

# Z Workload Scheduler New v9.5 release coming

Marco Cardelli (marco.cardelli@hcl.com)  
HCL Products & Platforms

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Session **NE**



# Agenda

- ✧ Market momentum & latest IBM Workload Automation deliveries
- ✧ Strategy and roadmap
- ✧ New ZWS v9.5 release - technical preview

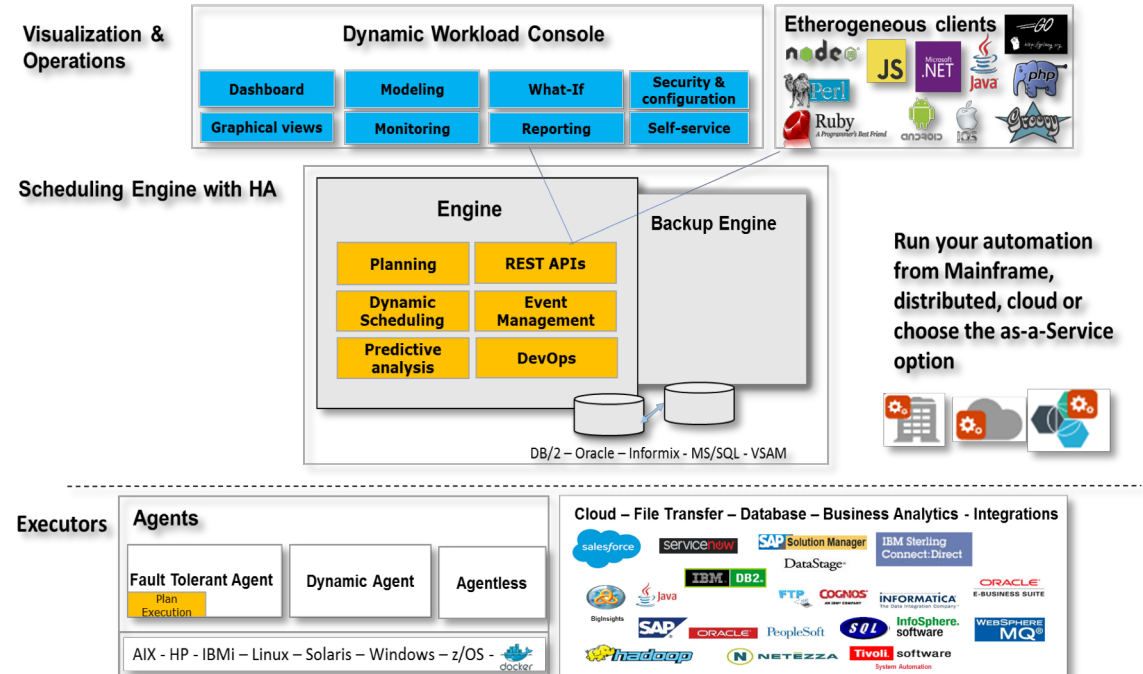
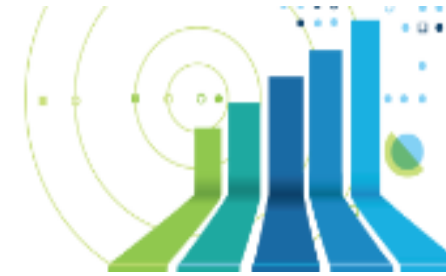
# Market momentum & Strategic vision



EMA named amongst the *Outstanding* capabilities :

- ★ Breadth of Application & Database Support
- ★ Developers Schedule in Code (DevOps)
- ★ Self-Service Portal
- ★ Security
- ★ Comprehensive API
- ★ Container Deployment
- ★ Flexibility of Licensing Model

## Re-Imagine Workload Automation



# IBM Workload Automation distinguished features

## Modeling

IMPROVED

- Modern and intuitive **web-based user interface**
- **Business integration** hub to bring relief in complex processes

## Monitoring & Analytics

IMPROVED

- **Hybrid Workload Automation** from a single point of control
- **Predictive scheduling**

## DevOps

NEW

- **Automate** every step between writing code and **deploying application** to customers

## Deployment & Upgrade

NEW

- Workload Automation components in **containers**
- **Agents flexibility** and Zero-downtime **upgrade of agents**

## APIs

NEW

- Scheduling through **APIs**

## Pricing

IMPROVED

- **All-inclusive** pricing and **mixed licensing models**

# IWSz SPE 09 & new IWS agent for z v9.4

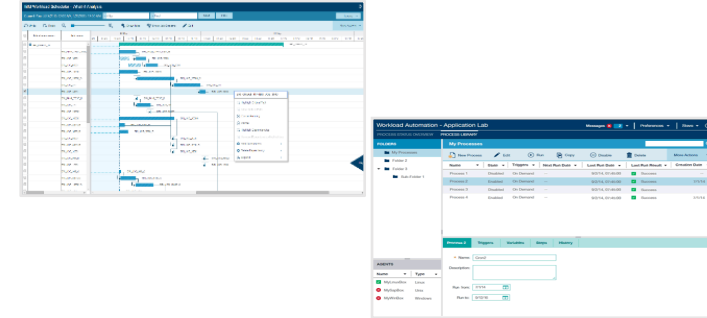
## Extend application dependencies support on z – New d-driven release

- **Extend application dependencies support**

- Critical path networks
- Workload Automation Programming Language
- What-if analysis tool

- **Accelerate adoption of DWC to z customers**

- Enhance lock management for JCL editing
- New columns added for the multi-engine view (Job Number, Job Identifier, Job Error code, Actual End)



## New IBM Workload Scheduler distributed agent for z/OS v9.4

- Event-driven workload automation (EDWA) for Scheduling with the Agent for z/OS
  - Detect an activity impacting a data set and trigger any kind of action when the event of closure is verified.
- Modify job definition in plan or database
  - Modify a job instance in the plan before it runs, modify an instance of a job in the plan that has already run and rerun the modified job or modify the job definition explicitly in the production plan getting the JCL directly from a remote data set.



## Agent on Solaris Sparc – proxy for zCentric

- Agents on **Solaris Sparc** - Support for fault-tolerant agents, dynamic agents, and z/OS agents has been extended on Sun Solaris SPARC 64-bit.
- **File Monitor**, new option to determine when fileCreated event is sent - The **-modificationCompletedTime** option can now optionally be specified with the **-event fileCreated** argument to determine when the **fileCreated** event is sent.
- **WLM SE integration and variable substitution** - If you submit a JCL when the WLM scheduling environment is not available, you can specify that the JCL is replaced in the JS file when the scheduling environment becomes available again. In this way, any variables contained in the JCL are updated with the most up-to-date values.
- New statuses "delete" and "started executing" in **EQQUX007** - The operation-status-change exit (EQQUX007) is also called when an operation changes status to Deleted (D), or Started (S) with the extended status set to Executing.
- Support **proxy for zCentric agents** - To have the IBM Workload Scheduler for z/OS Agent agent (z-centric) communicate with the z/OS controller through a proxy, you can configure the proxy properties in the JobManager.ini file and ROUTOPTS initialization statement.

# Strategy & Roadmap

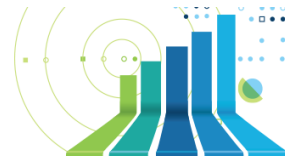
IBM Z Workload Scheduler - V9.5 release and beyond

## Digital Business Automation



- ▶ Enhancing **Hybrid** workload management from the cloud
- ▶ Scaling up **business workloads** (big data, complex ERP workload management)
- ▶ Expand to **new workload types** (cloud resources, containers, IoT ..)

## Unleash data-driven decisions powered by analytics & ML



- ▶ Providing a next level of **insights for your data** & enabling greater **Self Service Automation** for your end-users
- ▶ Providing **advanced visualizations** for workload trends discovery and machine learning for troubleshooting

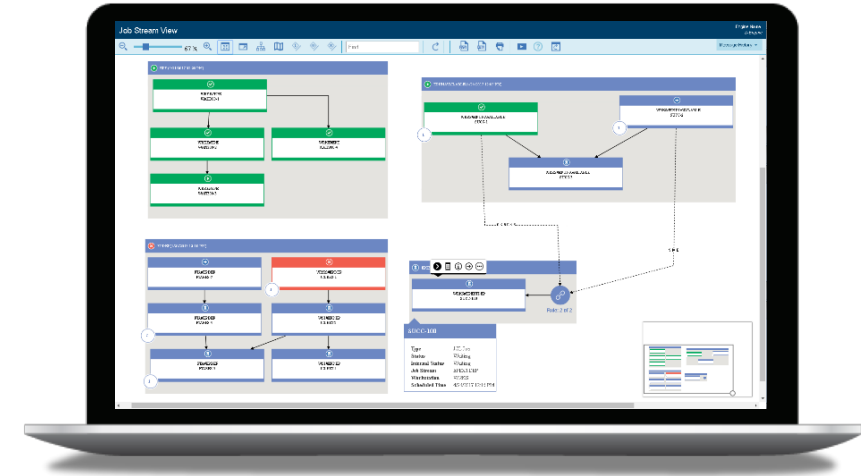
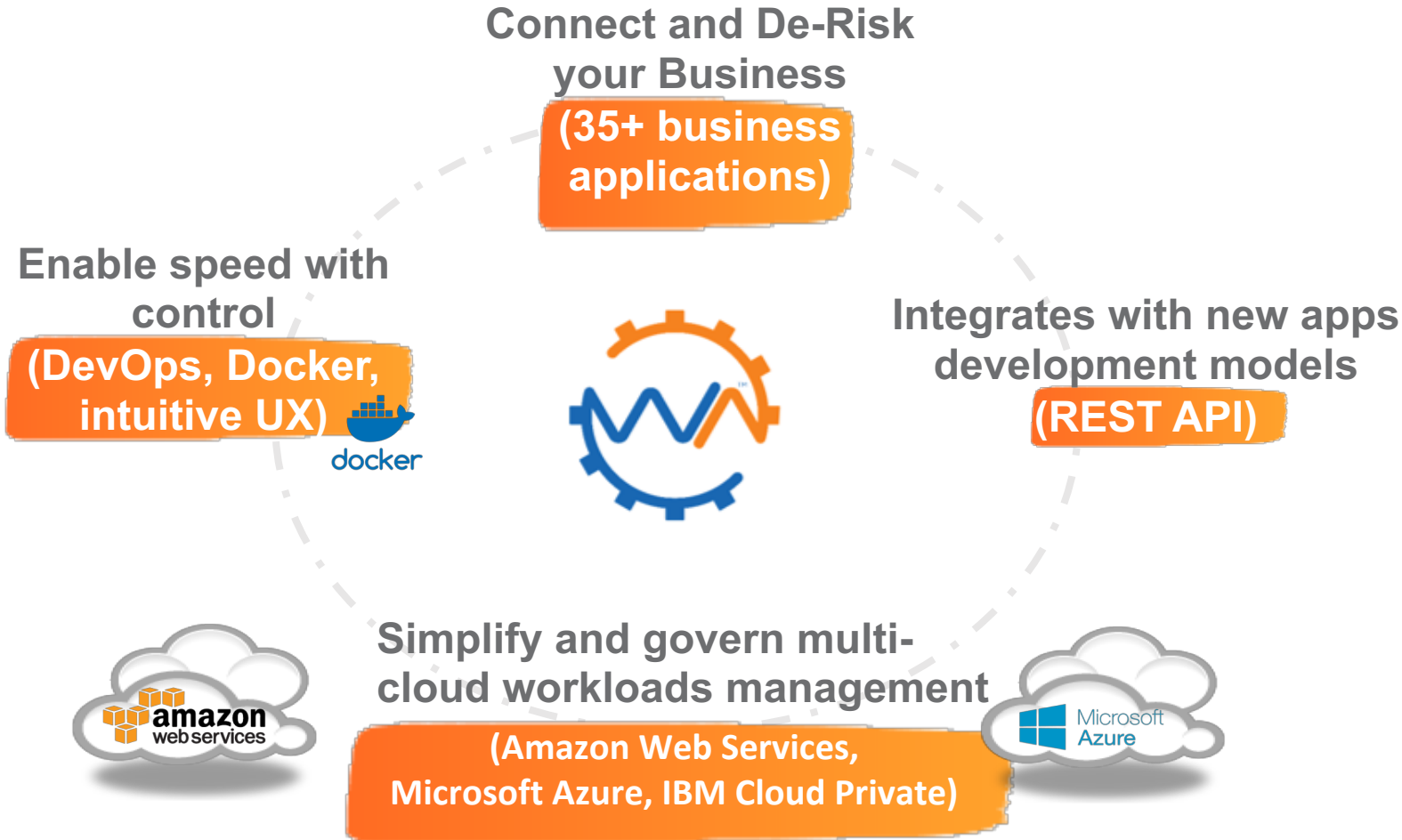
## Towards Workload Automation in Continuous Delivery

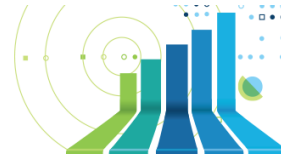


- ▶ Leveraging **containers** and our **unique Workload Automation as-a-Service capability** for managed and on-premises continuous delivery of enhancements
- ▶ Modernize and Innovate an evolutionary Workload Automation architecture, from API to micro-services.



# IWA – make the most of your Digital Business automation

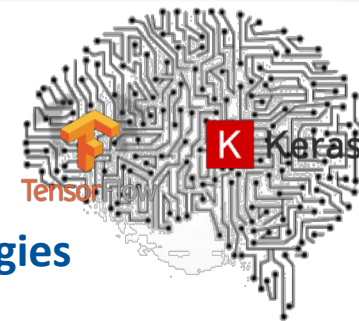
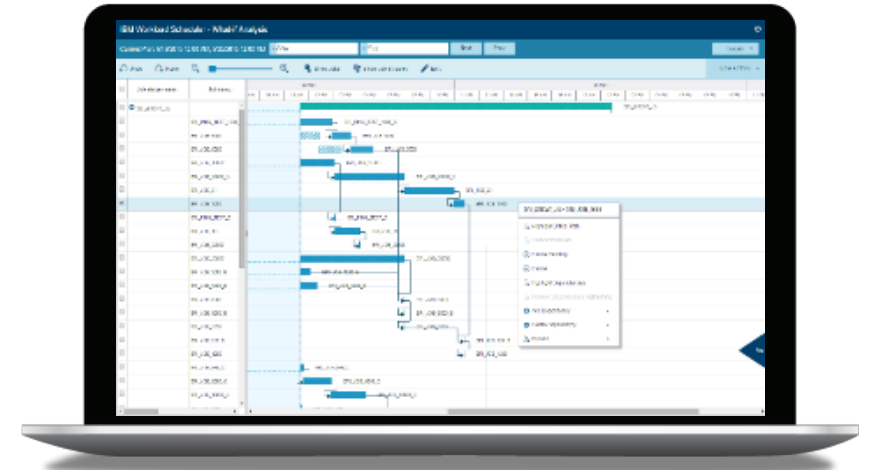




Drive insights and efficiencies in the execution of always more complex business processes

- ✓ Workload **duration prediction**, powered by *Machine-Learning capable of learning long-term dependencies*
- ✓ Workflow **SLA self-monitoring** and **optimization** with *embedded Workload Service Assurance*
- ✓ **What-if analysis**, simulation and deploy changes in production

## Analytics & Machine Learning



IBM Workload Automation elevates Automation capabilities with new technologies

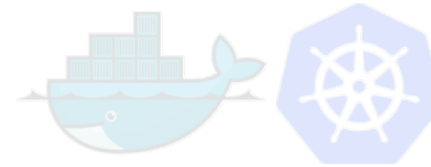


**Shift focus from  
managing the infrastructure to  
enabling your digital transformation**



**IBM Workload Automation elevates Automation capabilities  
with new technologies**

## Containers & Kubernetes



- ✓ Easy deployment, upgrades and downgrades with **IWA server and agents available in containers**
- ✓ Workload Automation Agents in containers to **orchestrate containers via APIs or kubectl CLI**

**Modernize and Innovate an evolutionary Workload  
Automation architecture, from API to micro-services.**

- ✓ **IWA offers today full REST APIs interfaces**
- ✓ Architecture evolving to embrace technological opportunities to deliver always better automation services

*In current plan 0-6 Months*  
Change Probability - low

1Q 19

9.5



## Easier deployment and full containerization

- Reduced prerequisite stack & Server components deployed in docker containers
- Continuous delivery for the Web User Interface
- Enablement for IBM Cloud Private for all the components

## Unleash Data-driven decisions

- New live dashboard experience, smart monitoring and easy customization
- Support IWS logs in Splunk
- Machine learning algorithms for predictive estimation of job duration
- Improved usability on WA reports

**Greater Business Agility** with **Workflow folders** for Line Of Business users and **SAP HANA** certification

## Mainframe modernization

- Define date and time on jobs for automatic completion and alerts
- **Analytics** - Enable integration of **ZWS logs** with CDP for analytics (**IOAz, Splunk, Elastic**)
- **Workload optimization**: Global policy to optimize the submission of non- critical jobs in a time
- **RFEs** – Condition code added to **OPSTAT** - New optional **NOP** behaviour – Automatic rebind after **job shadow** info modification



# IBM Workload Automation Roadmap 2019 and beyond

**Mid Term Plan 6-12 Months**  
Change Probability - medium

**Long Term Plan 12+ months**  
Change Probability – high

3Q 19

4Q 19 - 1Q 20

**9.5 FP1 – SPE 01**



- **Workflow Folders**
  - support for all WA objects
  - security delegation
  - exploitation tool
- **DWC enhancements**
  - Dashboard alerts
  - Workflow Folders tree view on dashboard and monitoring view
- Enhance **REST, FTP, Remote job and Sterling Connect:Direct plug-ins** (RFE 122394)
- **SAP end user** enhancement (RFE 120948)
- **Mainframe modernization**
  - Integration with Zowe (API + Web Desktop)
  - DWC on z/Liberty
  - Workload Optimization - Peak policy to change the scheduling algorithm when peak condition occurs



**9.5 FP2 – SPE 02**



- **Workflow Folders:**
  - submission of folders
  - User fields
  - Automatic notification (tickets, e-mails, ...) for error conditions defined at “Line of Business” level
  - Display folders in DWC graphical views
- **SaaS – EDWA support**
- **DWC enhancements**
  - Increase space for information display
  - Multiple jobstreams editing in modeling graphical view
  - Edit job stream before ad hoc submission
- **REST API – API key**
- Certification of v9.5 on **Kerberos and Open ID Connect authentication** for DWC and REST APIs
- **Workload analytics** – provide non graphical view for predictive analytics
- **Mainframe modernization**
  - Integration with Zowe (CLI)
  - Workload Optimization – User defined peak criteria



**Next**

- Driving hybrid workloads execution with enhanced Intelligent Automation:
  - Self service and adaptive modeling and monitoring
- Core product modernization
  - Workload Automation microservices
  - Unified agent with Fault Tolerance for dynamics agents



# Z Workload Scheduler v9.5

Technical Preview

# Define date and time alert and actions

## The requirements:

- Need a way to define a "Late" time on a job that on expiration generates alerts
- The "Late" attribute must be available for filtered queries
- Need to be able to mark a job complete at a certain day and time if the job is not completed

## Why we need a new feature:

- IWSz currently has alerting and "suppress if late" features based on the job latest start time that is calculated during the daily plan creation
- Some customers find too complex to deal with ZWS planning calculation for alerting and late actions

# Define date and time alert and actions

## User defined times/actions at job level

- **START TIME (check if a job has started)**
  - Set to C
  - Set to E
  - NOP including internal successors

## User defined times/actions at job level

- **On DEADLINE (check if a job has completed)**
  - Set to C
  - Set to E
  - NOP including internal successors

- **Alert messages**

- **Filter on late jobs**



# Define in AD data base

```
EQQAMTMP ----- TIME SPECIFICATIONS ----- Row 1 to 1 of 1
Command ==> _

Enter/Change data below:

Application time specifications:
Input arrival time          :
Default deadline day/time  :
Default duration           :      00.00.01

Operation time specifications: GENN 001
Input arrival              :   DAY    ___   TIME    ___
Default Operation deadline :   DAY    ___   TIME    ___   ACTION  _
Not started alert         :   DAY    ___   TIME    ___
Not started action        :   DAY    00   TIME    12.42   ACTION  C

Enter/Change data in the rows, and/or enter any of the following
row commands related to variable values:
I(nn) - Insert, R(nn),RR(nn) - Repeat, D(nn),DD - Delete

Row  Ext./Appl.  Duration  Deadline  Act  NOP  MH  Crt  Not started  Not started
cmd  Run Cycle   HH.MM.SS DD HH.MM Act  ind alert      action
      DD HH.MM  DD HH.MM Act  DD HH.MM  DD HH.MM Act

***** Bottom of data *****
```

# Filter late jobs

```
EQQSOPFP ----- SELECTING OPERATIONS ----- VALUE NOT VALID
Command ==>

Specify selection criteria below and press ENTER to create an operation list.
JOBNAME           ==> _____ WORK STATION NAME ==> _____
APPLICATION ID    ==> _____ OWNER ID           ==> _____
AUTHORITY GROUP   ==> _____ PRIORITY          ==> _____
GROUP DEFINITION  ==> _____ STATUS            ==> _____
CLEAN UP TYPE     ==> _____ CLEAN UP RESULT   ==> _____
OP. EXTENDED NAME ==> _____
OP. SE NAME       ==> _____ SUBMIT DEST       ==> _____
Input arrival in format YY/MM/DD HH.MM
FROM              ==> _____ TO                ==> _____
FAST PATH        ==> N Valid only along with jobname
Set Y, N or leave blank to select all:
MANUALLY HELD    ==> _ WAITING FOR SE ==> _ STARTED ON WAIT WS==> _
CRITICAL PATH    ==> _ COND RECOVERY JOB ==> _ RECOVERED BY COND ==> _
UNEXPECTED RC    ==> _ UNDEFINED COND ==> _ SHADOW JOB ==> _
STARTED AT STARTUP ==> _
Set L, N, E or leave blank to select all:
LATE              ==> _
Set P, M, B, E
WAITING PEND.PRED.=
```

EQQM420E Filter LATE can be L (Late on latest out) N (late on alert/action) E (either late on latest out or on alert/action) or blank.

# Workload Optimization

## The requirement:

- Allow non-critical jobs (not part of any critical path) to be delayed from starting at the beginning of the batch window....

## Why we need an enhancement:

- Currently IWSz submits as soon as possible all jobs in the workload:  
This can lead to SYSTEM overload and job interlock. ...  
... we got BATCH-delay due to much parallel BATCH.

# Workload Optimization

## **Define a global policy to smooth the submission of not critical or urgent jobs**

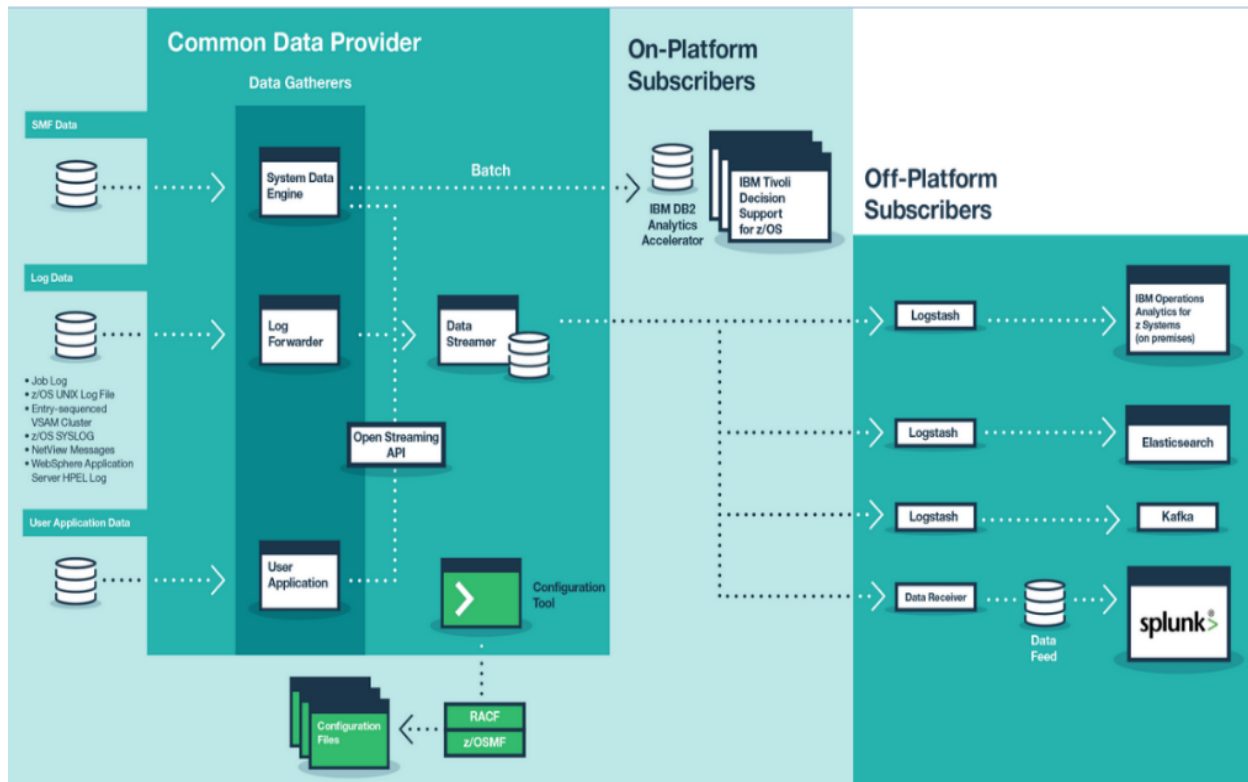
- **Distribute non-critical workload in a time range without exceeding the latest out time adjusted with its variance**
- **Choose jobs on critical path before all the other ones**

## **Define a global maximum submission rate**

- **Only for non-critical workload**

# CDP integration for LOG analytics

CDPz provides a streamlined method of capturing z/OS performance and operational data for use by analytics products. Input for CDPz can be SYSLOG/OPERLOG, JOBLOGs, SMF Records, NetView for z/OS logs, Unix System Services syslog and files. CDPz can send extracted data to any target that can receive it over an IP port.



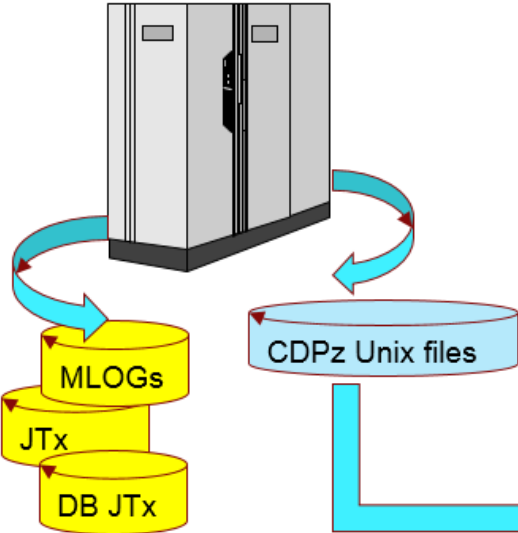
## ZWS user scenarios:

- Easier access to ZWS AUDIT data
- ZWS error messages integrated with System Messages for problem analysis

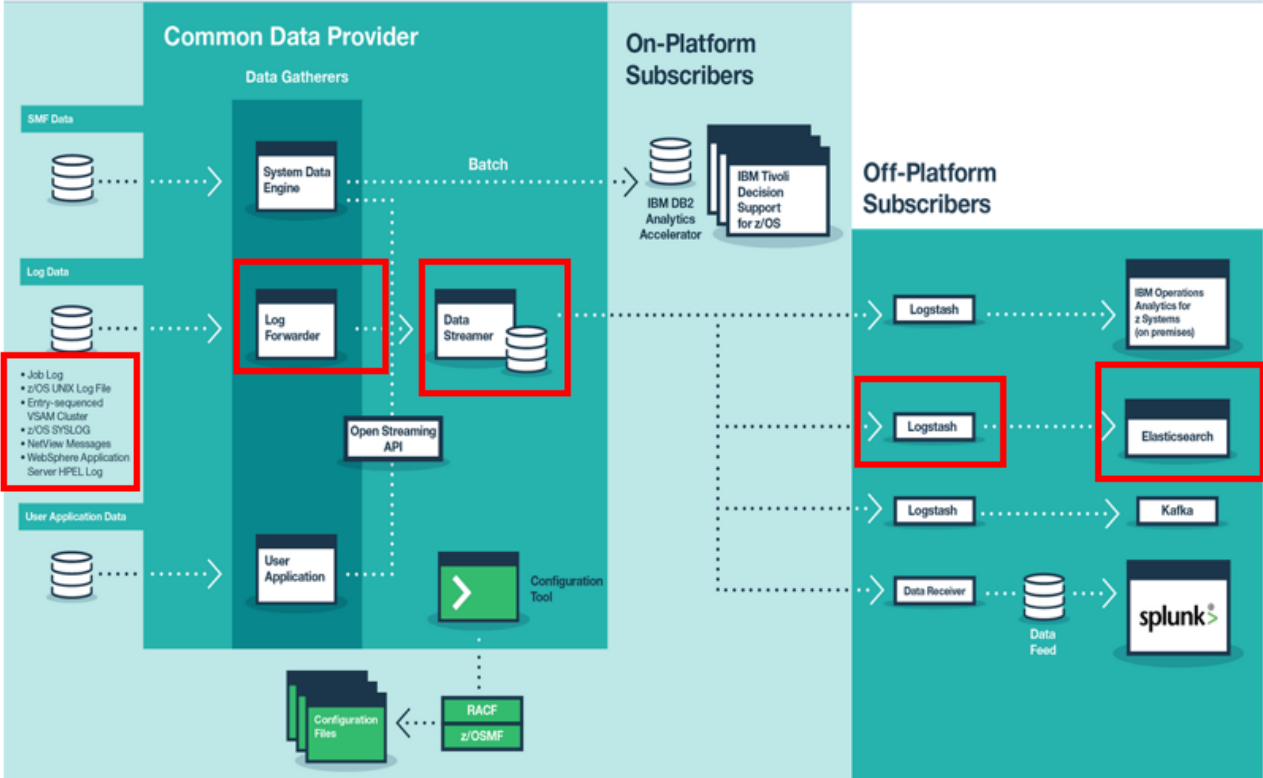
# ZWS-CDPz integration main flow

Controller writes a text message in the CDPz Unix files each time an “interesting” JT or DB JT event or message is issued ...

Controller



CDPz LOG forwarder and Data streamer are involved ...



# ZWS - CDPz Integration

**Messages** selected for logging are all error messages and a subset of relevant information/warning messages..... (EQQE026I, EQQE027I, EQQ038I, EQQE150W...)

**HIGH level of CUSTOMIZATION:** any message can be customized to be logged with CDP=YES

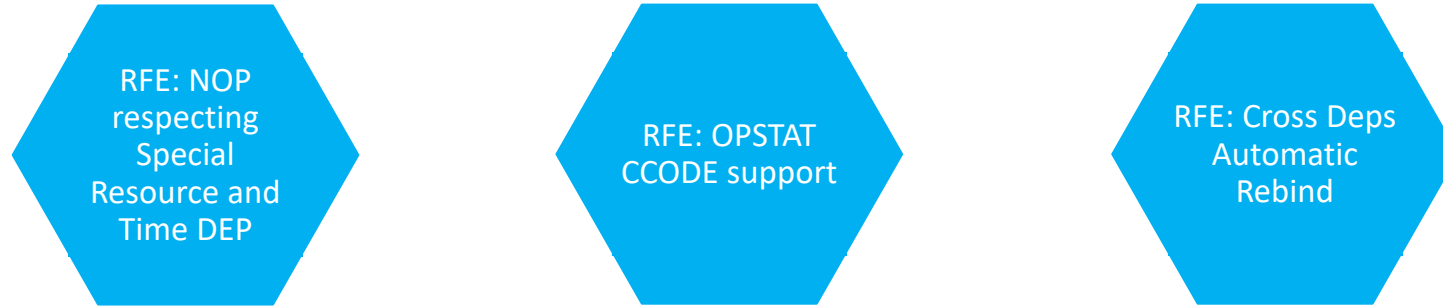
## **MCP events:**

- ADD occurrence
- RERAN occurrence
- CHANGE occurrence
- DELETE occurrence
- CHANGE workstation
- SET to WAIT occurrence
- SET to COMPLETE occurrence
- STATUS workstation
- OCCURRENCE GROUPS actions
- CHANGE virtual workstation
- STATUS virtual workstation

## **DB events:**

- WORKSTATION
- CALENDAR
- PERIOD
- APPLICATION
- OPERATOR INSTRUCTION
- SPECIAL RESOURCE
- JOB DESCRIPTION
- JCL VARIABLE TABLES
- RUN CYCLE GROUPS

# Customers' RFEs



- New global JTOPTS option **NOPWAIT** - Changes the behavior of the **NOP** command execution
  - ✓ If NOPWAIT(YES) is specified the NOP command will complete the operation after special resources and time dependencies are satisfied
- New **OPSTAT COMPLCODE** keyword - Can be used to set the operation completion code with status Complete
- **Cross Dependencies** - Automatic re-bind when bind information are modified in the current plan



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