

# Proactively reduce system issues by leveraging machine learning and real time anomaly detection

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82% of NA enterprises using Z will maintain or grow usage over next 2 years.

Forrester 2018

75% of customers say “developing a more integrated approach to operational resiliency” is the top priority this year

Forrester 2018

56% of customers have no succession plan for IBM Z skills

Forrester 2018

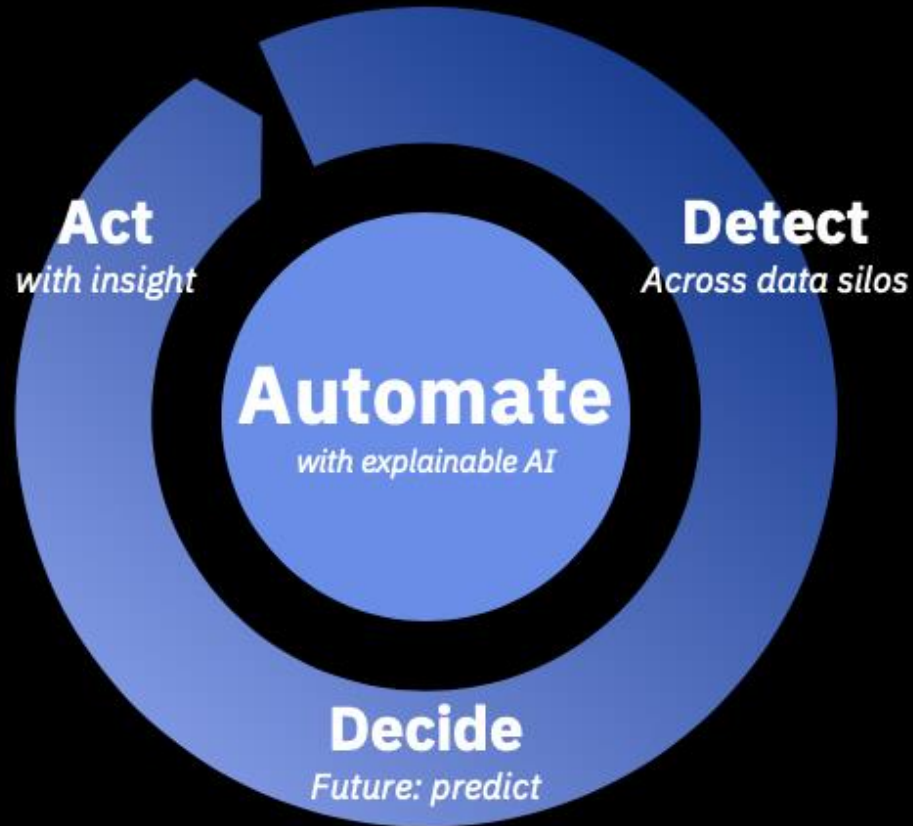
IBM Z powers 72% of customer facing apps, but organizational challenges limit ability to support

Forrester 2018

An aerial photograph of a busy city square, likely Times Square in New York City, showing a dense crowd of people walking. A large, semi-transparent blue rectangular overlay is positioned in the center-right of the image, containing white text. The text reads: "Digital transformation is impacting all areas of the enterprise".

Digital transformation is impacting all areas of the enterprise

# Accelerate your journey to AIOps



- **Detect:** monitor hybrid infrastructure and applications and detect issues and anomalies.
- **Decide:** analyze issues and anomalies to isolate problems and identify root causes.
- **Act:** rapidly respond to reduce impact on the customers with improved resiliency.

AI-powered automation drives operational resiliency and speed

# The cost of an outage

15%

of outages cost >

\$5M

per hour

Statista

IBM Z / GSE UK 2020 / November, 2020 / © 2020 IBM Corporation

34%

of outages cost >

\$1M

per hour

Statista

Regulatory fines  
can cost >

\$70M

BBC

Single incidents  
can cost >

\$100M

Reuters

# Firefighting

Issues identified by the internal or external users



38%

find out from users posting on social networks

58%

find out from users calling or emailing their organization's help desk

55%

find out from an executive or non-IT member at their company who alerts the IT department

# Firefighting The War Room

Our cloud services seem fine



Cloud support



IT Ops

Oh no! I'm getting reports that some users are having issues with my application

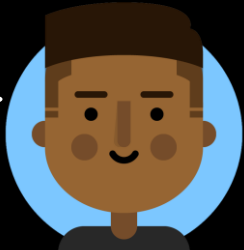


No unusual behavior with the network



Network

No issues with my databases



DBA

All our Linux systems look fine



Linux platforms

MQ looks ok to me.  
I'll check with the CICS zSME.



MQ SME

CICS is looking good.  
Must be Db2....



CICS SME

Uh-oh! That transaction is waiting on a lock impacting the response time.



Db2 SME

# Traditional Resource Monitoring



IT Ops

That's weird. I saw some application problems but they seem to have stopped. Hope it doesn't happen again!



I'm starting to see some storage violations.... I need to fix what's happening in the CICS application quickly.... I hope this isn't affecting any of the Line of Business apps!

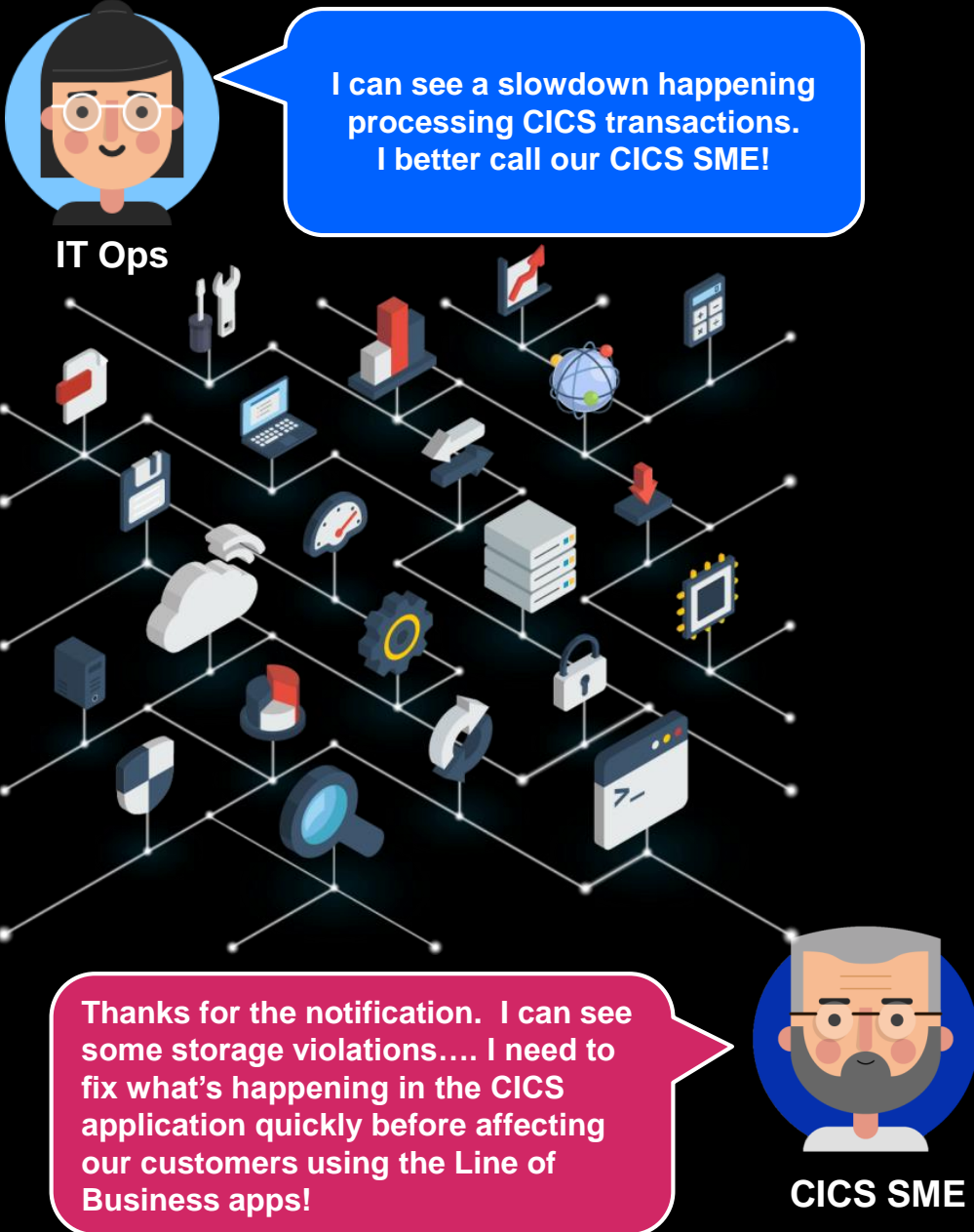


CICS SME

Issues identified by internal operations

# Proactive Operations

Issues identified by internal operations through enterprise visibility







# Best practice for Enterprise Operations – AI Ops

1. Deep dive, powerful and familiar tooling for visibility at the control block level
2. Integration between monitoring, automation & scheduling
3. **Machine Learning technology for forecasting of potential future problems**



**Application Performance Management**  
*End to end transaction visibility in Application specific views*

**Operations Analytics**  
*Ops metrics from across the enterprise in a single location*

**Deep dive tooling**  
*Domain specific tooling for the SMEs*

# IBM Z Operations Analytics

- Leverage **IBM Z Common Data Provider** to gain access to IBM Z operational data in near real time.
- **Gain hybrid cloud visibility** by integrating operational data with data from the rest of your enterprise.
- Expand domain expertise through domain-specific **out-of-the-box analysis, insights, and expert advice** including z/OS, WebSphere, Db2, CICS, IMS, MQ, Network, and Security
- **Reduce outages by proactively detecting operational anomalies** and notifying operations when they occur

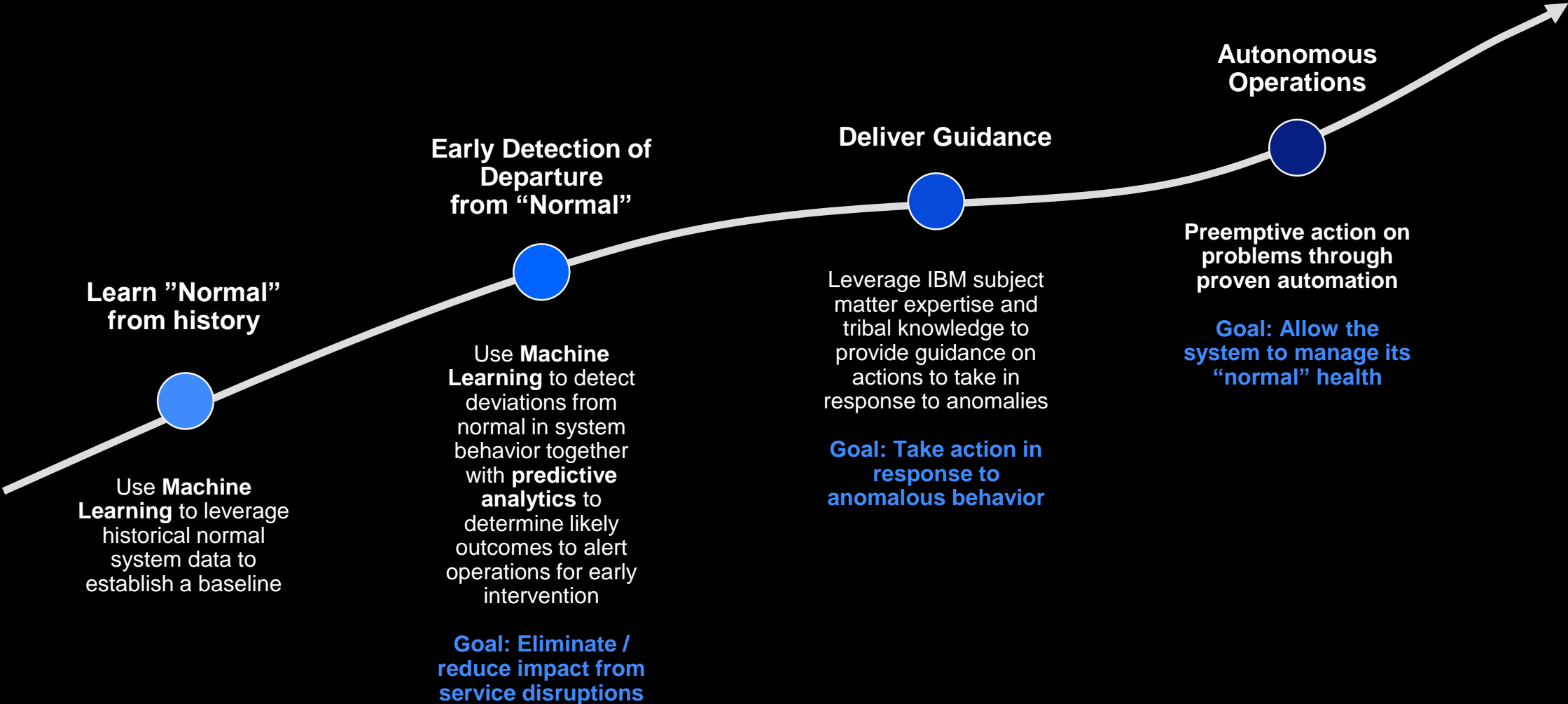


# Data Streaming - IBM Z Common Data Provider

- Access analytics data in near real time instead of hours
- Build your analytics ecosystem by collecting data once and streaming to multiple targets
- Largest breadth of data supported including all standard IBM SMF types, IMS log, DCOLLECT, RMF III, and various log types.
- Extensible to add new data types through configuration
- Advanced data filtering lets you decide how to manage your data
- Built to perform and reduce CPU overhead – 100% of the runtime components are zIIP eligible



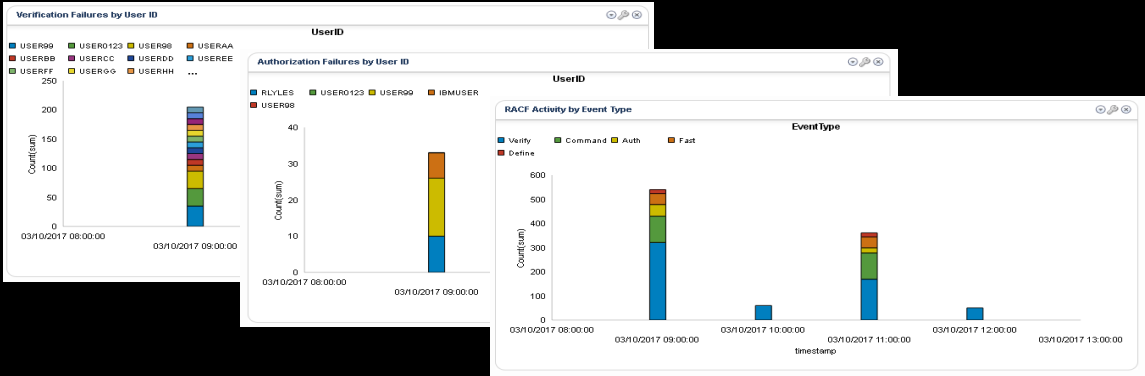
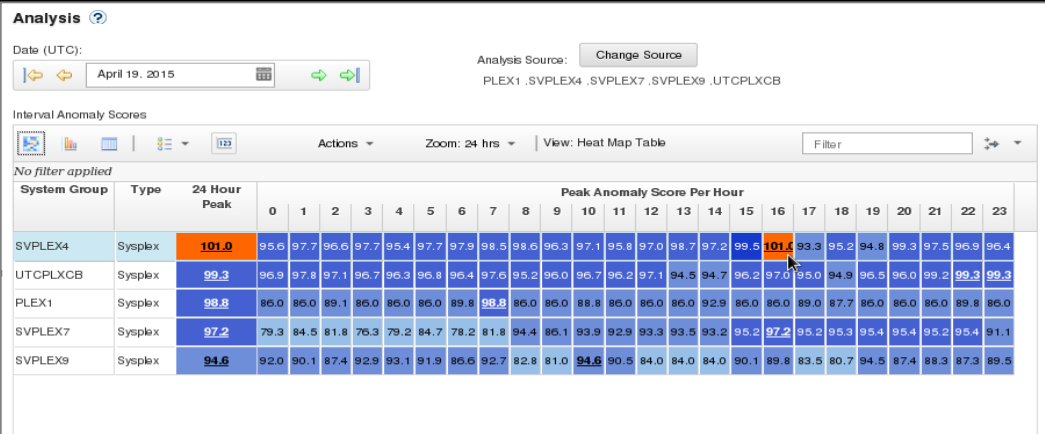
# IBM Z Operations Analytics AI Operations Journey



# IBM Z Operations Analytics

## IBM Z Advanced Workload Analysis Reporter (zAware)

- **Machine Learning** builds a normal baseline from **message data**
- **Anomaly detection** with z/OS and Linux for Z message logs
- **Proactive outage avoidance** with alerts for identified anomalies
- View the **history** of an anomalous message for faster problem resolution
- **Improve problem determination** intelligently using anomaly detection on IT operational data for **better Mean Time to Recovery**



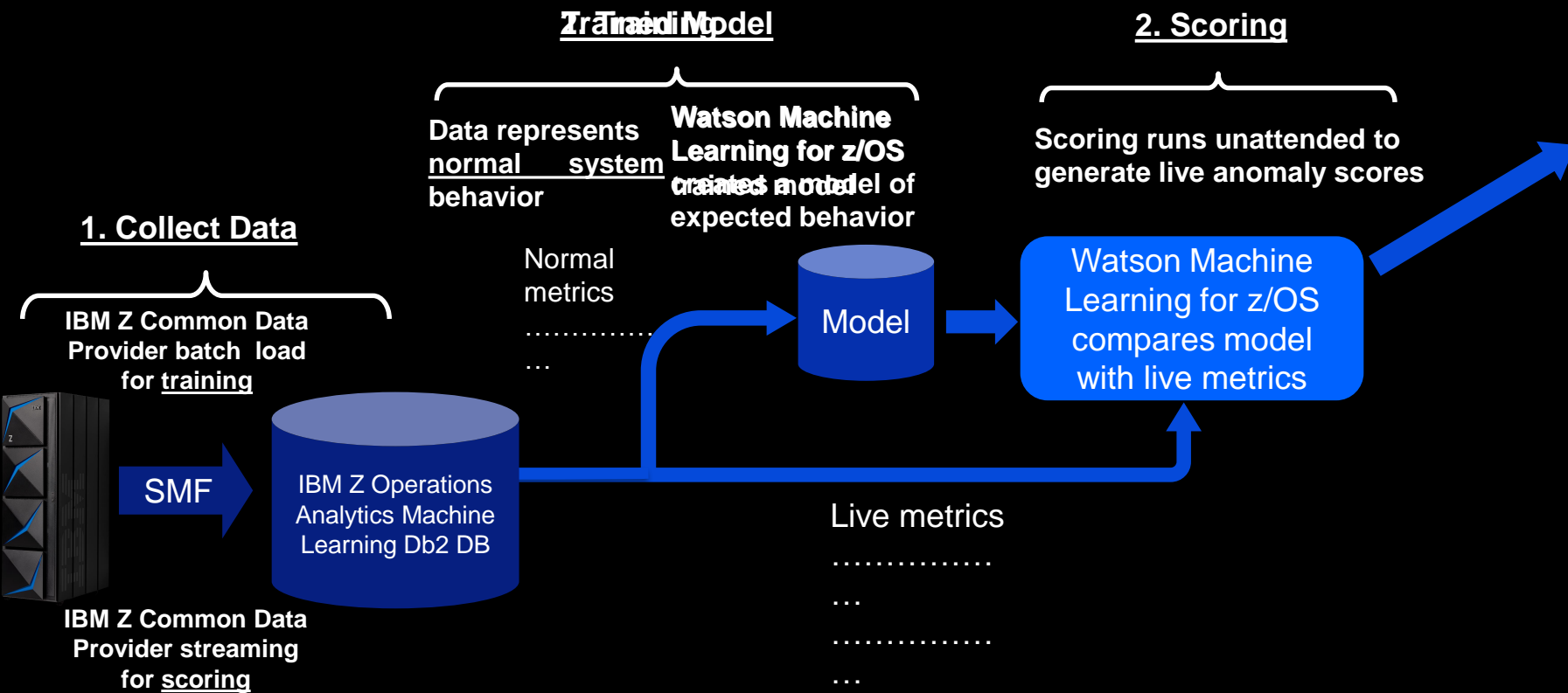
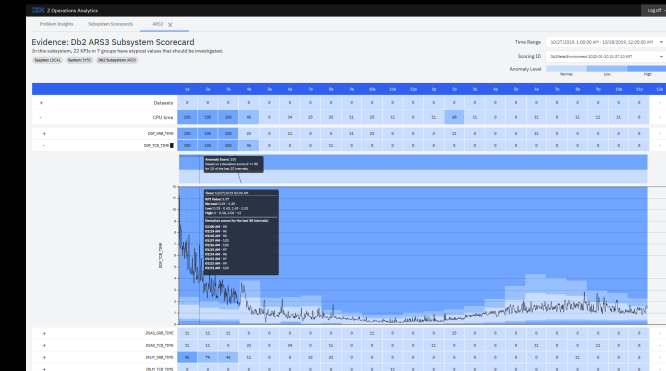
# Anomaly Detection

## Machine Learning Data and Analytic Flow

### Training, Scoring, and Visualization

### 3. Visualize Anomaly Scores

Visualize anomaly scores for each KPI in the subsystem to help diagnose potential issues



# Evidence: Db2 ARS3 Subsystem Scorecard

In this subsystem, no KPIs have high values.

Sysplex: LOCAL System: SYSC Db2 Subsystem: ARS3

Time Range 10/21/2019, 12:00:00 AM - 10/21/2019, 11:59:00 PM

Scoring ID Db2RetailEnvironment 2020-01-20 21:37:10.937

Anomaly Level   
 Normal  Low  High

		12a	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p*
+	Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	CPU time	0	11	0	23	11	0	11	23	0	11	11	0	11	23	0	0	0	0	0	23	23	23	11	0
+	Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	DDF	11	0	0	0	0	23	0	0	0	11	11	11	0	0	11	11	11	0	0	0	0	0	11	23
+	Latch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	Logs	0	0	0	0	0	23	0	0	0	0	0	0	0	0	11	0	11	0	0	0	0	0	0	0
+	Local Locking	11	11	0	34	23	45	11	23	23	23	11	11	23	34	11	23	11	0	11	11	11	11	23	23
+	Parallel Groups	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	11	0	0







# Evidence: Db2 ARS3 Subsystem Scorecard

In this subsystem, no KPIs have high values.

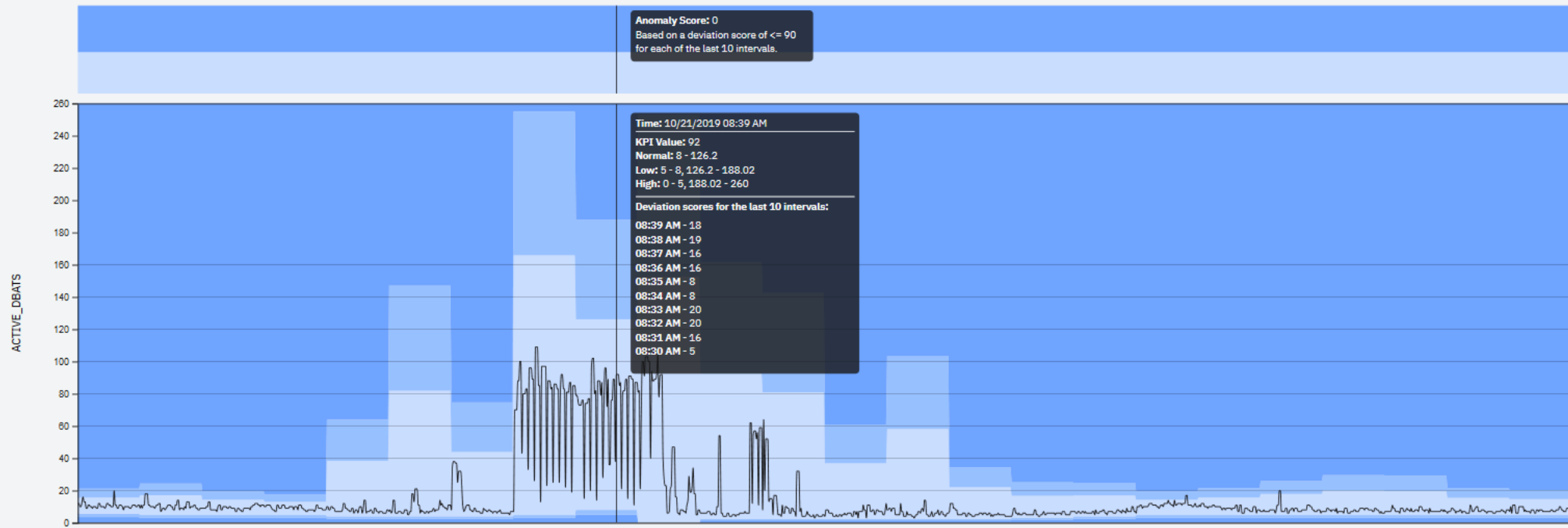
Time Range 10/21/2019, 12:00:00 AM - 10/21/2019, 11:59:00 PM ▼

Scoring ID Db2RetailEnvironment 2020-01-20 21:37:10.937 ▼

Anomaly Level Normal Low High

Sysplex: LOCAL System: SYSC Db2 Subsystem: ARS3

		12a	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p*
+	Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	CPU time	0	11	0	23	11	0	11	23	0	11	11	0	11	23	0	0	0	0	0	23	23	23	11	0
+	Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	DDF	11	0	0	0	0	23	0	0	0	11	11	11	0	0	11	11	11	0	0	0	0	0	11	23
+	ACC_QU_INAC_THR_T2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	ACTIVE_CI_CREATED	0	0	0	0	0	23	0	0	0	0	0	0	0	0	11	0	11	0	0	0	0	0	0	0
-	ACTIVE_DBATS	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0





# Evidence: Db2 ARS3 Subsystem Scorecard

In this subsystem, 22 KPIs in 7 groups have atypical values that should be investigated.

Time Range 10/27/2019, 1:00:00 AM - 10/28/2019, 12:00:00 AM

Scoring ID Db2RetailEnvironment 2020-01-20 21:37:10.937

Anomaly Level   
 Normal Low High

		1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p	12a	
+	Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
+	CPU time	100	100	100	45	0	34	23	23	11	23	11	0	11	68	11	0	0	11	0	11	11	11	11	0	-
+	Storage	100	100	100	100	100	100	100	100	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
+	DDF	100	100	100	100	79	79	0	11	23	34	0	11	34	68	11	11	11	11	0	34	0	56	0	0	-
+	Latch	100	100	100	100	100	100	100	100	100	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
+	Logs	100	90	34	11	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	11	0	0	0	0	-
+	Local Locking	100	100	100	95	11	34	11	11	45	23	11	11	11	11	23	23	11	11	11	11	23	34	11	0	-
+	Parallel Groups	100	100	100	90	0	23	0	34	34	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	-









# IBM Z Operations Analytics

Access to your operational data with the included IBM Z Common Data Provider.

Gain hybrid cloud visibility, breaking down operational silos by integrating IBM Z data with data from the rest of your enterprise.

Leverage machine learning to detect operational anomalies that could lead to broader business impacts.

# More Information

## Announcements

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## Case Study

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