



# 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



Why do we focus on leveraging the latest technology?

We care about performance.

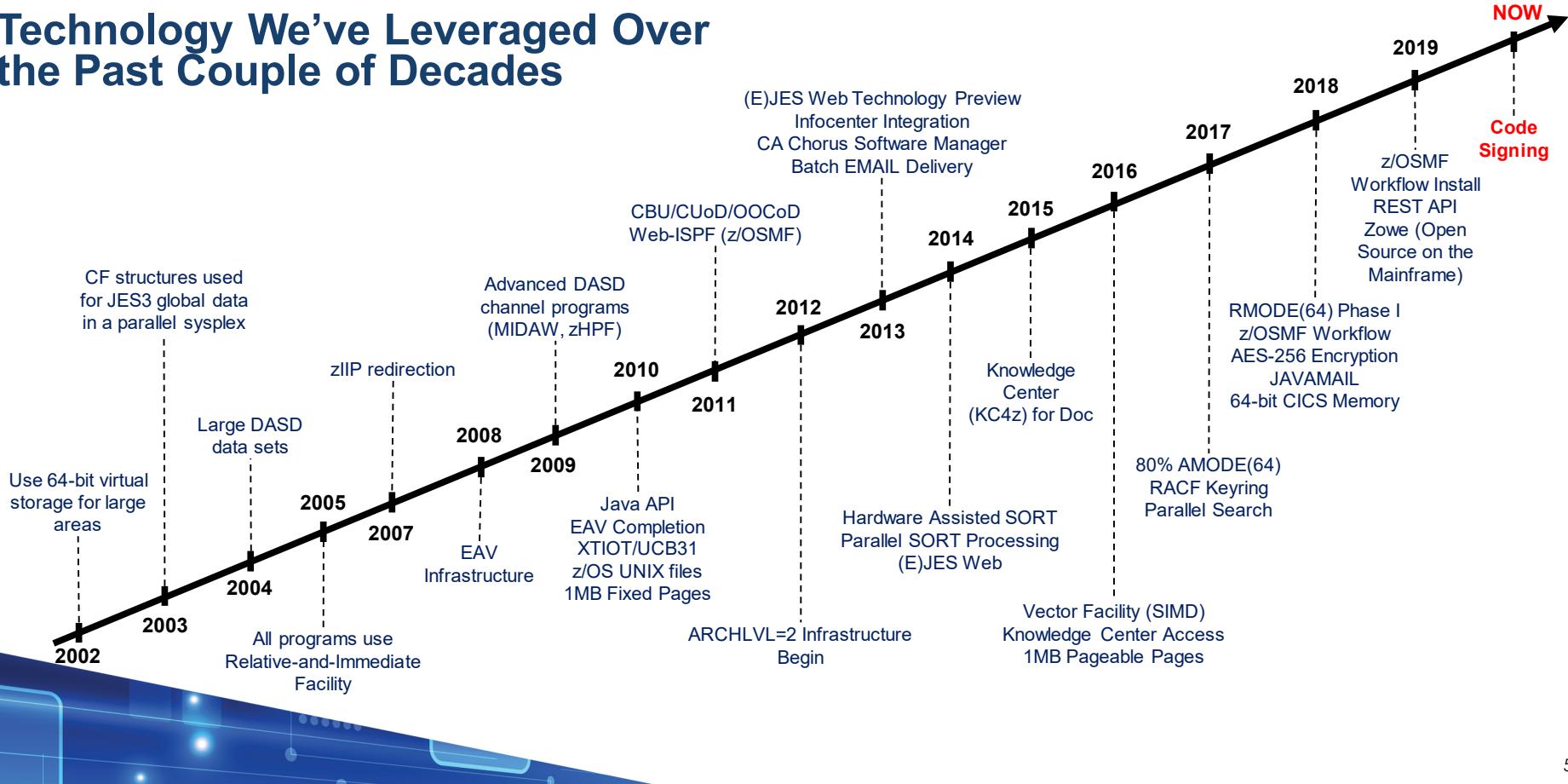
We care about reducing customer costs.

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

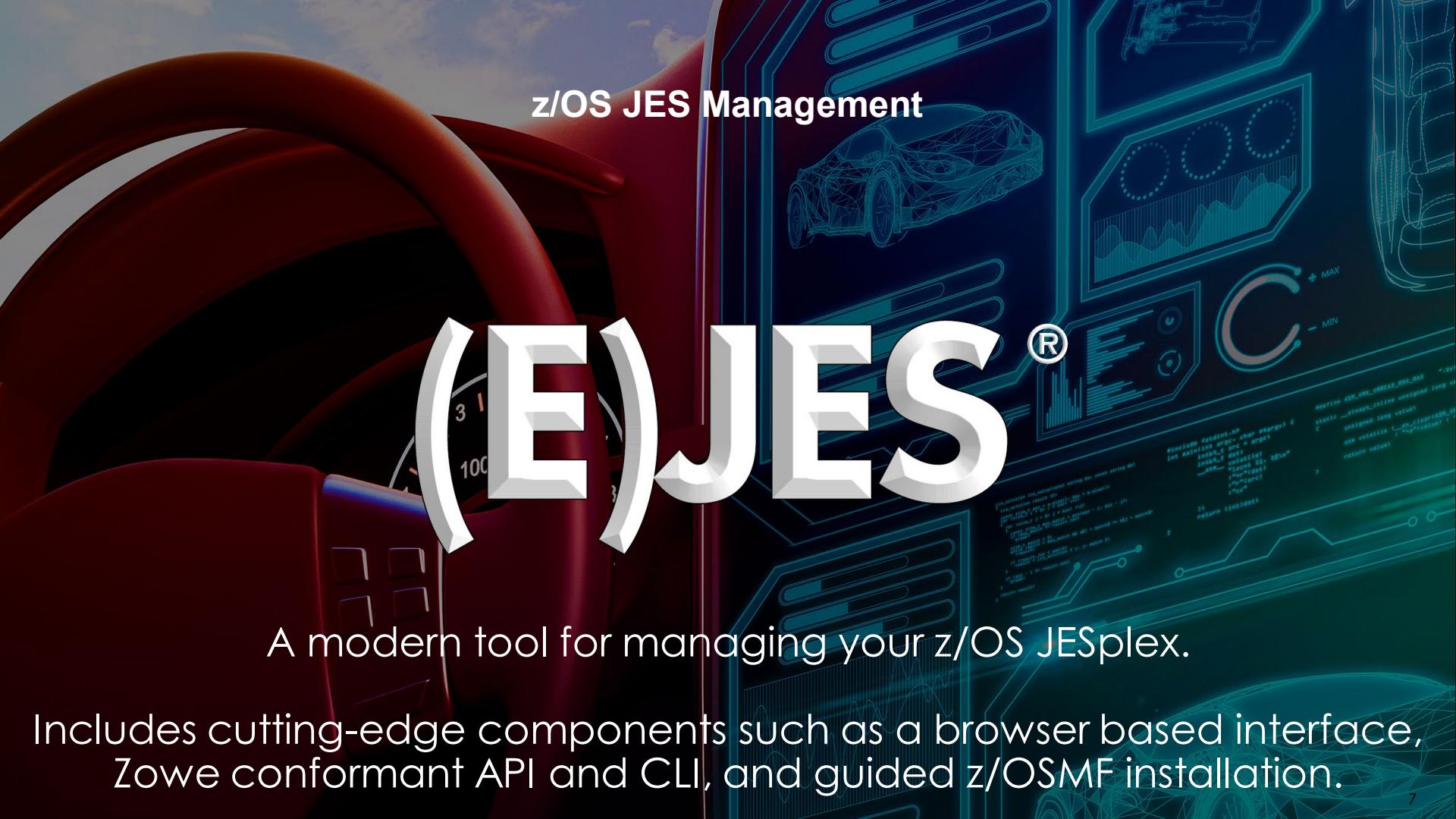


Phoenix Software JES3plus™ discussed in this presentation is a derivative work of IBM®'s JES3 licensed sourced code.

The logo features the text "JES3plus" in a large, metallic, 3D-style font. A small "TM" symbol is positioned above the letter "s". The background of the logo is a stylized illustration of interlocking gears in shades of brown, pink, and purple, set against a dark, blurred background.

JES3plus™

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.



**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

- ▶ 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 (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

(E)JES® Row 1 of 279

ACTIVITY PHXHQ2(S70) Paging 0 SIO 35 CPU 6/2 zIIP 0														
JobName	StepName	ProcStep	JobID	ASID	Pos	DP	Real	Paging	ExCP	CPU%	CPU-Utilization-Graph	ACPU%	zIIP%	
EJES29	QPXPDSE	ASM	J0294870	007C	IN	EC	23MB	.00	301.02	23.56	****2*	23.56	.00	
EJES22	EJESSUBS	ASM	J0294867	0075	IN	E8	38MB	.00	22.37	17.75	****2	17.75	.00	
EJES28	QPXENUF	ASM	J0294869	0056	IN	E8	16MB	.00	89.49	14.00	****	14.00	.00	
EJES23	EJESSV2	ASM	J0294868	0074	IN	E8	10MB	.00	151.24	7.37	**	7.37	.00	
EJES21	EJESIENV	ASM	J0294866	0060	IN	EC	15MB	.00	461.38	17.05	****	17.05	.00	
EJES20	EJESAPI4	ASM	J0294865	0072	IN	E8	11MB	.00	153.93	7.78	***	7.78	.00	
F01XXADM	TS01LOGON	TS27087	J0294707	0071	I0	FF	12MB	.00	.00	.00		.00	.00	

STATUS 32155 0X 83W 6H 0T 2124051 Records 0 Pages														
JobName	JobID	Status	Queue	Ambr	JP	Pos	WPos	MaxComp	Records	Pages	H-JOE	O-JOE	Owner	SeLabel
UNTERSE	J0031499	QUEUED	PRINT		1	3K		CC 0000		70	0	0	4	SMORGAN
COPYDUMP	J0031487	QUEUED	PRINT		1	3K		CC 0000		56	0	0	3	SMORGAN
SAMPLE1	J0031441	QUEUED	PRINT		1	3K		CC 0000		8,183	0	0	3	FRED1
SAMPLE1	J0031440	QUEUED	PRINT		1	3K		CC 0000		8,183	0	0	3	FRED1
SAMPLE1	J0		PRINT		1	3K		CC 0000		8,144	0	0	3	FRED1
EJES\$PAC	J0	Activity	PRINT		1	3K		CC 0000		1,702	0	0	3	EDJXAADM
BOZOID	J0	Alter	PRINT		1	2K		CC 0000		211	0	0	3	SMORGAN
BOZOID	J0	Browse	PRINT		1	2K		CC 0000						
BOZOID	J0	Cancel	PRINT		1	2K		CC 0000						
BOZOID	J0	Data Set Status	PRINT		1	2K		CC 0000						
APPMAINT	J0		PRINT		1	2K		CC 0000						
SPMOPREC	J0	Display	PRINT		1	2K		CC 0000						
SPMOPREC	J0	Download As	PRINT		1	2K		CC 0000						
SPMCRES	J0	Extract	PRINT		1	2K		CC 0000						
SPMCRES	J0	Hold	PRINT		1	2K		CC 0000						
APPMAINT	J0	Job Steps	PRINT		1	2K		CC 0000						
UPLDEGEN	J0		PRINT		1	2K		CC 0000						
RESTRESS	J0	Mail As	PRINT		1	2K		CC 0000						
UTLIB003	J0	Out Desc	PRINT		1	2K		CC 0000						
RESTHSF2	J0	Release	PRINT		1	2K		CC 0000						
UHFSD002	J0	Requeue To	PRINT		1	2K		CC 0000						
RESTHSF1	J0	Restart	PRINT		1	2K		CC 0000						
UHFSD001	J0	Run	PRINT		1	2K		CC 0000						
RESTHSF1	J0	Spin	PRINT		1	2K		CC 0000						
INITDLB4	J0	Sys Cancel	PRINT		1	2K		CC 0000						

OPERLOG PHXHQ													
N	00000000	MVS00	2019027	14:02:02.05		00000281	IEF1961	IDG1011	SMS ALLOCATED TO DDNAME (SYS00093)				
N	00000000	MVS00	2019027	14:02:02.05		00000281	IEF1961	DSN (H2S.H2S.HEALTH.CHECK.HISTORY.A0000295 )					
N	00000000	MVS00	2019027	14:02:02.05		00000281	IEF1961	STORCLAS (BASE) MGTCLAS (NOMIG) DATACLAS (LOGSTRM)					
N	00000000	MVS00	2019027	14:02:02.05		00000281	IEF1961	VOL SER NOS FOR DATA COMPONENT= MVSPV0					
M	00000000	MVS00	2019027	14:02:02.09		00000290	IXG2831	OFFLOAD DATASET H2S.H2S.HEALTH.CHECK.HISTORY.A0000295	804				
D						804	00000290	ALLOCATED NEW FOR LOGSTREAM H2S.H2S.HEALTH.CHECK.HISTORY					
E						804	00000290	IXG2841	OFFLOAD DATASET H2S.H2S.HEALTH.CHECK.HISTORY.A0000284	805			
M	00000000	MVS00	2019027	14:02:20.20		00000290	IXG2841	OFFLOAD DATASET H2S.H2S.HEALTH.CHECK.HISTORY.A0000280					
E						805	00000290	1G0700011	USER EDJXAADM LAST ACCESS AT 08:30:07 ON SUNDAY, JANUARY 27, 2019	00000290			
M	00020000	MVS70	2019027	14:02:22.90	CACOND0R	00000281	IEF1961	MODE 152012	IP 192.168.10.60/60322				
M	01200000	MVS70	2019027	14:02:22.91	EDJXAADM	00000281	IEF1961	1G0700051: USER EDJXAADM LOGGED ON AT 14:02:21 FROM TERMINAL LT03. 9					
E						964	00000090	IXC5861	STRUCTURE H2S.H2S.HEALTHCHKLOG IN COUNTING FACILITY CF01,				
D	40400000	MVS70	2019027	14:02:26.92		00000090	IXC5861	STRUCTURE VERSION D5964FFE 82F34643,					
E						965	00000090	15 IS NOW BELOW STRUCTURE FULL MONITORING THRESHOLD.					
N	40000000	MVS70	2019027	14:02:59.18	EJESWEB2	00000090	EJES0805	Logon by user EDJXAADM at 192.168.10..60					
N	00040000	MVS60	2019027	14:03:17.14		00000290	-STEPNAME PROCSTEP RC EXCP CONN TCB SRB CLOCK						
N	00040000	MVS60	2019027	14:03:17.14		00000290	-INIT ENDED NAME=						
N	00000000	MVS60	2019027	14:03:17.15		00000281	IEF1961 IEF1421 INIT INIT - STEP WAS EXECUTED - COND CODE 0000						
N	00000000	MVS60	2019027	14:03:17.15		00000281	IEF1961 IEF3731 STEP/ /START 2019027.1345						
N	00000000	MVS60	2019027	14:03:17.15		00000281	IEF1961 IEF0321 STEP/ /STOP 2019027.1403						
N	00000000	MVS60	2019027	14:03:17.15		00000281	IEF1961 CPU: 0 HR 00 MIN 00.02 SEC SRB: 0 HR						
N	00000000	MVS60	2019027	14:03:17.15		00000281	IEF4041 INIT - ENDED TIME=14.03.17						
N	00000000	MVS60	2019027	14:03:17.15		00000281	IEF1961 ATB- REAL:						
N	00000000	MVS60	2019027	14:03:17.16		00000281	IEF1961 OK						
N	00000000	MVS60	2019027	14:03:17.16		00000281	IEF1961 VIRT- ALLOC: 17M SHRD: 0M						
N	00000000	MVS60	2019027	14:03:17.17		00000281	IEF1961 IEF3751 JOB/INIT /START 2019027.1345						
N	00000000	MVS60	2019027	14:03:17.17		00000281	IEF1961 IEF0331 JOB/INIT /STOP 2019027.1403						
N	00000000	MVS60	2019027	14:03:17.17		00000281	IEF1961 CPU: 0 HR 00 MIN 00.02 SEC SRB: 0 HR						

PSELECT 1-SELECTION SORT

Find: mvs70

# (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

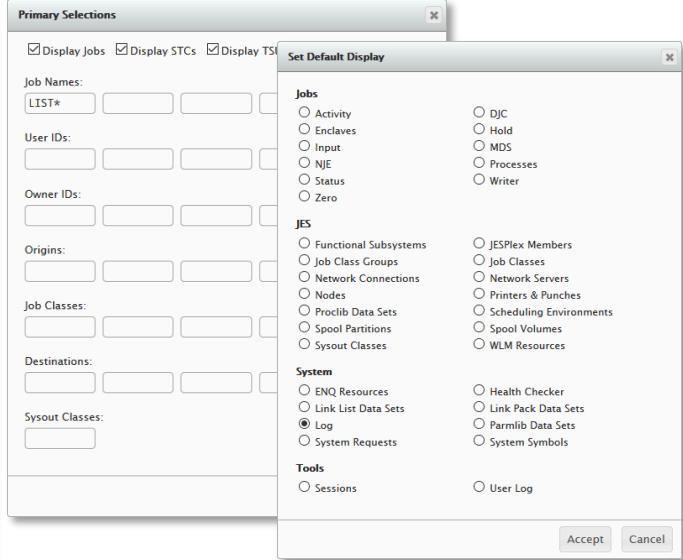
Automatic carriage control conversion for local printing. Full-featured PDF document creation.

# (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.

STATUS - 3264S - 132X - 3074W - 59H - 0T - 51814298 Records - 51179550 Lines - 0 Pages Row 150 of 3,265

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	JO184725	05/03	W-OUTPUT	OUTSERV	7		147,024	2 CC 0000		2,623	2,589	0	9	0	0	0	RWEATH	RWEATH			
RWEA0000	JO184728	05/03	W-OUTPUT	OUTSERV	1		16,336	2 CC 0000		114	114	0	4	0	0	0	RWEATH	RWEATH			
EXP0000	JO184729	05/03	W-OUTPUT	OUTSERV	7		396,148	2 CC 0000		9,228	9,194	0	9	0	0	0	RWEATH	RWEATH			
LETRGREN	JO184736	05/03	W-OUTPUT	OUTSERV	2		28,588	2 CC 0000		188	188	0	5	0	0	0	RWEATH	RWEATH			
F0184738	JO184738	05/03	W-OUTPUT	OUTSERV	0		12,252	2 JCLERR		61	61	0	2	0	0	0	RWEATH	RWEATH			
ODEASHA	JO184745	05/03	W-OUTPUT	OUTSERV	5		65,344	2 CC 0000		880	861	0	7	0	0	0	RWEATH	RWEATH			
ODESTART	JO184746	05/03	W-OUTPUT	OUTSERV	2		24,504	4 CC 0000		293	293	0	4	0	0	0	RWEATH	RWEATH			
RWEATH	JO184747	05/03	W-OUTPUT	OUTSERV	1		32,672	1B S622		402	402	0	3	0	0	0	RWEATH	RWEATH			
ODEDEDP	JO184753	05/03	W-OUTPUT	OUTSERV	2		20,420	2 CC 0000		98	98	0	5	0	0	0	RWEATH	RWEATH			
ODESTART	JO184754	05/03	W-OUTPUT	OUTSERV	2		24,504	4 CC 0000		294	294	0	4	0	0	0	RWEATH	RWEATH			
ODELOGI	JO184779	05/03	W-OUTPUT	OUTSERV	1		20,420	2 CC 0000		106	106	0	4	0	0	0	RWEATH	RWEATH			
ODETLBR	JO184780	05/03	W-OUTPUT	OUTSERV	1		20,420	2 CC 0000		108	108	0	4	0	0	0	RWEATH	RWEATH			
ODETLBR	JO184786	05/03	W-OUTPUT	OUTSERV	4		36,756	2 CC 0000		173	173	0	7	0	0	0	RWEATH	RWEATH			
CAMCOPYV	JO184787	05/03	W-OUTPUT	OUTSERV	1		20,420	2 CC 0000		84	84	0	5	0	0	0	SMORGAN	SMORGAN			
ODELOGL	JO184792	05/03	W-OUTPUT	OUTSERV	4		36,756	2 CC 0000		177	177	0	7	0	0	0	RWEATH	RWEATH			
ODESTART	JO184793	05/03	W-OUTPUT	OUTSERV	2		24,504	4 CC 0000		291	291	0	4	0	0	0	RWEATH	RWEATH			
UJESRC2F	JO184794	05/03	W-OUTPUT	OUTSERV	7		44,924	4 CC 0000		276	276	0	9	0	0	0	EJES	SMORGAN			
ODEINIT1	JO184798	05/03	W-OUTPUT	OUTSERV	1		16,336	2 CC 0000		63	63	0	4	0	0	0	RWEATH	RWEATH			
ODEINIT1	JO184799	05/03	W-OUTPUT	OUTSERV	1		16,336	2 CC 0000		63	63	0	4	0	0	0	RWEATH	RWEATH			
ODESTART	JO184800	05/03	W-OUTPUT	OUTSERV	2		36,756	4 CC 0000		395	395	0	4	0	0	0	RWEATH	RWEATH			
CAMCOPYV	JO184807	05/03	W-OUTPUT	OUTSERV	2		32,672	2 CC 0000		146	146	0	7	0	0	0	SMORGAN	SMORGAN			
BKUPUSER	JO184885	05/03	W-OUTPUT	OUTSERV	1		473,744	2 CC 0000		2,770	2,765	0	4	0	0	0	SYSP0PER	SYSP0PER			
BKUPDOC	JO184888	05/03	W-OUTPUT	OUTSERV	1		16,336	2 CC 0000		106	101	0	4	0	0	0	SYSP0PER	SYSP0PER			
BKUPUB1	JO184894	05/03	W-OUTPUT	OUTSERV	1		36,756	2 CC 0000		498	493	0	4	0	0	0	SYSP0PER	SYSP0PER			
BKUPUDR	JO184896	05/03	W-OUTPUT	OUTSERV	5		559,508	2 CC 0000		5,451	5,089	0	10	0	0	0	SYSP0PER	SYSP0PER			
BKUPLOCL	JO184897	05/03	W-OUTPUT	OUTSERV	1		24,504	2 CC 0000		180	175	0	4	0	0	0	SYSP0PER	SYSP0PER			
IEAVTSZR	SO184917	05/04	W-OUTPUT	OUTSERV	1		49,008	15 CC 0000		484	484	0	1	0	0	0	SYSP0PER	SYSP0PER			



# (E)JES Web

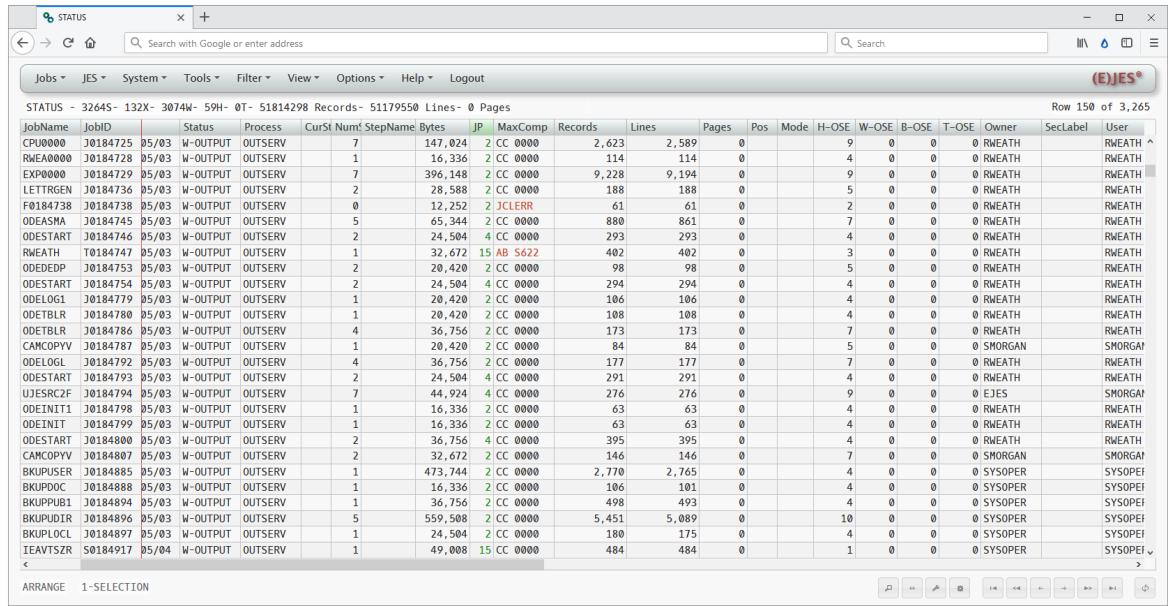
- A number of different color schemes and other display options are supported. This color scheme approximates the colors use on a 3270 terminal.

The screenshot shows a web browser window titled '(E)JES' with a terminal-like interface. The terminal window has a title bar 'STATUS' and a menu bar with options like Jobs, JES, System, Tools, Filter, View, Options, Help, and Logout. The main area displays a table of job information with the following columns: JobName, JobID, QTime, QDate, Status, Process, CurS1 Num!, StepName JP, MaxComp, Records, Lines, Pages, Bytes, Pos, Mode, H-OSE, W-OSE, B-OSE, T-OSE, Owner, and Sect. The table contains over 3,000 rows of data, with Row 150 of 3,275 highlighted. The data includes various job names like CPU0000, RWEA0000, EXP0000, LETRGEN, F0184738, ODEASMA, ODESTART, RWEATH, T0184747, ODEDEDP, ODESTART, ODELOG1, ODEBTLR, ODEBTLR, CAMCOPYV, ODELOGL, ODESTART, UJESRC2F, ODEINIT1, ODEINIT1, ODESTART, CAMCOPYV, BKUPUSER, BKUPDOC, BKUPUB1, BKUPUDIR, BKUPUDCL, IEAVTSZR, IEAVTSZR, LKSUBS, and LKSUBS, along with their respective details such as start times, processes, and output types.

JobName	JobID	QTime	QDate	Status	Process	CurS1 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		
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		
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 JCLEAR	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	T0184747	10:50:22	2018/05/03	W-OUTPUT	OUTSERV	1		15 AB S622	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		
ODELOG1	J0184779	12:52:33	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000	106	106	0	20K		4	0	0	0	RWEATH		
ODEBTLR	J0184780	12:57:10	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000	108	108	0	20K		4	0	0	0	RWEATH		
ODEBTLR	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	13:12:24	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		
BKUPUB1	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	560K		10	0	0	0	SYSOPER		
BKUPUDCL	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		
IEAVTSZR	S0184918	00:01:05	2018/05/04	W-OUTPUT	OUTSERV	1		15 CC 0000	467	467	0	49K		1	0	0	0	SYSOPER		
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 shows a web browser window titled '(E)JES®' displaying a table of job status data. The table has approximately 25 columns, including 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 data is sorted by the 'Status' column. The table contains over 500 rows of job information, with some rows highlighted in red or green. The browser interface includes a search bar at the top and various 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			
LETTTRGEN	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 JCLEAR		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 S62	402	402	0	3	0	0	0	RWEATH	RWEATH			
ODEDEDP	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			
ODELOGI	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			
CAMCOPYV	J0184787	05/03	W-OUTPUT	OUTSERV		1	20,420	2 CC 0000	84	84	0	5	0	0	0	SMORGAN	SMORGAN			
ODELOGI	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			
UJESRC2F	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			
ODEINIT1	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			
CAMCOPYV	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			
BKUPUDIR	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	S0184917	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  QDate GT 2018/05/31 AND - +  
02  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

The screenshot shows a web-based application window titled '(E)JES®' with a toolbar at the top. The main area displays a table of job status records. The columns include 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 has 3,270 rows, with row 150 highlighted. The application includes a search bar, navigation buttons, and a footer with 'ARRANGE', 'FILTER', and '1-SELECTION' options.

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
CPU00000	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		
RWEA00000	J0184728	10:19:23	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		114	114	0	16K		4	0	0	0	RWEATH		
EXP00000	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		
LETTREGEN	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 JCLEAR		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	T0184747	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		
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		
BUKUSER	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		
BUKUPDOC	J0184888	21:29:59	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		106	101	0	16K		4	0	0	0	SYSOPER		
BUKUPUBL	J0184894	21:45:00	2018/05/03	W-OUTPUT	OUTSERV	1		2 CC 0000		498	493	0	37K		4	0	0	0	SYSOPER		
BUKUPDIR	J0184896	22:00:00	2018/05/03	W-OUTPUT	OUTSERV	5		2 CC 0000		5,451	5,089	0	560K		10	0	0	0	SYSOPER		
BUKULOC	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		

# (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

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
LOGSAV60	J0185457	00:00:59	2018/05/06	W-OUTPUT	OUTSERV	11		4 AB SB37		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		
LOGSAVA0	J0185459	12:59:20	2018/05/06	W-OUTPUT	OUTSERV	0		1 CC 0000		19	19	0	4K		0	1	0	0	SYSOPER		
IEAVTSZR	S0185462	00:01:02	2018/05/06	Activity		1		15 CC 0000		454	454	0	45K		1	0	0	0	SYSOPER		
IEAVTSZR	S0185463	00:01:02	2018/05/06	Alter		1		15 CC 0000		1,465	1,465	0	151K		1	0	0	0	SYSOPER		
EJESXPTP	J0185479	02:00:00	2018/05/06	Browse		2		2 CC 0000		6,482	6,482	0	392K		4	0	0	0	EDJXADM		
DFS	S0185482	02:46:13	2018/05/06	Cancel		5		5 CC 0000		84	81	0	12K		3	0	0	0	SYSOPER		
DB8GSTR	S0185487	02:46:13	2018/05/06	Data Set Status		5		5 JCLEAR		14	14	0	8K		3	0	0	0	SYSOPER		
EJSVJ3	S0185488	02:46:13	2018/05/06	Display		5		5 CC 0000		2	2	0	4K		1	0	0	0	EJES		
TDRVR	S0185489	02:46:13	2018/05/06	ISZSMGR		5		5 AB S222		78	78	0	16K		4	0	0	0	PHOENIX		
ISZSMGR	S0185491	02:46:13	2018/05/06	DJC		5		5 CC 0000		381	381	0	33K		1	0	0	0	SYSOPER		
LOGSAV0	J0185570	12:59:20	2018/05/06	Download As		1		1 CC 0000		200	200	0	12K		0	1	0	0	SYSOPER		
LOGSAVA0	J0185571	12:59:25	2018/05/06	Extract		1		1 CC 0000		123,424	111,634	0	8M		0	2	0	0	SYSOPER		
RWEA0571	J0185578	13:06:38	2018/05/06	Hold		2		2 CC 0000		92	92	0	16K		4	0	0	0	RWEATH		
CPU0571	J0185579	13:06:38	2018/05/06	Mail As		2		2 CC 0000		1,425	1,391	0	98K		9	0	0	0	RWEATH		
RWEA0571	J0185582	13:07:44	2018/05/06	EXP0571		1		2 CC 0000		92	92	0	16K		4	0	0	0	RWEATH		
J0185583	J0185583	13:07:44	2018/05/06	Out Desc		7		2 CC 0000		1,750	1,716	0	110K		9	0	0	0	RWEATH		
BKUPVM1	J0185594	14:05:32	2018/05/06	Release		121		8 CC 0004		3,416	3,416	0	486K		64	0	0	0	RWEATH2		
BKUPVM2	J0185591	14:05:32	2018/05/06	Requeue To		21		8 CC 0000		696	696	0	98K		14	0	0	0	RWEATH2		
MAKEUTIL	J0185592	14:05:32	2018/05/06	Restart		3		8 CC 0000		671	671	0	49K		6	0	0	0	RWEATH2		
BKUPUSER	J0185648	21:14:59	2018/05/06	Run		1		2 CC 3072		59	57	0	16K		4	0	0	0	SYSOPER		
BKUPDOC	J0185652	21:29:59	2018/05/06	Spin		1		2 CC 3072		59	57	0	16K		4	0	0	0	SYSOPER		
BKUPPUB1	J0185658	21:44:59	2018/05/06	Sys Cancel		1		2 CC 3072		59	57	0	16K		4	0	0	0	SYSOPER		
BKUPUDIR	J0185661	21:59:59	2018/05/06			5		2 CC 0000		1,200	1,054	0	102K		10	0	0	0	SYSOPER		
BKUPLOCL	J0185662	21:59:59	2018/05/06			1		2 CC 3072		59	57	0	16K		4	0	0	0	SYSOPER		
EJESVJ3	S0185709	22:44:39	2018/05/06	W-OUTPUT	OUTSERV	2		15 CC 0000		2	2	0	4K		1	0	0	0	EJES		
CICSA	S0185713	22:46:03	2018/05/06	W-OUTPUT	OUTSERV	5		15 JCLEAR		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 header bar with tabs for STATUS, JES, System, Tools, Filter, View, Options, Help, and Logout. A search bar is also present. Below the header is a table titled "STATUS - 3269S- 137X- 3074W- 59H- 0T- 51814298 Records- 51179550 Lines- 0 Pages". The table has 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 contains numerous rows of job data. In the bottom left corner of the table area, there is a text box labeled "Command:" followed by the placeholder text "Enter a line command and press ENTER. Press ESC to dismiss.". To the left of the table, the text "Type your command here." is displayed with an arrow pointing towards the command input field.

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
LOGSAV60	J0185457	00:00:59	2018/05/06	W-OUTPUT	OUTSERV	11	4	AB SB37		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		
LOGSAVA0	J0185459	12:59:20	2018/05/06	W-OUTPUT	OUTSERV	0	1	CC 0000		19	19	0	4K			0	1	0	0	SYSOPER		
IEAVTSZ0	S0185462	00:01:02	2018/05/06	W-OUTPUT	OUTSERV	1	15	CC 0000		454	454	0	45K			1	0	0	0	SYSOPER		
IEAVTSZR	S0185463	00:01:02	2018/05/06	W-OUTPUT	OUTSERV	1	15	CC 0000		1,465	1,465	0	151K			1	0	0	0	SYSOPER		
EJESXPIR	J0185479	02:00:00	2018/05/06	W-OUTPUT	OUTSERV	1	2	CC 0000		6,482	6,482	0	392K			4	0	0	0	EDJXAADM		
DFS	S0185482	02:46:13	2018/05/06	W-OUTPUT	OUTSERV	1	15	CC 0000		84	81	0	12K			3	0	0	0	SYSOPER		
DB8GMST0	S0185487	02:46:13	2018/05/06	W-OUTPUT	OUTSERV	0	15	JCLERR		14	14	0	8K			3	0	0	0	SYSOPER		
EJESVJ3	S0185488	02:46:13	2018/05/06	W-OUTPUT	OUTSERV	2	15	CC 0000		2	2	0	4K			1	0	0	0	EJES		
FTDRVR3	S0185489	02:46:13	2018/05/06	W-OUTPUT	OUTSERV	1	15	AB S222		78	78	0	16K			4	0	0	0	PHOENIX		
ISZSMGR	S0185491	02:46:13	2018/05/06	W-OUTPUT	OUTSERV	1	15	CC 0000		381	381	0	33K			1	0	0	0	SYSOPER		
LOGSAV50	J0185570	12:59:20	2018/05/06	W-OUTPUT	OUTSERV	0	1	CC 0000		200	200	0	12K			0	1	0	0	SYSOPER		
LOGSAVA0	J0185571	12:59:25	2018/05/06	W-OUTPUT	OUTSERV	0	1	CC 0000		123,424	111,634	0	8M			0	2	0	0	SYSOPER		
RWEA0571	J0185572	13:06:33	2018/05/06	W-OUTPUT	OUTSERV	1	2	CC 0000		92	92	0	16K			4	0	0	0	RWEATH		
CPU0571	J0185579	13:06:38	2018/05/06	W-OUTPUT	OUTSERV	7	2	CC 0000		1,425	1,391	0	98K			9	0	0	0	RWEATH		
RWEA0571	J0185582	13:07:44	2018/05/06	W-OUTPUT	OUTSERV	1	2	CC 0000		92	92	0	16K			4	0	0	0	RWEATH		
EXP0571	J0185583	13:07:44	2018/05/06	W-OUTPUT	OUTSERV	7	2	CC 0000		1,750	1,716	0	110K			9	0	0	0	RWEATH		
BKUPVM1	J0185590	14:05:32	2018/05/06	W-OUTPUT	OUTSERV	121	8	CC 0004		3,416	3,416	0	486K			64	0	0	0	RWEATH2		
BKUPVM2	J0185591	14:05:32	2018/05/06	W-OUTPUT	OUTSERV	21	8	CC 0000		696	696	0	98K			14	0	0	0	RWEATH2		
MAKEUTL1	J0185592	14:05:32	2018/05/06	W-OUTPUT	OUTSERV	3	8	CC 0000		671	671	0	49K			6	0	0	0	RWEATH2		
BKUPUSER	J0185648	21:14:59	2018/05/06	W-OUTPUT	OUTSERV	1	2	CC 3072		59	57	0	16K			4	0	0	0	SYSOPER		
BKUPDOC	J0185652	21:29:59	2018/05/06	W-OUTPUT	OUTSERV	1	2	CC 3072		59	57	0	16K			4	0	0	0	SYSOPER		
BKUPUB1	J0185658	21:44:59	2018/05/06	W-OUTPUT	OUTSERV	1	2	CC 3072		59	57	0	16K			4	0	0	0	SYSOPER		
BKUPUD1	J0185661	21:59:59	2018/05/06	W-OUTPUT	OUTSERV	5	2	CC 0000		1,200	1,054	0	102K			10	0	0	0	SYSOPER		
BKUPUDC1	J0185662	21:59:59	2018/05/06	W-OUTPUT	OUTSERV	1	2	CC 3072		59	57	0	16K			4	0	0	0	SYSOPER		
EJESVJ3	S0185709	22:44:39	2018/05/06	W-OUTPUT	OUTSERV	2	15	CC 0000		2	2	0	4K			1	0	0	0	EJES		
CICCSA	S0185713	22:46:03	2018/05/06	W-OUTPUT	OUTSERV	5	15	JCLERR		294	294	0	33K			4	0	0	0	CICCSA		

Command: Enter a line command and press ENTER. Press ESC to dismiss.

# (E)JES Web

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

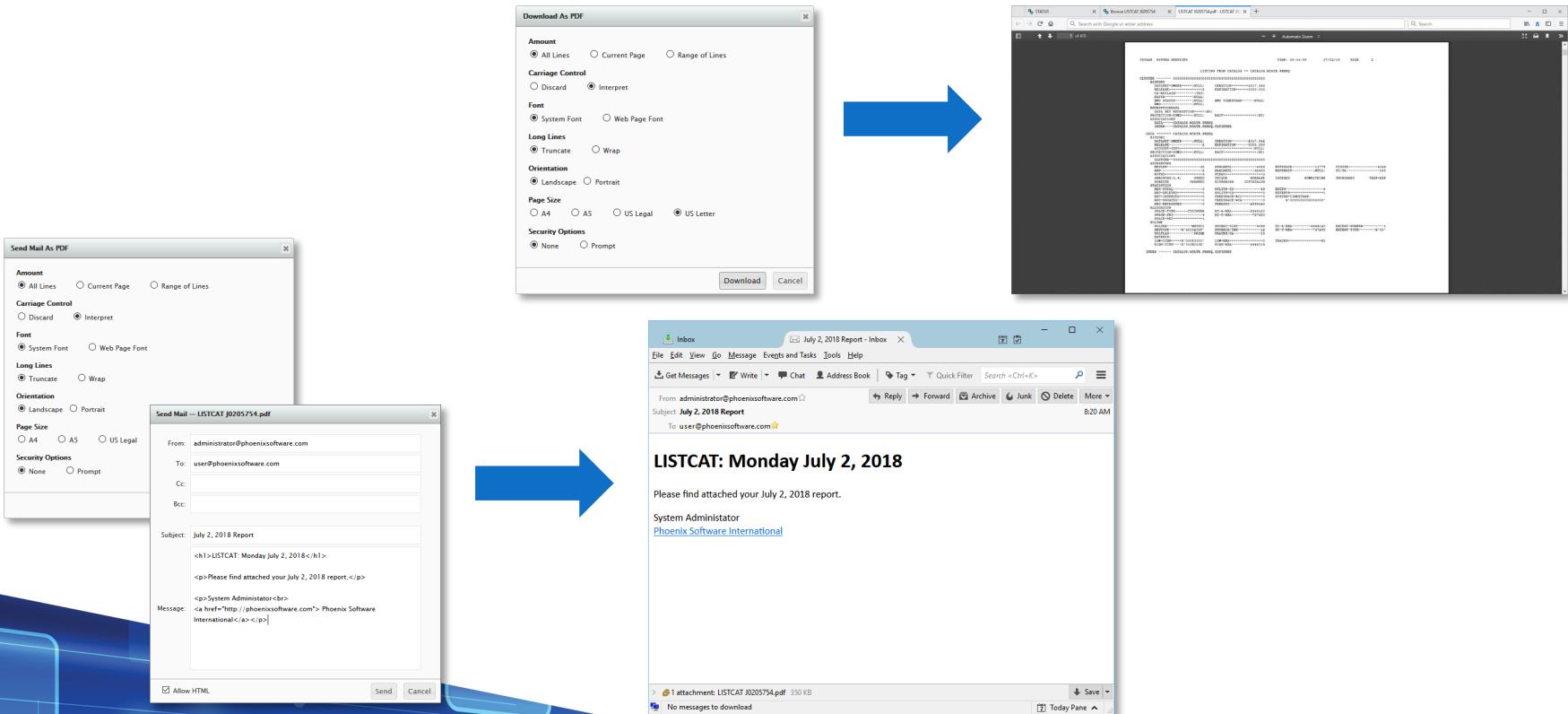
**Press Enter to issue the command or Esc to cancel.**

5-OVERTYPES 5-SELECTION

**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.



# 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

The screenshot shows a Java application running within an Eclipse-based IDE. The interface includes:

- Top Bar:** eclipse-workspace - Eclipse IDE, File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, Help.
- Left Sidebar:** Package Explorer (Launcher [Launcher master]), Libraries (Libraries [Libraries master]), Git Repositories (IEAVTSZR, EJESVJ2, SMORGAN, RWEATH, EDJXADM, DFHMSMA, IEAVTSZR, SMORGAN, DFHMSMA, SMORGAN).
- Central Area:** A code editor window titled "Launcher.java" containing Java code. The code defines a class "Launcher" with a static inner class "CommandCallback".

```
1 package com.phoenixsoftware.util;
2
3 import static com.ibm.jzos.Enqueue.ISGENQ_CONTROL_EXCLUSIVE;
4
5 public class Launcher {
6
7     static Process p;
8     static String pidfile;
9     static String launchfile;
10    static int returnCode = 0;
11
12    /**
13     * Operator interaction.
14     */
15    static class CommandCallback implements MvsCommandCallback {
16
17        private class CommandException extends Exception {
18            static final long serialVersionUID = 1L;
19            public CommandException(String s) {
20                super(s);
21            }
22        }
23        public void handleModify(String s) {
24            String message = "";
25        }
26    }
27}
```
- Right Sidebar:** Task List, Outline (com.phoenixsoftware.util), and a status bar at the bottom.
- Bottom Status Bar:** Jobs, JES, System, Tools, Filter, View, Options, Help, Logout, (E)JES, Row 633 of 2,682.
- Table View:** A large table showing job statistics across multiple columns.

# 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

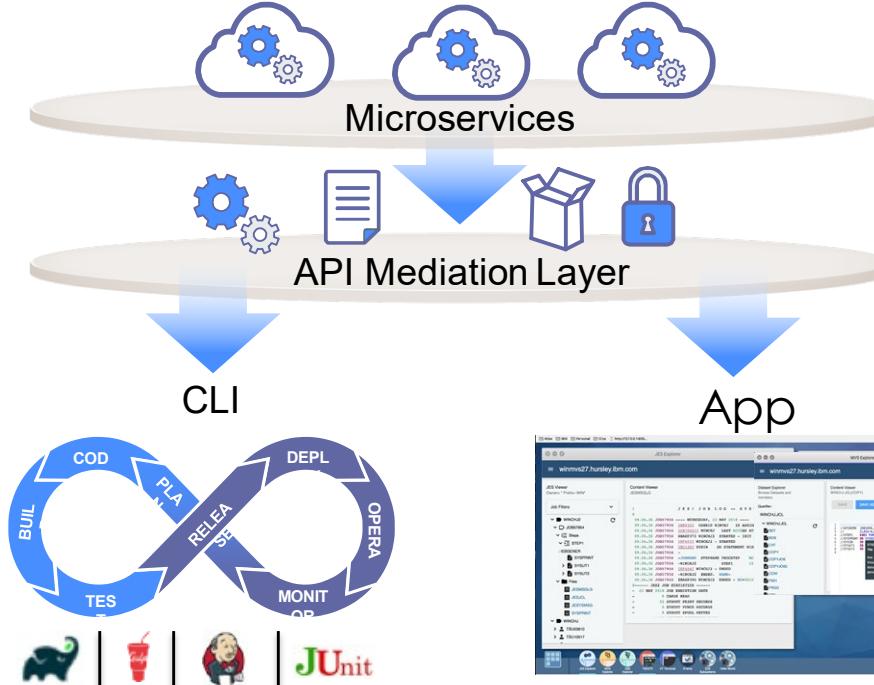
- An extensible framework for connecting applications and tools to mainframe data and applications.
- Aims to make the mainframe an integrated and agile platform within the changing IT architectural landscape.
- First open source project on z/OS. All code is licensed under the Eclipse Public License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



## Framework and Ecosystem at a Glance



- Plugins
- Plugins
- Plugins



- Plugins
- Plugins
- Plugins

# 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 shows a browser window with two main panels. The left panel is titled 'JES Explorer' and displays a hierarchical tree view of JES jobs, including 'WINCHU2', 'WINBS7954', 'Steps', 'STEPI', 'ISERGENER', 'SYSPRINT', 'SYSUT1', 'SYSUT2', and 'Files'. The right panel is titled 'Content Viewer' and shows a 'JESMSGLG' log entry for job 'WINCHU2'. The log details various system messages and job steps, such as 'JOB00011 WINCHU2 LAST ACCESS AT 0915430 ON WE', 'JOB00012 WINCHU2 - STANDED', and 'JOB00013 WINCHU2 - STANDED'. At the bottom of the browser window, there is a navigation bar with icons for JES Explorer, MVS Explorer, USS Explorer, TN3270, VT Terminal, Iframe, ZOS Subsystems, and Hello World.

**Swagger-defined z/OS REST APIs**

Method	Endpoint	Description
GET	/api/v1/jobs	Get a list of all jobs
GET	/api/v1/jobs/{jobName}	Get a job by name
DELETE	/api/v1/jobs/{jobName}/{jobId}	Cancel a job and purge its associated files
GET	/api/v1/jobs/{jobName}/{jobId}/files	Get a list of output file names for a job
GET	/api/v1/jobs/{jobName}/{jobId}/files/{fileId}/content	Get content from a specific job output file
GET	/api/v1/jobs/{jobName}/{jobId}/steps	Get job steps for a given job
POST	/api/v1/jobs/dataset	Submit a job given a data set

The screenshot illustrates the API Mediation Layer architecture. On the left, a 'API Catalog' page is shown with a table of services and their status. On the right, a terminal window displays the 'bright zos-files' command being run, followed by its description, usage, and actions.

**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.

**DESCRIPTION**

-----

Manage z/OS data sets and USS files

**USAGE**

-----

bright zos-files [action] [object] [options]

**ACTIONS**

-----

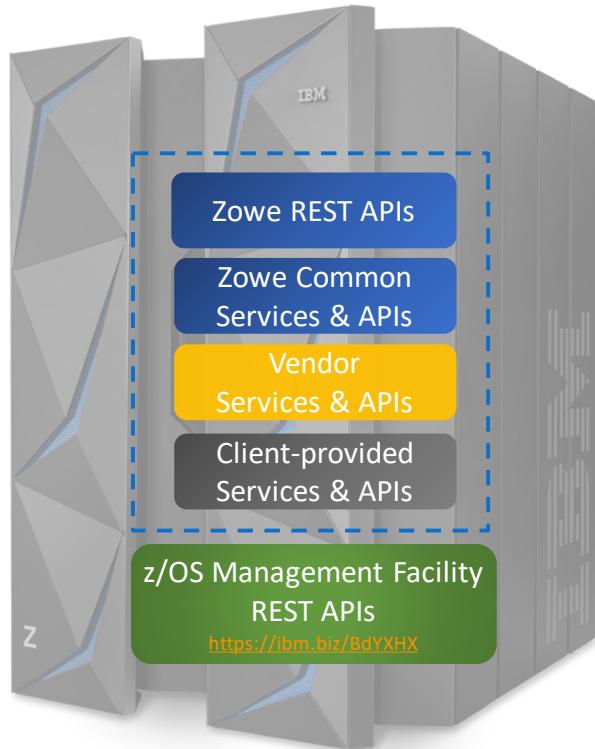
bright zos-files [action] [object] [options]

Swagger-defined z/OS REST APIs

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

## • Mainframe Virtual Desktop

- A web-based window manager that provides full screen interactive experience

## • Zowe Node Server

- Runs zLUX; uses Express.js as web service framework for communication between applications and z/OS services and components, pre-reqs Node.js for z/OS

## • ZSS Server

- Provides secured REST API services

## • Application Plug-in

- Data services, Configuration data service, URI broker, app-to-app communication, Error reporting UI, Logging utility

## • Explorers

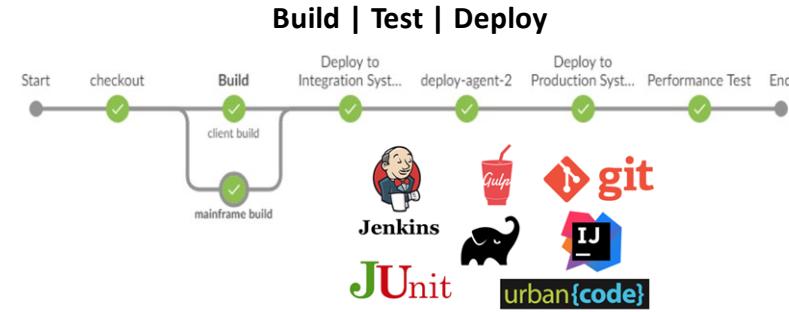
- JES, MVS, USS explorers
- Basic editing support for REXX and JCL

The screenshot displays the Zowe Web Desktop environment with several open windows:

- JES Explorer**: Shows a tree view of jobs and steps under "winmvs27.hursley.ibm.com". A job named "WINCH2" is expanded, showing its steps: JESBGENER, SYSPRINT, and SYSPRT.
- TN3270**: A terminal window showing a JCL listing for job "WINCH2". The JCL includes definitions for datasets like "JESMSG02", "JESJCL1", and "JESYMSG02", and various EXEC statements.
- USS Explorer**: A file explorer window showing Unix files in the directory "/u/winchj". Files listed include ".bash\_history", ".bash\_profile", "profile", ".sh\_history", "ssh", "Test.bdt", "alpha2test", "alphatest", "ClosedBeta", "dead.letter", "Drop4", and "Drop5".
- MVS Explorer**: A dataset explorer window showing datasets under "WINCHJ.JCL". Datasets listed include "BET", "BOB", "CAT", "COPY", "COPYJOB", "COPYOBJ", "COW", "FISH", and "FROG".
- Content Viewer**: A window displaying the JCL code for the "WINCH2" job, which defines datasets and executes various programs.

# 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.

The screenshot shows a web-based API catalog interface. At the top, there's a search bar labeled "Search for APIs". Below it, a section titled "Available API services" lists two items: "API Mediation Layer API" and "IBM z/OSMF API Services". Both items have a status indicator "All services are running". The background features a stylized circuit board or network diagram.

The screenshot shows a detailed view of the API Catalog service documentation. It includes the service name "apicatalog", a brief description ("API Catalog service to display service details and API documentation for discovered API services."), and the API version "1.0.0". It also provides the base URL "[ Base URL: ca3x.ca.com:10010/api/v1/apicatalog ]". Below this, there's a "REST API" section describing the service's purpose and a link to the "Swagger/OpenAPI JSON Document". At the bottom, there's a "Current state information" section with two API endpoints: "GET /containers" (described as "Lists catalog dashboard tiles") and "GET /containers/{id}" (described as "Retrieves a specific dashboard tile information").

## 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

The screenshot shows a web browser window titled "API Catalog". The main content area displays the "(E)JES REST API" documentation. At the top left is a "Back" button. Below it, the title "(E)JES REST API" is displayed, followed by the subtitle "(E)JES REST API through Zowe". A search bar contains the text "ejes". The main content area contains the following text:

**(E)JES REST API**

Invoke (E)JES Web services through the Zowe API Catalog.

**(E)JES V5R9 REST API Documentation © 2019 Phoenix Software International, Inc.**

API Version: 1.0

[ Base URL: mvs60.phx:7554/api/v1/ejes ]

Leverages the (E)JES Java API to provide REST API services.

[Swagger/OpenAPI JSON Document](#)

[Technical Support - Website](#)

[Send email to Technical Support](#)

Licensed Product of Phoenix Software International, Inc.

# 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.

The Microsoft Word ribbon interface is shown at the top. The Home tab is selected, displaying various font and paragraph styling tools. The ribbon also includes tabs for File, Insert, Design, Layout, References, Mailings, Review, View, Help, and a search bar.

## Navigation

Search document

Headings Pages Results

Perform ACCEPT of Product Components

Allocate Distribution Libraries

Perform ACCEPT of Product Components

Chapter 4. Perform Tasks for CSM Installation Path

Run the EJFINST Utility

Select with the EJESPF1 Utility

Add (E)JES Product to the CSM Software Catalog

Add (E)JES Install Package to CSM Software Cata...

Initiate Product Install

Choose Install Type

Specify System Data Set Names

Extract Customization Library from CSM Package

Chapter 5. Perform Tasks for ZMF Installation Path

Customization USERMOD/PTF Member Trans...

Installing Customization USERMODs/PTFs wit...

Chapter 5. Perform Tasks for ZMF Installation Path

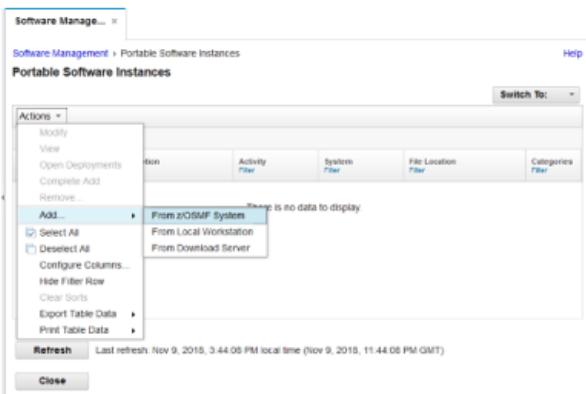
Unlock and Unpack the Portable Software Instan...

Add the Portable Software Instance to Software...

Deploy the Portable Software Instance

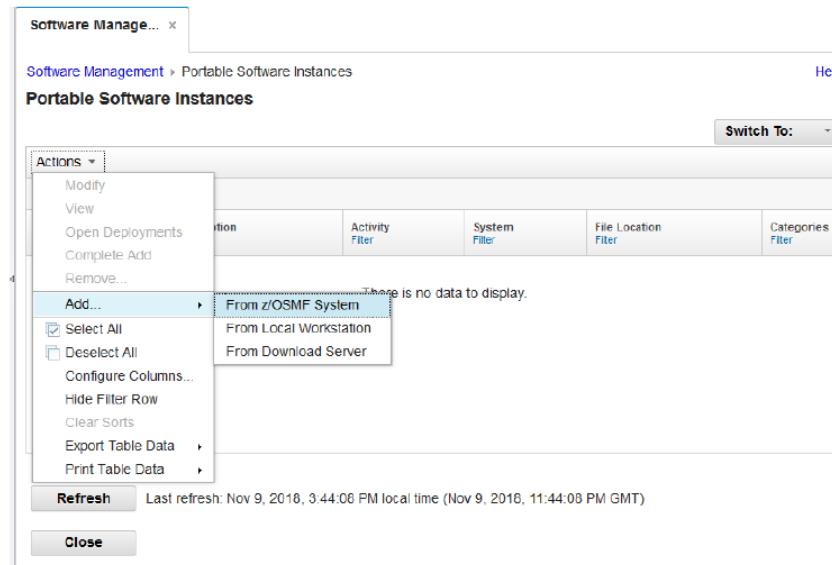
## Add the Portable Software Instance to Software Management

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.



## 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.



## 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 Library
  - Dynamically Add SUEJELPA to Link-Block Area
  - Dynamically Update Active LNKLST 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 &gt;

## 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 shows the z/OSMF Software Management interface. On the left, there is a navigation tree with the 'Contents' node selected. The main area displays a table titled 'Portable Software Instances' with columns: Action, Name, Activity Filter, System Filter, File Location Filter, and Categories Filter. A message at the bottom of the table says 'There is no data to display.' Below the table is a 'Actions' dropdown menu with 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 open, showing 'From z/OSMF System' (which is also highlighted), 'From Local Workstation', and 'From Download Server'. At the bottom of the interface, there 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)'.

SearchSearch Filters: (E)JES V5R9  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 EJESPFI 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 ISM Package
  - Perform Post-CSM 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

&lt; Previous | Next &gt; | Topic View |

(E)JES V5R9 &gt; (E)JES Installation &gt; Chapter 5. Perform Tasks for ZMF Installation Path &gt; 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/OS System" to invoke the "Add Portable Software Instance" dialog.

The screenshot shows the z/OSMF Software Management interface. On the left, there is a navigation pane with a 'Table of Contents' section. In the center, there is a main content area titled 'Add the Portable Software Instance to Software Management'. Below this title, there is a brief instruction: 'From the z/OSMF Software Management main tab select "Portable Software Instances". Then click "Actions" à "Add..." à "From z/OS System" to invoke the "Add Portable Software Instance" dialog.' Below this instruction, there is a screenshot of the 'Portable Software Instances' table. The table has columns for Action, Name, Activity Filter, System Filter, File Location Filter, and Categories Filter. A tooltip 'There is no data to display.' is shown over the table. On the left side of the table, there is a 'Actions' dropdown menu. The 'Add...' option is selected, and a submenu is open with three options: 'From z/OSMF System', 'From Local Workstation', and 'From Download Server'. At the bottom of the table, there are buttons for 'Refresh' and 'Close', and a status message: 'Last refresh: Nov 9, 2018, 3:44:08 PM local time (Nov 9, 2018, 11:44:08 GMT)'.

# 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.

Workflows

Workflows > EJES V5R9 Installation > 5.2. Add the Portable Software Instance to Software Management

Properties for Workflow Step 5.2. Add the Portable Software Instance to Software Management

General Details Dependencies Notes Perform Status Input Variables Feedback

Title: Add the Portable Software Instance to Software Management

Description:

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.

Software Manage... ×

Software Management > Portable Software Instances

Portable Software Instances

Actions ▾

- Modify
- View
- Open Deployments
- Complete Add
- Remove...
- Add... ▾
- Select All
- Deselect All
- Configure Columns...
- Hide Filter Row
- Clear Sorts
- Export Table Data ▾
- Print Table Data ▾

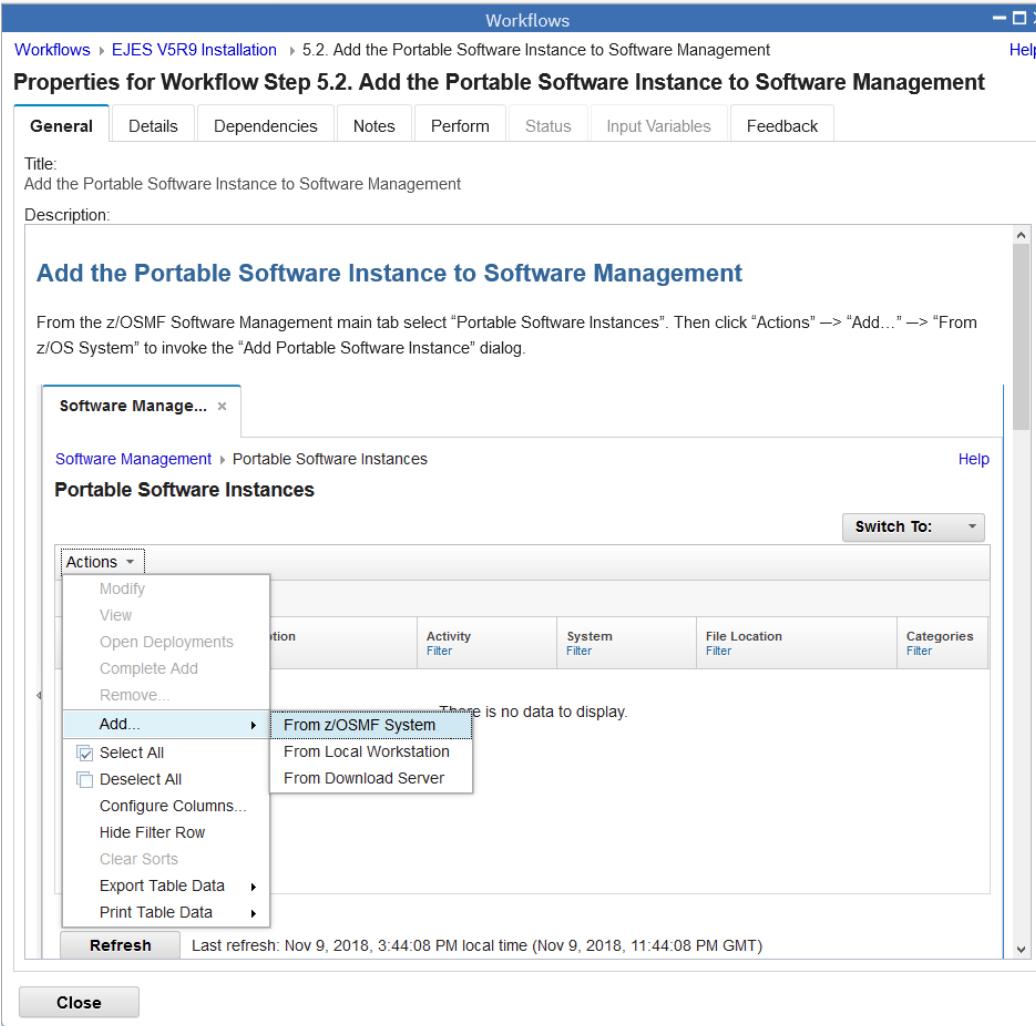
There is no data to display.

From z/OSMF System  
From Local Workstation  
From Download Server

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

Close

Help



# 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: <ftp://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><p><b>SSHPROMPT</b> is the easiest to use if S</p><p><b>HTTPBATCH</b> uses the SMP/E GIMGTPKG ut</p><p>Specify <b>OTHER</b> 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

Value Must be a Choice

Set Default

Remove Cho

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

Properties for Workflow Step 2.1. Choose Download Method

Details Dependencies Notes Perform Status Input Variables Feed

Input Variables General Review Instructions

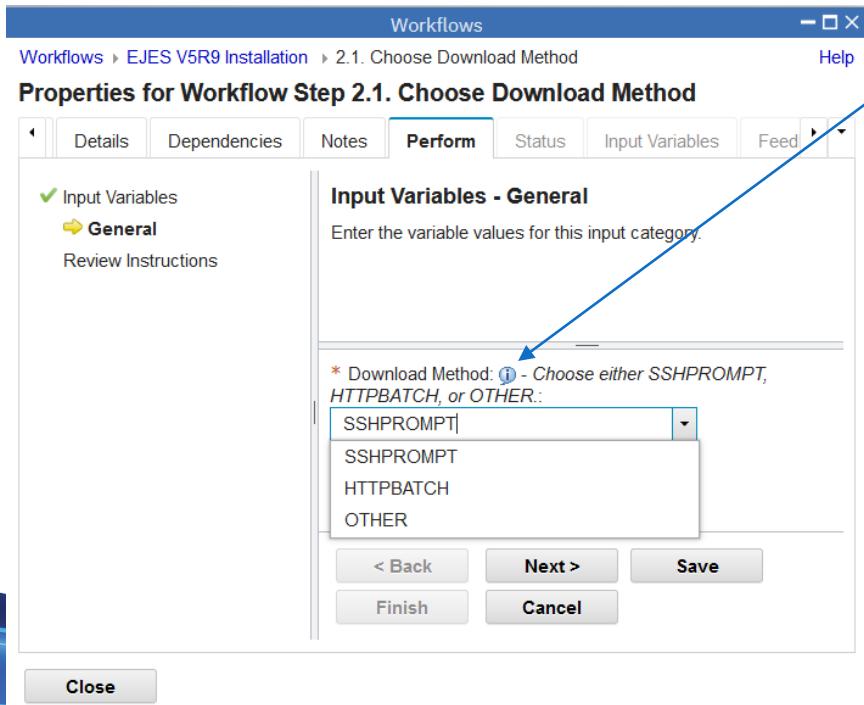
**Input Variables - General**  
Enter the variable values for this input category.

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

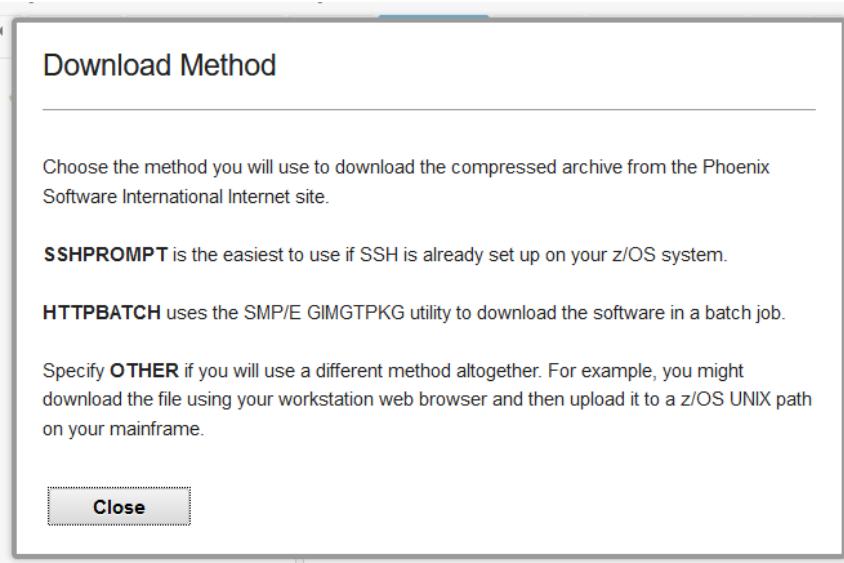
SSHPROMPT  
HTTPBATCH  
OTHER

< Back Next > Save  
Finish Cancel

Close



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



# Defining a String Variable

- Creates an ordinary entry field

Variable Details

**Workflow Variables**

\* Variable Name:

\* Scope:

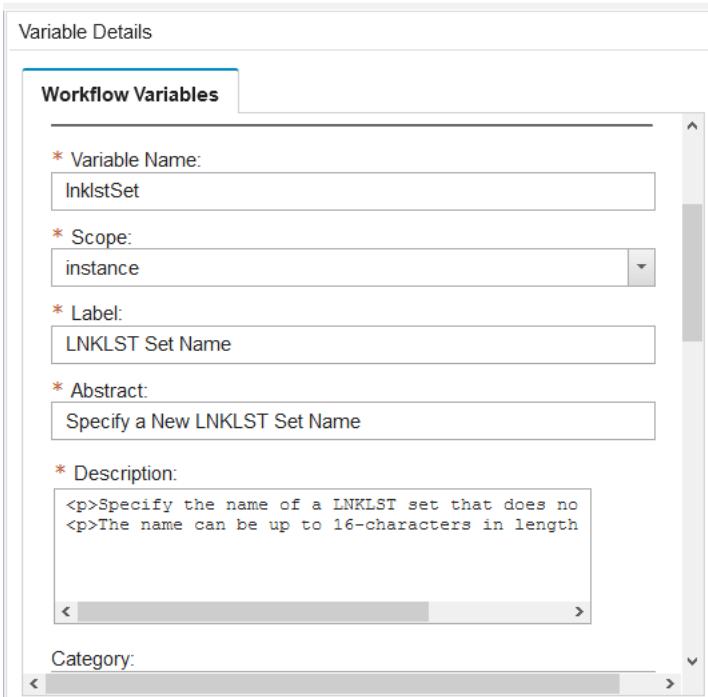
\* Label:

\* Abstract:

\* 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

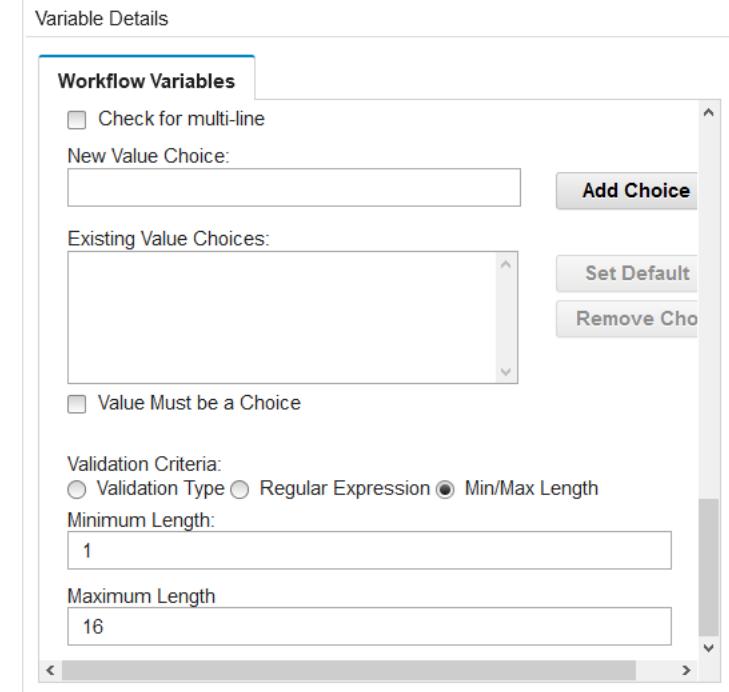
Existing Value Choices: Set Default Remove Cho

Value Must be a Choice

Validation Criteria:  
 Validation Type  Regular Expression  Min/Max Length

Minimum Length:

Maximum Length:



# Defining a Boolean Variable

- Creates a check-box (checked = TRUE)

Variable Details

**Workflow Variables**

\* Variable Name:

\* Scope:

\* Label:

\* Abstract:

\* Description:

Category:

Variable Details

**Workflow Variables**

Category:

Expose To User:

Read Only At:

Check to use substitution

Required At Create

Prompt At Create

Visibility:

Type:

Default Value:

# 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

Details Dependencies Notes Perform Status Input Variables Feed ▾

✓ 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: [i](#) - Specify a New LNKLST Set Name:  
upto16chars

\* SEJELPA on LNKLST?: [i](#) - Check this box to indicate SEJELPA should be added to LNKLST instead of LPA:

Command Target System: [i](#) - 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](#)

### Concatenation

#### 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

**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-weight:bold;>From the z/OSMF Software Management</h1><p>From the z/OSMF Software Management</p><!-- 
```

\* Weight (1-1000):  
10

Skills:

Step Type:

**Step Prerequisites**

A step might require other steps to be completed before it can be performed. On this tab, you can modify the list of prerequisite steps for the selected step.

**Eligible Prerequisite Steps**

- S506968068
- S506968069
- S506968070
- S506968071

**Existing Prerequisite Steps**

- S529859795

**Description:**

None  Target State  State Expression  Extended Expression

**Step Details**

Instructions Type Conditions Security Variables

### Step Conditions

A step can have a conditional dependency that must be satisfied before the step can be performed. On this tab, you can modify or remove an existing step condition, or create a new one.

Set this step as conditional

\* Expression:  
\${instance-installPath} == "TRADITIONAL" || \${instance-installPath} == "ZMF"

Description:  
This step is for the ZMF installation path only.

None  Target State  State Expression  Extended Expression

Target State Set Description:  
This step is ready for ZMF and skipped for TRADITION

**State Expression Table**

Action	Search
<input type="checkbox"/> Expression	State
<input type="checkbox"/> \${instance-installPath} == "TRADITIONAL"	skipped
<input type="checkbox"/> \${instance-installPath} == "CSM"	skipped
<input type="checkbox"/> \${instance-installPath} == "ZMF"	ready

# 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 its 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 Instructions Only step does not require any input or output. To modify. To view the properties for this step, see the Instructions tab.

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

have type-specific properties to step, see the Instructions tab.

# 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.

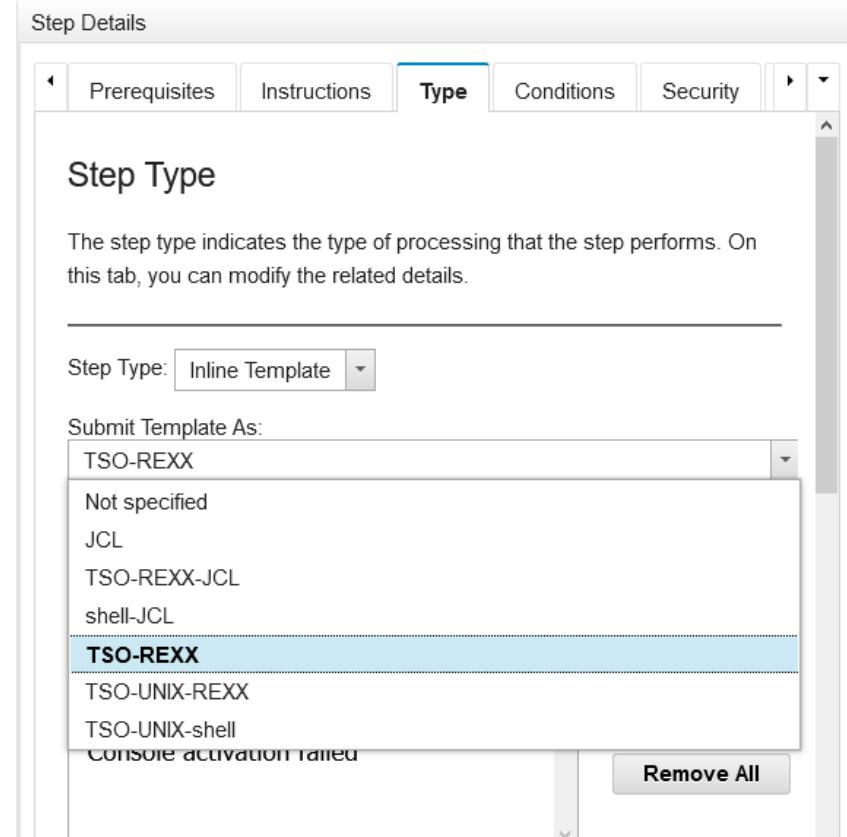
Step Type: **Inline Template**

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 ISPLOG 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 😞

The screenshot shows the 'Step Details' panel of the Workflow Editor. The 'Type' tab is selected, showing a 'Step Type' of 'REST API'. The 'Request' tab displays a JSON payload for a SWI LIST request, and the 'Response' tab shows the actual JSON response received from the server.

**Step Details**

**Type**

**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:** zosmf.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:** /zosmf/swmgmt/swi

Check to use substitution

**Dependencies** **Notes** **Perform** **Status** **Input Variables** **Feedback**

**Status**

**State:** Complete **Expected status code:** 200 **Actual status code:** 200

**Request** **Response** **Message**

```
{ "swilist": [ { "categories": null, "created": "2018-12-04T10:25:27-08", "createdby": "EDJXADM", "description": "(E)JES Version 5, Release 9.0\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://zosmf.phx.phoenixsoftware.com:10443/zosmf/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.

# 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