

Automate Everything - Best Practices to Create a Self-Driving Data Center

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CA Technologies

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Session **OF**



Abstract

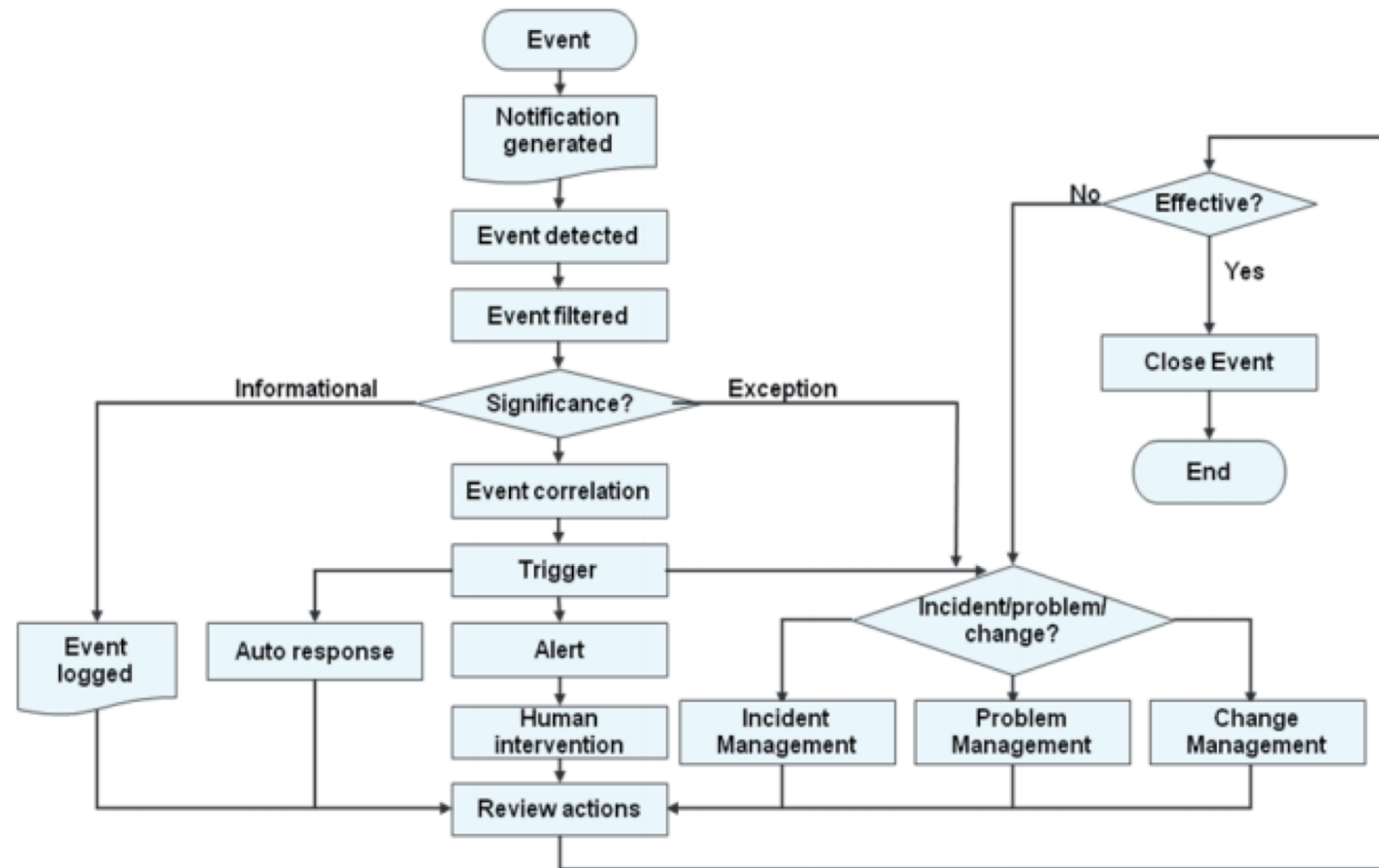
"Automate everything" is a new mantra many CIOs are adopting as they realize that to stay competitive, their teams must automate (i.e., eliminate scripting) traditionally manual infrastructure, operations, and development processes to drive scale, speed, quality, and improved security. Automation frees up staff time to focus on strategic, critical tasks. To accomplish this, teams must often analyze and define these workflows across separate silos (such as business units, disparate enterprise applications, and heterogeneous IT infrastructure landscapes) and work together to isolate process automation, integrating data sources with applications. During this session the speaker(s) will cover the best practices to achieve the coveted results.

Mainframe Management Best Practices Facilitating Automating Everything

ITIL Best Practices and Processes

- Developed by the UK Government in the 1980's as a process for controlling and managing operations
- Large IT Organization modeled their “Best Practices” based on it's methodologies
- Automation fall under the Service Operations Practices
 - Event Management – Detect when something is not functioning correctly
 - Access Management – Granting users the right to use a service
 - Request Management – Fulfilling minor change requests
 - Problem Management – Resolve the root cause of an Incident to prevent reoccurrence
 - Incident Management – Aims to restore normal service operations as quickly as possible and minimize effect on business operations

Event Management Process Flow



Process to move from No Automation to automating everything

Journey to Automate Everything

- No Automation
- Drive Assistance
- Partial Automation
- Conditional Automation
- High Automation
- Full Automation

A screenshot of a Syslog terminal window displaying various vehicle system logs. The logs include timestamps, system identifiers, and messages such as 'COMMAND INPUT ==>', 'STARTED - INIT 2', 'CLASS A', 'PROFILE ** (G) IN THE STARTED CLASS WAS U', 'TO START BPXAS WITH JOBNAM BPXAS.', 'ON STCINROR', 'STARTED', 'TIME=19.05.37', 'Ready to accept commands.', 'ENDED - TIME=19.05.39', and 'INACTIVE ***** C=AB'. The terminal window has a menu bar with options like Display, Filter, View, Print, Options, and Help.



Level 0: No Automation

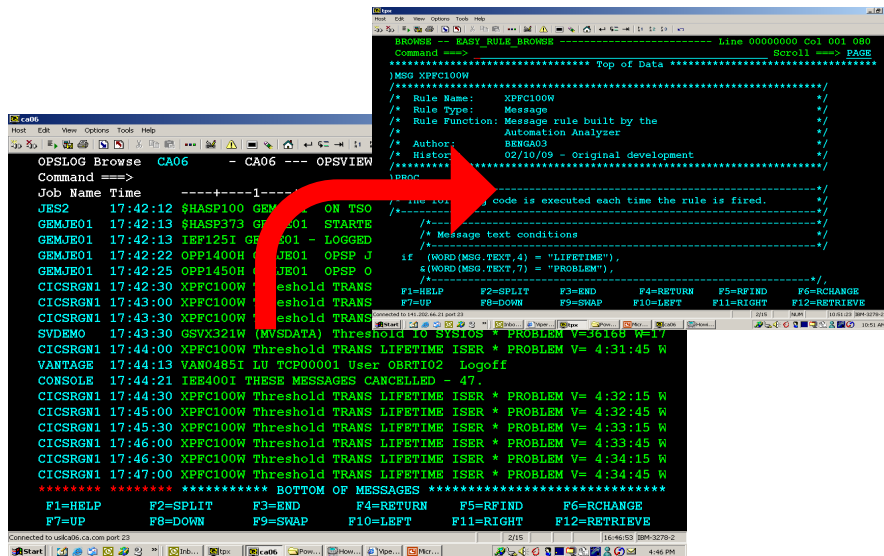


An Operator manually monitors messages as they scroll by on a Mainframe Console

When an actionable message is issued, the Operator looks up the desired response and manually takes this action

- Process is very slow and inefficient
- Any issues without clearly defined processes will require escalation to next level of expertise further slowing down remediation process
- Complicated issues result in “War Room” situations impacting the majority of IT Staff

Level 1: Drive Assistance



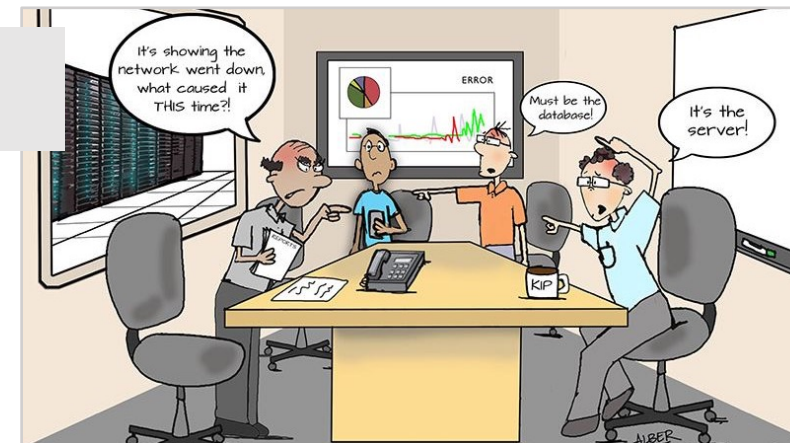
```

OPSLOG Browse CA06 - CA06 --- OPSVIEW
Command ==>
Job Name Time
-----
JES2 17:42:12 $HASP100 GEN... ON TSO
GEMJEO1 17:42:13 $HASP373 GEN... STARTE
GEMJEO1 17:42:13 IEF125I GEN... LOGGED
GEMJEO1 17:42:22 OPP1400H GEN... OPSP J
GEMJEO1 17:42:25 OPP1450H GEN... OPSP O
CICSRGN1 17:42:30 XPFC100W Threshold TRANS
CICSRGN1 17:43:00 XPFC100W Threshold TRANS
CICSRGN1 17:43:30 XPFC100W Threshold TRANS
SVDEMO 17:43:30 GSVX321W (MVS)DATA Threshold to SYSIOS * PROBLEM V=36168 W=17
CICSRGN1 17:44:00 XPFC100W Threshold TRANS LIFETIME ISER * PROBLEM V= 4:31:45 W
VANTAGE 17:44:13 VAN0485I LU TCP00001 User OBRT102 Logoff
CONSOLE 17:44:21 IBE400I THESE MESSAGES CANCELLED - 47.
CICSRGN1 17:44:30 XPFC100W Threshold TRANS LIFETIME ISER * PROBLEM V= 4:32:15 W
CICSRGN1 17:45:00 XPFC100W Threshold TRANS LIFETIME ISER * PROBLEM V= 4:32:45 W
CICSRGN1 17:45:30 XPFC100W Threshold TRANS LIFETIME ISER * PROBLEM V= 4:33:15 W
CICSRGN1 17:46:00 XPFC100W Threshold TRANS LIFETIME ISER * PROBLEM V= 4:33:45 W
CICSRGN1 17:46:30 XPFC100W Threshold TRANS LIFETIME ISER * PROBLEM V= 4:34:15 W
CICSRGN1 17:47:00 XPFC100W Threshold TRANS LIFETIME ISER * PROBLEM V= 4:34:45 W
***** BOTTOM OF MESSAGES *****
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE
  
```

Level of distrust exists between automation and MF Staff, resulting in continuation of manual monitoring



War Room



Automation package takes over roll of monitoring log, however limited to notifying of issues

System Level Automation

Primary Function

- Monitor system logs and event triggers to increase system availability

Features

- Log Monitoring, Resource Startup and Shutdown, Resource Prereq Ordering, System Triggers, Time of Day processing, Analysis Tools

Examples

- OPS/MVS, Tivoli System Automation, AutoOperator

Level 2: Partial Automation

Introduction of Root Cause Analysis, primarily focused on assigning blame



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OPSSLOG Browse CA06 --- CA06 --- OPSVIEW
Command ==>

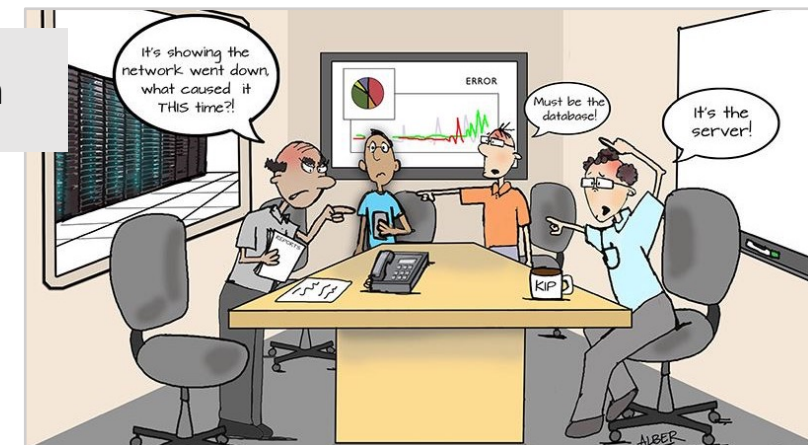
Job Name Time
JES2 17:42:12 SHASP100 GEN... ON TSD
GEMJED1 17:42:13 SHASP272 GEN... STARTS
GEMJED1 17:42:13 IEP1251 GEN... LOGGED
GEMJED1 17:42:22 OPP1400H GEN... OPSP J
GEMJED1 17:42:25 OPP1450H GEN... OPSP O
CICS8GM1 17:42:30 XPF100W Threshold TRANS
CICS8GM1 17:43:00 XPF100W Threshold TRANS
CICS8GM1 17:43:30 XPF100W Threshold TRANS
SVDEMO 17:43:30 GSX321W (MYSDATA) Threshold in SYSID... PROBLEM V=431:15 N
CICS8GM1 17:44:00 XPF100W Threshold TRANS LIFETIME ISER * PROBLEM V=431:15 N
VANTAGE 17:44:13 VAN04851 LG TCP00001 User ORGT02 logoff
CONSOLE 17:44:21 IRR4001 THESE MESSAGES CANCELLED = 47.
CICS8GM1 17:44:30 XPF100W Threshold TRANS LIFETIME ISER * PROBLEM V=431:15 N
CICS8GM1 17:45:00 XPF100W Threshold TRANS LIFETIME ISER * PROBLEM V=431:15 N
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CICS8GM1 17:46:30 XPF100W Threshold TRANS LIFETIME ISER * PROBLEM V=431:15 N
CICS8GM1 17:47:00 XPF100W Threshold TRANS LIFETIME ISER * PROBLEM V=431:15 N
***** BOTTOM OF MESSAGES *****
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RTMO F6=CHANGE
F7=UP F8=DOWN F9=SNAP F10=LEFT F11=RIGHT F12=RETRIEVE
  
```

Development of more sophisticated automated processes, with repetitious tasks fully automated

```

JES2: EXTEND Resource Control
----- KE21 -- S Y S V I E W -----
Date/Time: 1997/12/29 04:02
System: JES2 SSM Mode: ACTIVE
-----
Table Name Current State Desired State Mode Type Warn
-----
BOJ_SCM ALERYS Down Up ACTIVE UNKNOWN EXC
BOJ_SCM CICSADG1 Down Up ACTIVE UNKNOWN EXC
BOJ_SCM CICSADG3 Down Up ACTIVE UNKNOWN EXC
BOJ_SCM CICSIN1 Down Up ACTIVE UNKNOWN EXC
BOJ_SCM DASD Down Up ACTIVE UNKNOWN EXC
BOJ_SCM JES2 Down Up ACTIVE UNKNOWN EXC
BOJ_SCM JOBSREG Down Up ACTIVE UNKNOWN EXC
BOJ_SCM OPERATOR Down Up ACTIVE UNKNOWN EXC
BOJ_SCM PAGING Down Up ACTIVE UNKNOWN EXC
BOJ_SCM PRINTERS Down Up ACTIVE UNKNOWN EXC
BOJ_SCM STORAGE Down Up ACTIVE UNKNOWN EXC
BOJ_SCM TAPE Down Up ACTIVE UNKNOWN EXC
-----
COMMAND ==>
  
```

War Room



Batchjob Monitoring and Automation

Primary Function

- Manage the execution of batch job, following a predetermined order, based upon either a schedule or an external event

Features

- Batch job monitoring and execution, Off Platform monitoring through Agents, Calendaring functionality, predecessor / successor ordering, System level hooks, Application level views

Examples

- ESP, Tivoli Workload Scheduler, Control-M

Level 3: Conditional Automation

Increase automation sophistication by
introduction of integration of
performance product static threshold
monitoring

Root Cause
Analysis focused
on creating fixes
to prevent
reoccurrence



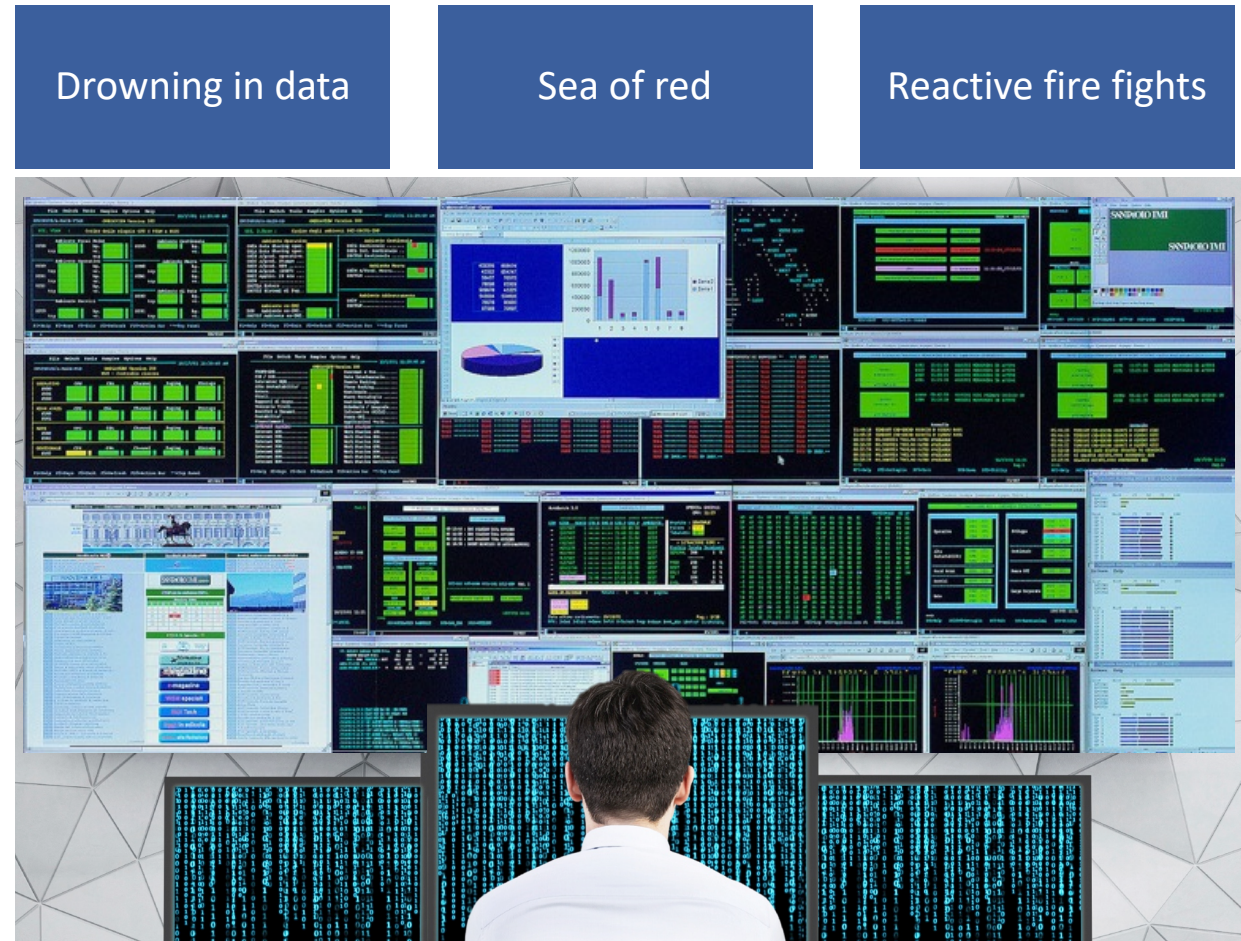
Cmd	Name	Resource	AlertCtrl	Limit	Pct	WarningRuleType	Prd	Unit	TrigLvl	Disabled	Count	Msg Log	SNP	OPMSUS	Trop	TropDes
___Add	*			0	%	AUTO	000	2	STATUS	NO		YES	YES	YES	NO	*
___CPU	CP			100	90	UPPER	0	5	WARNING	NO	35	NO	YES	NO	YES	*
___HWP	HIP			100	90	UPPER	0	5	WARNING	NO		NO	YES	NO	YES	*
___JESSTOP				90	100	90	UPPER	0	2	PROBLEM	NO		NO	YES	NO	*

War Room,
starting to get
phased out



Historical State of Data Center Monitoring

- Disparate monitoring tools and display systems
- Required expert knowledge
- Very little integration between monitoring and automation toolsets
- Distributed, Network, and Mainframe working in silos



Process Automation

Primary Function

- Automation of a set of tasks that Operation staff would typically complete manually to deal with a situation or operational requirement

Features

- Visual process flows, linkage to multiple systems and applications, predecessor / successor ordering, Process reusability

Examples

- Automic One Automation, Robotic Process Automation, TrueSight Orchestration

DevOps Automation

Primary Function

- Bridge the gap between application development deployment activities and the operational monitoring requirements

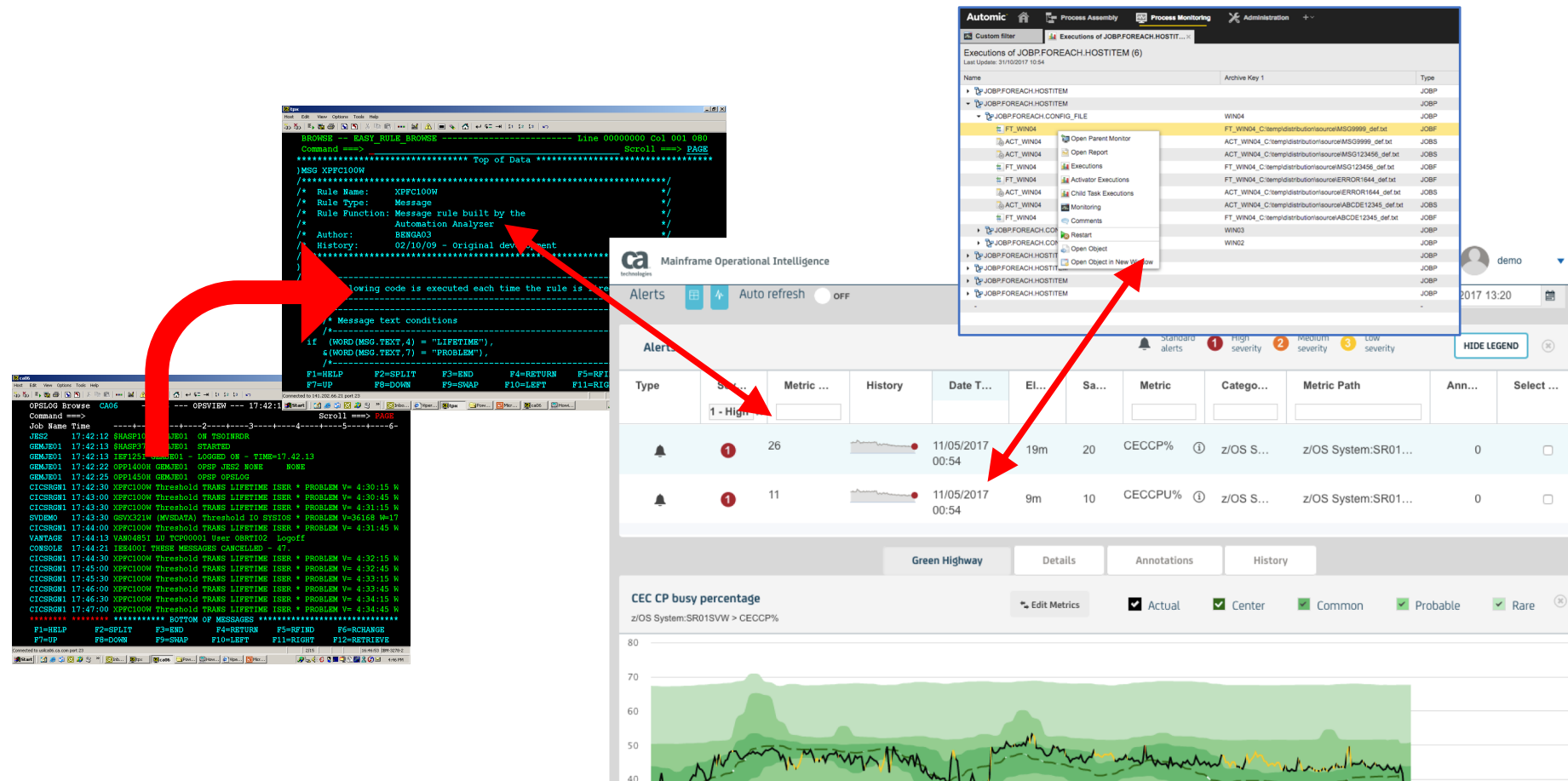
Features

- Code repositories and deployment, Application topology, Linkage to change management products, Ability to segregate responsibilities

Examples

- Endeavor, Brightside, UrbanCode, Application Delivery Foundation

Level 4: High Automation



Usage of Machine Learning
Predictive Analysis to feed
automation products better
data

Manual Monitoring
process reemerges to
double check Machine
Learning



Machine Learning

Primary Function

- Collect system level, monitoring tool, and application data to understand historical pattern allowing for the ability to predict before systems being performing sub-optimally

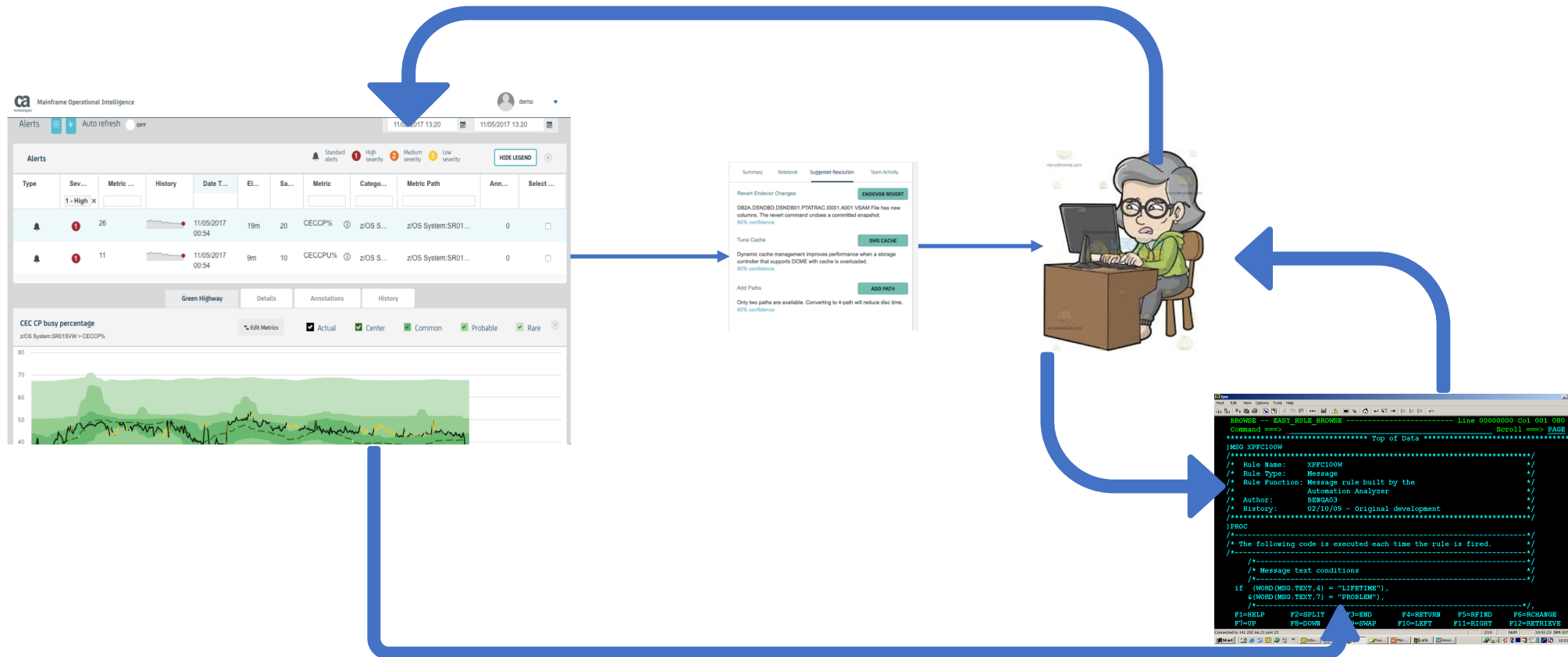
Features

- Large data lakes or access to the data, predictive learning algorithms, dashboarding / alerting infrastructure, integrated or access to System / Process Automation tools, Robust reporting and presentation layers

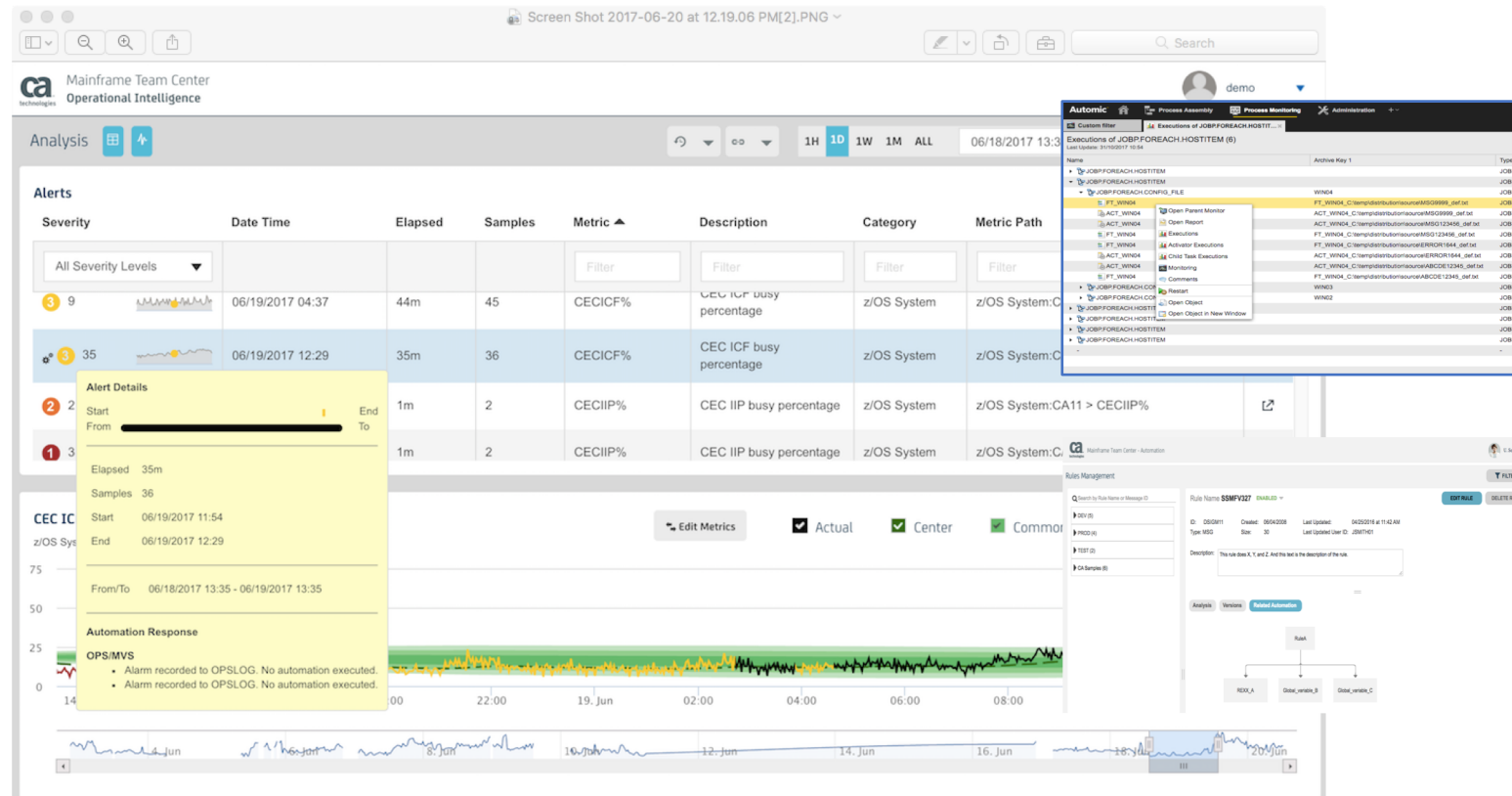
Examples

- Mainframe Operational Intelligence, Operations Analytics, Splunk

How to advance beyond Level 4



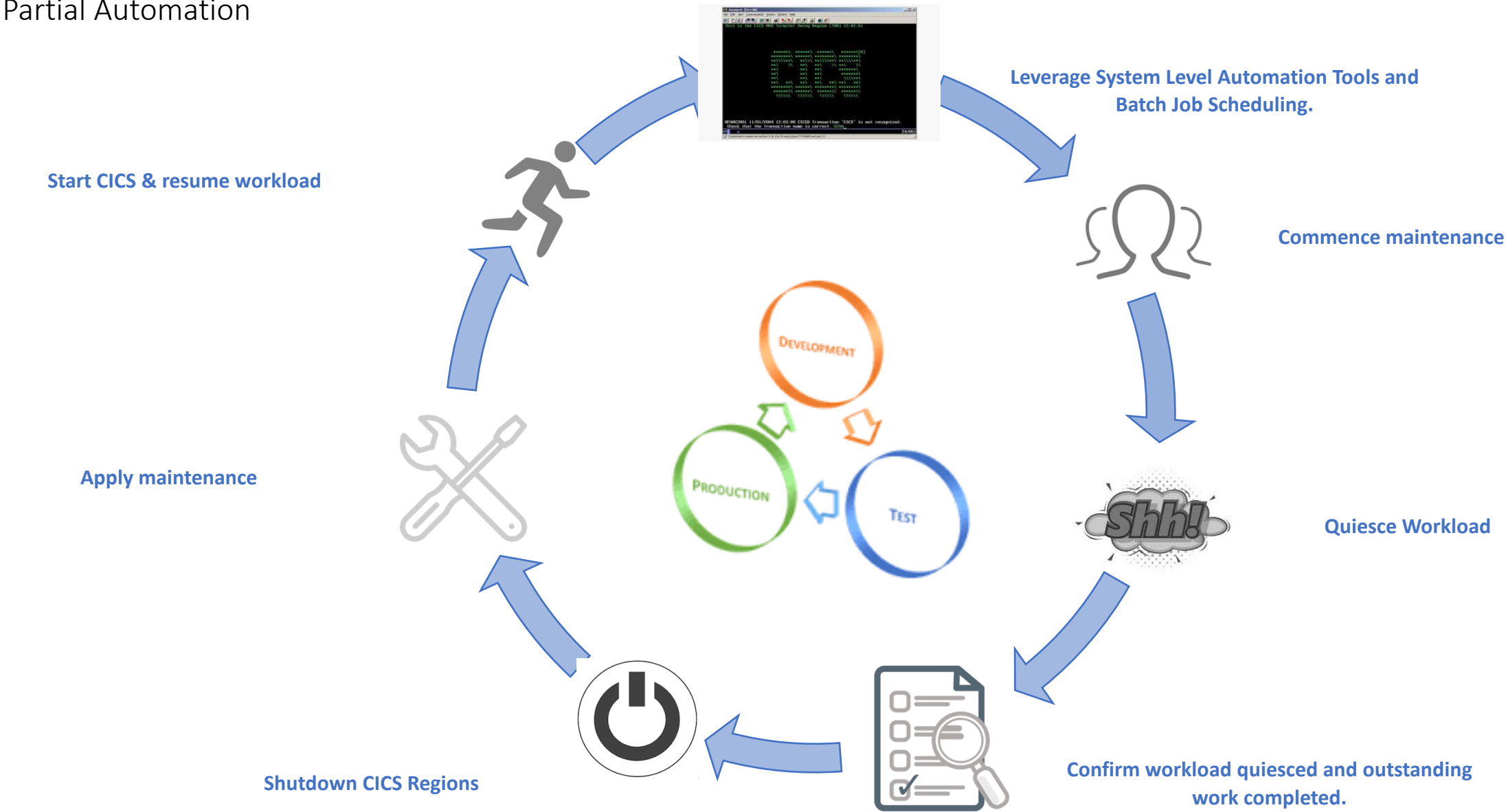
Level 5: Full Automation



Example Processes

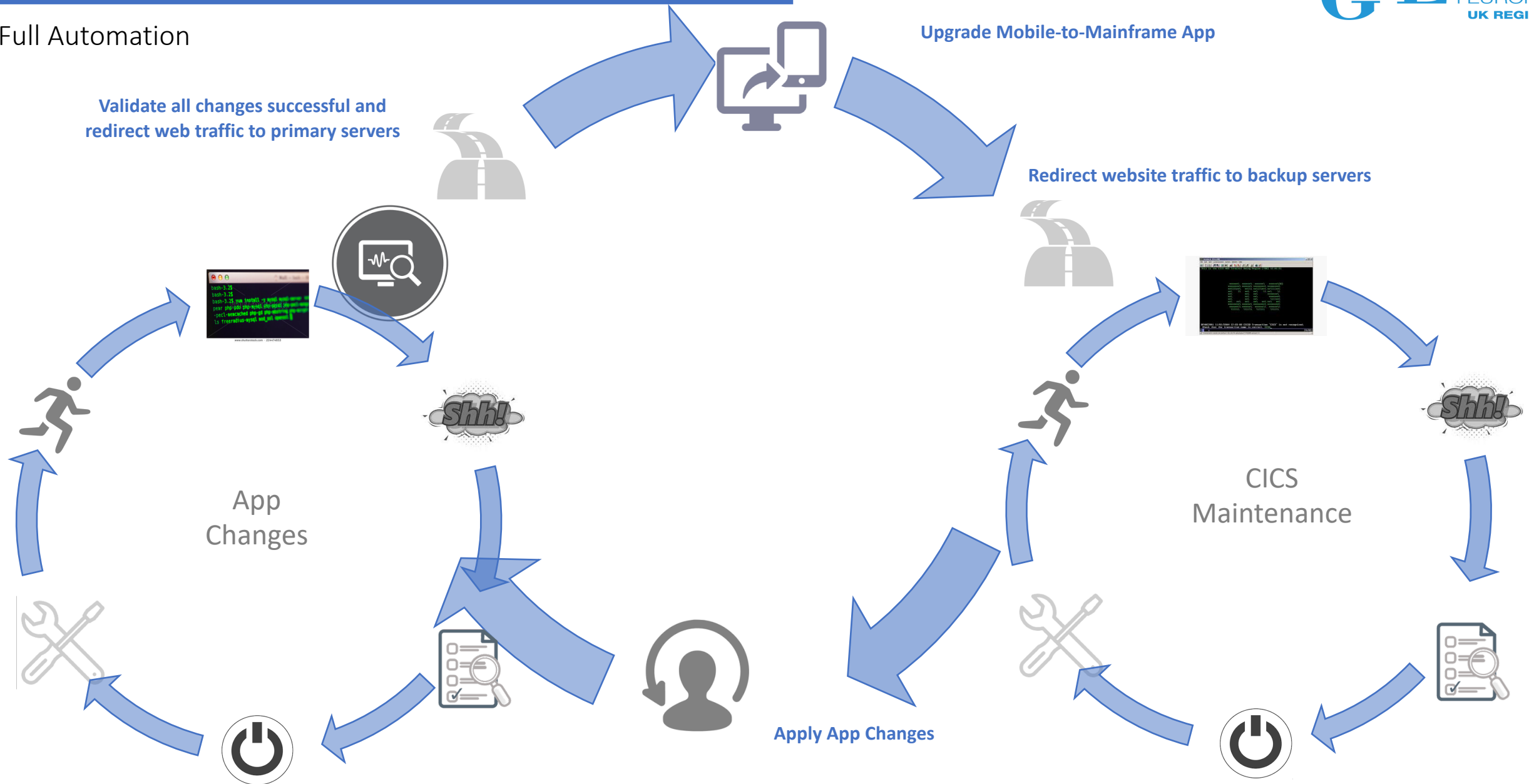
System Maintenance – Level 2

Partial Automation



WebApp Upgrade – Level 5

Full Automation



Static Threshold Exceeded – Level 3

Conditional Automation

Static Threshold

- Performance Threshold Exceeded

Alert

- Alert sent to system level automation tool

Data Collection
& Analysis

- Additional data obtained from performance tool and z/OS

Action

- Corrective action taken based on insights

Dynamic Threshold Exceeded– Level 5

Full Automation

Dynamic
Threshold

- Dynamic Threshold Exceeded

Correlation

- Event Correlation

Remediation

- Automated Remediation



Questions?

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- Please submit your feedback online at
 - <http://conferences.gse.org.uk/2018/feedback/OF>
- Paper feedback forms are also available from the Chair person
- This session is **OF**

