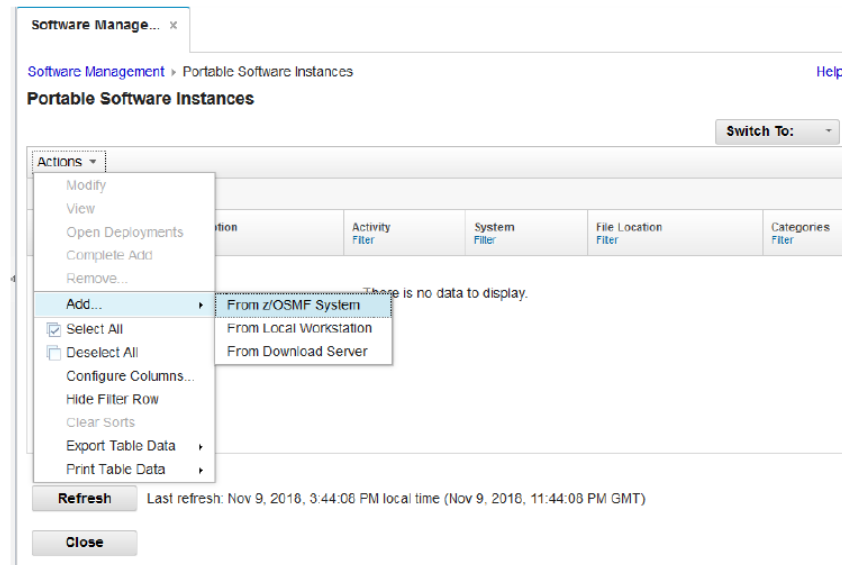
171%



Add the Portable Software Instance to Software Management

From the z/OSMF Software Management main tab select “Portable Software Instances”. Then click “Actions” → “Add...” → “From z/OS System” to invoke the “Add Portable Software Instance” dialog.

PDF



Contents

- Chapter 1. (E)JES Installation Overview
- Chapter 2. Download and Process the Compressed Archive
- Chapter 3. Perform Tasks for Traditional Installation Path
- Chapter 4. Perform Tasks for CSM Installation Path
- Chapter 5. Perform Tasks for ZMF Installation Path
 - Unlock and Unpack the Portable Software Instance
 - Add the Portable Software Instance to Software Management**
 - Deploy the Portable Software Instance
 - Discover ZMF Deployment Variables
 - Run EJESJCLU Utility to Create JCL and USERMODs
- Chapter 6. Receive and Apply the Customization USERMODs
- Chapter 7. Dynamically Define (E)JES Modules to the System
 - Dynamically APF Authorize the Libraries
 - Dynamically Add SHELPA to Link Pack Area
 - Dynamically Update Active LNKLIST Concatenation
 - Dynamically Install the SVC Routine
- Chapter 8. Update System IPL-Time Definitions
 - Add Load Library Definitions to Parmlib
 - Install the SVC Routine
- Chapter 9. Change Default Product Behaviors
- Chapter 10. Perform TSO and ISPF Modifications
- Chapter 11. Customize Multisystem Operations
- Chapter 12. Miscellaneous Installation Tasks
- Chapter 13. Define Security for (E)JES
- Chapter 14. Make Product Documentation Available
- Chapter 15. (E)JES Web Deployment
- Chapter 16. Phoenix TP Monitor Installation

Chapter 5. Perform Tasks for ZMF Installation Path >

Add the Portable Software Instance to Software Management

From the z/OSMF Software Management main tab select "Portable Software Instances". Then click "Actions" → "Add..." → "From z/OSMF System" to invoke the "Add Portable Software Instance" dialog.

The screenshot shows the z/OSMF Software Management interface. The main tab is 'Portable Software Instances'. The 'Actions' menu is open, showing the following options: Modify, View, Open Deployments, Complete Add, Remove..., Add..., Select All, Deselect All, Configure Columns..., Hide Filter Row, Clear Sorts, Export Table Data, and Print Table Data. The 'Add...' option is highlighted, and a sub-menu is visible with the following options: From z/OSMF System, From Local Workstation, and From Download Server. The 'From z/OSMF System' option is selected. The main table area displays the message 'There is no data to display.' The 'Refresh' button is visible, and the last refresh time is shown as 'Nov 9, 2018, 3:44:08 PM local time (Nov 9, 2018, 11:44:08 PM GMT)'. The 'Close' button is also visible.

Search Filters: (E)JES V5R9 x ☒ Auto-select | [Clear All](#) | [Add Products...](#)**Table of Contents**[Allocate Distribution Libraries](#)[Perform ACCEPT of Product Components](#)**▼ Chapter 4. Perform Tasks for CSM Installation Path**[Run the EJESINST Utility](#)[Interact with the EJESPMF Utility](#)[Add \(E\)JES Product to the CSM Software Catalog](#)[Add \(E\)JES Install Package to CSM Software Catalog](#)[Initiate Product Install](#)[Choose Install Type](#)[Specify System Data Set Name](#)[Extract Customization Library from CSM Package](#)[Perform Post-Install Product Customization](#)**▼ Chapter 5. Perform Tasks for ZMF Installation Path**[Unlock and Unpack the Portable Software Instance](#)[Add the Portable Software Instance to Software Management](#)[Deploy the Portable Software Instance](#)[Discover ZMF Deployment Variables](#)[Run EJESJCLU Utility to Create JCL and USERMODs](#)**▼ Chapter 6. Receive and Apply the Customization US****▼ Generate System Environment Table**[Common Problems Generating the System Environment Table](#)[Specify Assembled Installation Options](#)[Install the License](#)

Search Results

[< Previous](#) | [Next >](#) | [Topic View](#) | [\(E\)JES V5R9 > \(E\)JES Installation > Chapter 5. Perform Tasks for ZMF Installation Path > Add the Portable Software Instance to Software Management](#)**Add the Portable Software Instance to Software Management**

From the z/OSMF Software Management main tab select "Portable Software Instances". Then click "Actions" à "Add..." à "From z/OSMF System" to invoke the "Add Portable Software Instance" dialog.

Software Manage... x

[Software Management](#) > Portable Software Instances [Help](#)

Portable Software Instances

Switch To: ▾

Actions ▾

- Modify
- View
- Open Deployments
- Complete Add
- Remove...
- Add...** ▸
 - From z/OSMF System
 - From Local Workstation
 - From Download Server
- ☒ Select All
- ☐ Deselect All
- Configure Columns...
- Hide Filter Row
- Clear Sorts
- Export Table Data ▸
- Print Table Data ▸

Position	Activity Filter	System Filter	File Location Filter	Categories Filter
There is no data to display.				

Refresh Last refresh: Nov 9, 2018, 3:44:08 PM local time (Nov 9, 2018, 11:44:08 PM GMT)

Close

z/OSMF Workflow Result

- ▶ Unlike the other formats, which are documentation only, the workflow is a tabbed display.
- ▶ Some tabs like **Details**, **Dependencies**, **Status** and **Input Variables** contain metadata that might be of interest to the sysprog user.
- ▶ The **Notes** tab lets you author and keep your own notes associated with this step.
- ▶ **Perform** actually “runs” the step.
- ▶ **Feedback** lets you answer survey questions to provide useful feedback about your experience.

The screenshot shows the 'Workflows' application window. The breadcrumb path is 'Workflows > EJES V5R9 Installation > 5.2. Add the Portable Software Instance to Software Management'. The title bar says 'Workflows'. The main title is 'Properties for Workflow Step 5.2. Add the Portable Software Instance to Software Management'. Below this are tabs: 'General' (selected), 'Details', 'Dependencies', 'Notes', 'Perform', 'Status', 'Input Variables', and 'Feedback'. The 'General' tab contains the following information:

- Title:** Add the Portable Software Instance to Software Management
- Description:** Add the Portable Software Instance to Software Management

Below the description is a detailed description of the step:

Add the Portable Software Instance to Software Management

From the z/OSMF Software Management main tab select "Portable Software Instances". Then click "Actions" -> "Add..." -> "From z/OS System" to invoke the "Add Portable Software Instance" dialog.

The screenshot also shows a sub-window titled 'Software Manage...' with a tab 'Software Management > Portable Software Instances'. It has a 'Switch To:' dropdown and a table titled 'Portable Software Instances'. The table has columns: 'Action', 'Activity Filter', 'System Filter', 'File Location Filter', and 'Categories Filter'. The 'Actions' dropdown menu is open, showing options: 'Modify', 'View', 'Open Deployments', 'Complete Add', 'Remove...', 'Add...' (selected), 'Select All', 'Deselect All', 'Configure Columns...', 'Hide Filter Row', 'Clear Sorts', 'Export Table Data', and 'Print Table Data'. The 'Add...' menu item has a sub-menu with three options: 'From z/OSMF System' (selected), 'From Local Workstation', and 'From Download Server'. The table area shows 'There is no data to display.' At the bottom of the sub-window is a 'Refresh' button and a timestamp: 'Last refresh: Nov 9, 2018, 3:44:08 PM local time (Nov 9, 2018, 11:44:08 PM GMT)'. A 'Close' button is at the bottom of the main window.

Our Content Transformation Approach

- ▶ It is possible to save a Word document as a **Word XML Document**.
- ▶ That's the format we probably would have used if we weren't already using MadCap Flare to help us create the HTML and Eclipse versions of our product documentation. No reason to believe it wouldn't work just as well for you.
- ▶ Instead, we had MadCap Flare convert the native Word document into XHTML documents – one for each chapter in the book.
 - What is XHTML?
 - From Wikipedia: XHTML documents are well-formed and may therefore be parsed using standard XML parsers, unlike HTML, which requires a lenient HTML-specific parser.
- ▶ We then ran a self-authored script (a Windows BAT file) against the XHTML files to transform them into XML files that are compatible with z/OSMF workflows.
 - That script is here: <http://www.phoenixsoftware.com/pub/demo/workflow.bat>

Our Content Transformation Approach

- ▶ Workflows do not support style sheets (CSS). That is a MAJOR restriction for anyone attempting to directly author content using an XML editor such as the z/OSMF Workflow Editor. However, since our approach is to script a conversion from Word, it's really not terrible at all.
- ▶ The script uses the **sed** utility (originally from UNIX) on Windows to do the necessary transformations. Here's what one of the commands looks like to convert our "Railroad" style (used to document command syntax) into HTML:
 - ▶ `sed -i -E "s/<pre Railroad><code>/<pre style=\"padding:0;\"><code style=\"font-family: 'Courier New', Courier, monospace;font-size:100%%;border:none;background-color:#ffffff;\">/g" ..*Chapter*.xml`
- ▶ At first we ran into an unacceptable number of restrictions. Generally, only simple HTML is supported by the Workflow and the Workflow Editor. We found this *extremely* disappointing because the published result looked like we were in an "HTML for Dummies" class learning the basics. ☹

Our Content Transformation Approach

- ▶ Then we discovered the `<![CDATA[some stuff]]>` XML tag is accepted!
 - CDATA stands for Character Data and it means that the data in between the innermost brackets includes data that could be interpreted as XML markup, but should not be.
 - It looks a bit like an XML comment, but isn't. It's actually part of the document.
 - It's not perfect because there is no way to escape the CDEnd sequence `]]>`. Just don't use that anywhere and you should be OK.
- ▶ By wrapping all of our content in the CDATA tag, we were able to convince Workflow and Workflow Editor to ignore (and pass along) HTML tags they previously rejected as not supported and since the browsers understand those tags, that's what matters most.
- ▶ It would be best if Workflow and Workflow Editor were enhanced to natively understand everything, but what's there now is still very usable, especially for a scripted conversion situation.

Our Content Transformation Approach

- ▶ We struggled with images for a while.
- ▶ When you “create” a workflow, you are actually copying it from whichever source location you specify into some undisclosed location deep inside z/OSMF.
- ▶ All file references are relative to that undisclosed location rather than the original source location. Explicit file references suffer “out of zone” security errors.
- ▶ Therefore, the only workable approach for images is to embed them as base-64 text within the workflow. Again, the trusty CDATA tag allows this to occur.
- ▶ This restriction is not all bad. There are advantages to having a single, self-contained workflow file that isn’t dependent on anything else. But it can become quite large if you have many images. It can also be cumbersome to edit the XML.

Our Metadata Creation Approach

- ▶ The Workflow Editor does a pretty good job with most of the metadata
 - Beware! It has been shown to strip the CDATA tags around non-complex content if it thinks it understands everything therein.
 - This does not alter what the end user sees, but can cause confusion for anyone attempting to later inspect/edit the content XML directly. You might need to replace it with newly-converted text.
- ▶ Other than within a chapter, we generally implement dependencies on prior chapters (parent steps) rather than on any singular leaf steps within them.
- ▶ Within a chapter, we generally make each leaf step dependent on the prior one unless we want to allow parallel steps.
- ▶ We generally try to set the weight of a step that actually performs an action (submits a job, runs a script) ten times higher than one that is instructions only.
- ▶ We use simple, hand-written HTML for our variable descriptions and help/information pop-ups. You really don't need anything fancy there.

Defining a Value Choice Variable

- Creates a drop-down list of choices

Variable Details

Workflow Variables

* Variable Name:
downloadMethod

* Scope:
instance

* Label:
Download Method

* Abstract:
Choose either SSHPROMPT, HTTPBATCH, or OTHER.

* Description:
<p>Choose the method you will use to download
Phoenix Software International Internet sit
<p>SSHPROMPT is the easiest to use if S
<p>HTTPBATCH uses the SMP/E GIMGIPKG ut
<p>Specify OTHER if you will use a diff

Category:

Variable Details

Workflow Variables

Default Value:
SSHPROMPT

☐ Check for multi-line

New Value Choice:

Add Choice

Existing Value Choices:
SSHPROMPT
HTTPBATCH
OTHER

Set Default
Remove Cho

☒ Value Must be a Choice

Validation Criteria:
☒ Validation Type ☐ Regular Expression ☐ Min/Max Length

Validation Options:
ALPHA

Our Value Choice Variable with Help Pop-up

- ▶ This choice populates the workflow instance variable **downloadMethod** with the chosen string in the drop-down list. It can be used for step conditions, in templates (JCL, REXX execs, shell scripts), etc.

Workflows

Workflows > EJES V5R9 Installation > 2.1. Choose Download Method

Help

Properties for Workflow Step 2.1. Choose Download Method

Details Dependencies Notes **Perform** Status Input Variables Feed

✓ Input Variables

➡ General

Review Instructions

Input Variables - General

Enter the variable values for this input category.

* Download Method: ⓘ - Choose either SSHPROMPT, HTTPBATCH, or OTHER..

SSHPROMPT

SSHPROMPT

HTTPBATCH

OTHER

< Back Next > Save

Finish Cancel

Close

- Clicking on the blue information bubble produces this pop-up

Download Method

Choose the method you will use to download the compressed archive from the Phoenix Software International Internet site.

SSHPROMPT is the easiest to use if SSH is already set up on your z/OS system.

HTTPBATCH uses the SMP/E GIMGTPKG utility to download the software in a batch job.

Specify **OTHER** if you will use a different method altogether. For example, you might download the file using your workstation web browser and then upload it to a z/OS UNIX path on your mainframe.

Close

Defining a String Variable

- Creates an ordinary entry field

Variable Details

Workflow Variables

* Variable Name:
lnklstSet

* Scope:
instance

* Label:
LNKLST Set Name

* Abstract:
Specify a New LNKLST Set Name

* Description:
<p>Specify the name of a LNKLST set that does no
<p>The name can be up to 16-characters in length

Category:

Variable Details

Workflow Variables

☐ Check for multi-line

New Value Choice:

Add Choice

Existing Value Choices:

Set Default

Remove Cho

☐ Value Must be a Choice

Validation Criteria:
☐ Validation Type ☐ Regular Expression ☒ Min/Max Length

Minimum Length:
1

Maximum Length
16

Defining a Boolean Variable

- ▶ Creates a check-box (checked = TRUE)

Variable Details

Workflow Variables

* Variable Name:
lpalnk

* Scope:
instance

* Label:
SEJELPA on LNKLST?

* Abstract:
Check this box to indicate SEJELPA should be added to LNKLST ir

* Description:
<p>If you will have many concurrent (E)JES users
should reduce your system's total virtual sto
<p>For a sandbox system or trial install, a LNKL
should normally be just fine.</p>

Category:
General

Variable Details

Workflow Variables

Category:
General

Expose To User:

Read Only At:

☐ Check to use substitution

☐ Required At Create

☐ Prompt At Create

Visibility:
private

Type:
boolean

Default Value:
true

Our String and Boolean Variables with Help Pop-ups

Workflows

Workflows > EJES V5R9 Installation > 7.3. Dynamically Update Active LNKLST Concatenation

Help

Properties for Workflow Step 7.3. Dynamically Update Active LNKLST Concatenation

DetailsDependenciesNotesPerformStatusInput VariablesFeed

✓ Input Variables

➔ General

Review Instructions

Review Script

Run and Save Script

Input Variables - General

Enter the variable values for this input category.

* LNKLST Set Name: ⓘ - Specify a New LNKLST Set Name:
upto16chars

☒ * SEJELPA on LNKLST?: ⓘ - Check this box to indicate SEJELPA should be added to LNKLST instead of LPA:

Command Target System: ⓘ - Enter system name to which commands should be routed or leave blank for current system:

< Back

Next >

Save

Finish

Cancel

Close

LNKLST Set Name

Specify the name of a LNKLST set that does not yet exist.

The name can be up to 16-characters in length.

Close

SEJELPA on LNKLST?

If you will have many concurrent (E)JES users, then placing modules in LPA should reduce your system's total virtual storage requirements.

For a sandbox system or trial install, a LNKLST install should normally be just fine.

This variable is also referenced by the following steps:

State	No.	Title	Owner
Not Ready	7.2	Dynamically Add SEJELPA to Link Pack Area	edjxadm
Not Ready	8.1	Add Load Library Definitions to Parmlib	edjxadm

Close

Defining a Conditional Step

- ▶ You need conditions in addition to prerequisites
- ▶ In this case variable **installPath** controls the state

OverviewPrerequisitesInstructionsTypeCondit

Step Overview

Overview information is required for every step. On this tab, you can modify the step title, description, and other basic information about the selected step.

* Name:

S529859796

* Title:

Add the Portable Software Instance to Software Management

Description:

<h1 style="color: #336699;font-size: 22px;font-
<p>From the z/OSMF Software Management
<p>
<!-- \$(instance-installPath) == "TRADITIONAL" | skipped |
| <input type="checkbox"/> \$(instance-installPath) == "CSM" | skipped |
| <input type="checkbox"/> \$(instance-installPath) == "ZMF" | ready |

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Types of Steps

- ▶ A File or Inline Template lets you use an Apache Velocity Template alone or to run a batch job, REXX exec, or z/OS UNIX shell script.
 - A File Template is external to the workflow.
 - <https://velocity.apache.org/engine/2.0/user-guide.html>
- ▶ A REST API call allows you to use services that are defined and available in your instance of z/OSMF or outside servers whose URLs you know.
- ▶ Instructions Only is, as it's name suggests, a step that educates you about something or asks you to perform some action manually.
 - When you first convert a book into a workflow, all steps will be Instructions Only.
- ▶ A Calling Step is how you launch one workflow as a subroutine to another.

Step Details

Overview Prerequisites Instructions **Type** Conditions

Step Type

The step type indicates the type of processing that the step performs. On this tab, you can modify the related details.

Step Type: Instructions Only

An Instruction has type-specific properties to modify. To view these properties, see the Instructions tab.

- File Template
- Inline Template
- REST API
- Instructions Only**
- Calling Step

Template Steps Run Batch, REXX, or Shell

- ▶ **Not specified** uses template functions only
- ▶ **JCL** is a batch job
- ▶ **TSO-REXX-JCL** is a batch wrapper around a TSO/E REXX exec
- ▶ **shell-JCL** is a batch wrapper around a z/OS UNIX shell script
- ▶ **TSO-REXX** is an immediate execution of a REXX exec under TSO/E
- ▶ **TSO-UNIX-REXX** is an immediate execution of a REXX exec running in the OMVS z/OS UNIX environment
- ▶ **TSO-UNIX-shell** is an immediate execution of a shell script running in the OMVS z/OS UNIX environment
- ▶ You can have inline or file templates
- ▶ The templates can have embedded workflow variables.
- ▶ You can save the results as a data set or z/OS UNIX file

Step Details

Prerequisites Instructions **Type** Conditions Security

Step Type

The step type indicates the type of processing that the step performs. On this tab, you can modify the related details.

Step Type: Inline Template

Submit Template As:

- TSO-REXX
- Not specified
- JCL
- TSO-REXX-JCL
- shell-JCL
- TSO-REXX**
- TSO-UNIX-REXX
- TSO-UNIX-shell
- Console activation failed

Remove All

Some Tips and Techniques for Scripts

- ▶ Scripts complete normally only when they produce the message defined as “Message for Program Success.”
- ▶ Scripts complete with failure if they produce any of the messages defined as “Message for Program Failure.”
- ▶ You can’t do ANYTHING in your script after you produce one of these messages. Workflow pulls the “rug” out from under you. So make sure message issuance is the very last thing the script does. (We put a “dummy” EXIT instruction after.)
- ▶ Scripts that produce none of the defined messages will time out and fail that way.
- ▶ Workflow variables can be prompted for and used in the same step.
- ▶ If you wish to use ISPF services, be sure to allocate ISPLLOG to DUMMY or any action you take will cause prompting for log data set disposition at ISPF session termination causing your script to hang and time out.
 - Thanks to Marvin Knight of IBM for helping our team with this!
- ▶ If you have a z/OS background, stick to REXX. It’s easier to use **syscalls()** to get z/OS UNIX functionality in a REXX exec than it is to go the other way around.

REST API Steps

- ▶ GET, PUT, POST and DELETE methods supported.
- ▶ The workflow editor makes required some fields that are documented as optional. 😞
- ▶ Your workflow can “map” the response and set workflow variables from the results.
- ▶ So far, no PSWI management capabilities 😞

Step Details

PrerequisitesInstructionsTypeConditionsSecurity

Step Type

The step type indicates the type of processing that the step performs. On this tab, you can modify the related details.

Step Type: REST API

* HTTP Method:

GET

Scheme Name:

https

* Host Name:

zsmf.phx.phoenixsoftware.com

☒ Check to use substitution

Port Number:

10443

☐ Check to use substitution

* User name:

\$_workflow-workflowOwnerUpper

☒ Check to use substitution

* Password:

●●●●●●

☐ Check to use substitution

* URI Path:

/zsmf/swmgmt/swi

☐ Check to use substitution

DependenciesNotesPerformStatusInput VariablesFeedback

State: Expected status code: Actual status code:

✔ Complete 200 200

RequestResponseMessage

```
{  "swiurl": {    "categories": null,    "created": "2018-12-04T10:25:27-08",    "createdby": "EDJXADM",    "description": "(E)JES Version 5, Release 9.0\n\nContains restricted materials of Phoenix Software International. Copyright \u00a9 1990-2019 by Phoenix Software International. Licensed materials property of Phoenix Software International.",    "globalzone": "EJES.CSI",    "lastmodified": "2019-05-06T07:24:50-07",    "locked": null,    "lockedby": null,    "modifiedby": "EDJXADM",    "name": "EJESV5R9",    "productinfo": "retrieved": "2019-05-10T12:12:16-07",    "swiurl": "https://zsmf.phx.phoenixsoftware.com:10443/zsmf/swmgmt/swi/MVS60/EJESV5R9",    "system": "MVS60",    "targetzones": [      "EJESTZN"    ]  }}
```

Using Array Variables in a Template

- ▶ Templates can use workflow array variables
- ▶ In this simplistic case, we create a PDS member that contains the data set name and volume serial for every data set in the software instance.
- ▶ See SYS1.SAMPLIB(IZUDWFVR) for more examples of variable use.

```
<template>
<inlineTemplate substitution="true">
List of Data Sets Used:
##
## Loop For All Data Sets
##
#foreach($item in ${instance-izud-datasets})
DSNAME=${item.izud-dsname}) VOLUME=${item.izud-volumes[0]}
#end
</inlineTemplate>
<saveAsDataset substitution="true">
${instance-izud-createdby}.PARMLIB(DSNLIST)</saveAsDataset>
</template>
```

Workflow Steps can be Automated

- ▶ Check the “Auto-Enable” box on General tab.
- ▶ When the user clicks “Perform” from the Steps page, they get a confirmation dialog.
- ▶ You must prompt (or provide discovered defaults) for every required variable needed for the steps you wish to automate together as a group.
- ▶ Reasons automation will stop:
 - Processing reaches an automated step for which one or more required variables are not satisfied.
 - Processing reaches an automated step that is somehow not eligible for automatic processing.
 - For example, if the step is Unassigned.
 - Processing is stopped through a user request.
- ▶ Press <Refresh> to see the results!

Perform Automated Step

The selected step can be performed automatically. How would you like to proceed?

- ☒ Automatically perform the selected step, and all subsequent automated steps, according to their declared step dependencies, until one of the following occurs:

- all workflows steps have been completed.
- a non-automated, non-Complete step, is reached, or
- an error occurs.

☐ Automatically perform the selected step only.

☐ Manually perform the selected step.

When input file variable conflicts occur:

- ☒ Always use input file values. Existing values will be overwritten and automation will continue.
- ☐ Always keep existing values. Input file values will be ignored and automation will continue.
- ☐ Allow step or workflow owner to choose whether the input file value or existing value should be used for each conflicting variable. Automation will be stopped.

OK

Cancel

Help

General Rules of Thumb

- Organize your actionable steps as leaf steps under at least one parent level.
- In our opinion, you should put your primary step content under the **<description>** tag. That's the content users see when they select a step from Steps page. The text under the **<instructions>** tag isn't shown until after **Perform** is selected and is better suited to helping explain what to expect from the workflow than it is to explaining how to perform an activity on your z/OS system.
- Use existing high-quality content wherever possible.
- Use high-quality graphics to explain things. A picture is worth 1000 words!
- Keep abreast of APAR activity in this space.
 - Development is ongoing and usually satisfied through SPEs.
- Documentation is not as thorough as one might hope. Be prepared to experiment. Use the Velocity Template doc provided by Adobe!
- Collaborate with colleagues, join the Zorow community and ask and share!

Objective

- ▶ Discussed how Phoenix Software International is applying the use of present-day tools with the mainframe such as:
 - **(E)JES, (E)JES Web and Eclipse** – A modern, lightweight browser-based system management tool for users who prefer not to work in a 3270 and for developers who want to leverage the Eclipse IDE for development
 - Providing modern interfaces for system management for those not comfortable with 3270
 - Leveraging modern development tools such as REST APIs and the Eclipse IDE
 - **Zowe** – Open source framework for the mainframe that provides solutions that allow development and operations teams to securely manage, control, script, and develop on the mainframe like any other cloud platform
 - What is Zowe?
 - How does Zowe work?
 - How can you participate in and leverage Zowe?
 - How are we participating in and leveraging Zowe?
 - **z/OSMF Workflow** – automation of routine procedures and tasks through the use of a modern interface and **Zorow** – An open source community dedicated to contributing and collaborating on z/OSMF Workflows
 - What is z/OSMF Workflow?
 - What is Zorow?
 - How can you participate in and leverage Zorow?
 - How are we participating in and leveraging Zorow?

Want to learn more?

- ▶ Phoenix Products: <https://www.phoenixsoftware.com/>
- ▶ Eclipse: <https://www.eclipse.org/>
- ▶ Zowe: <https://www.openmainframeproject.org/projects/zowe>
- ▶ Zorow: <https://www.openmainframeproject.org/projects/zorow>

THANK YOU

