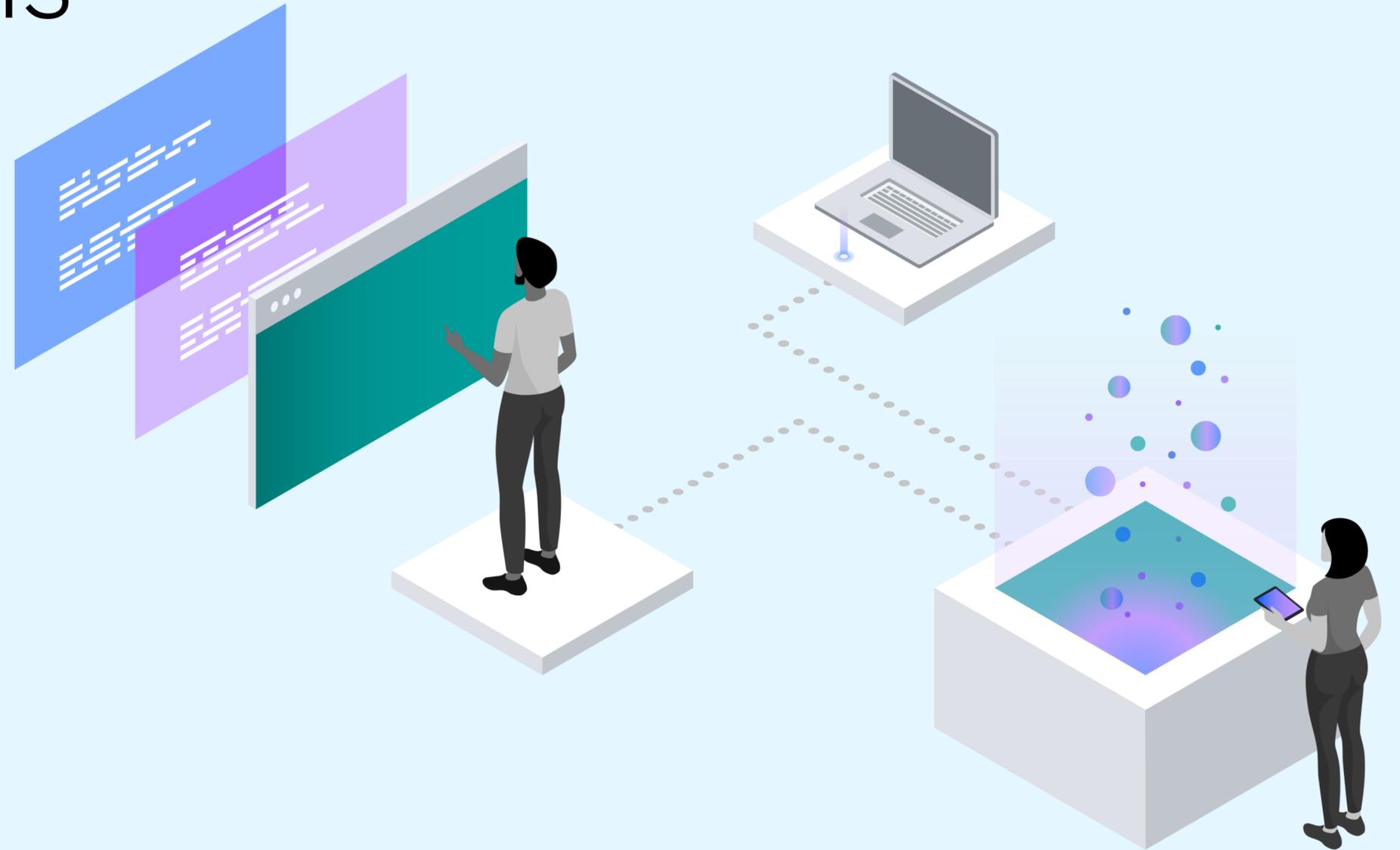


AIOps with IBM Z

Overview & Solutions



IT under pressure: Meeting greater customer demands with fewer skilled employees

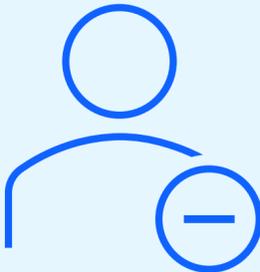
1 sec

of latency causes a 7% reduction in customer conversion and a 16% reduction in customer satisfaction



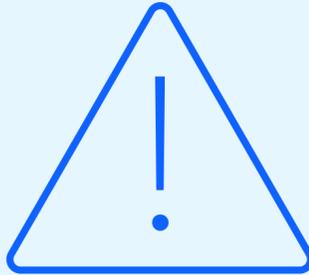
50%

of all employees need to upskill or reskill by 2025 for responsibilities arising from automation and new technologies



\$250K

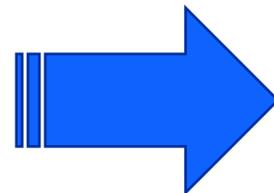
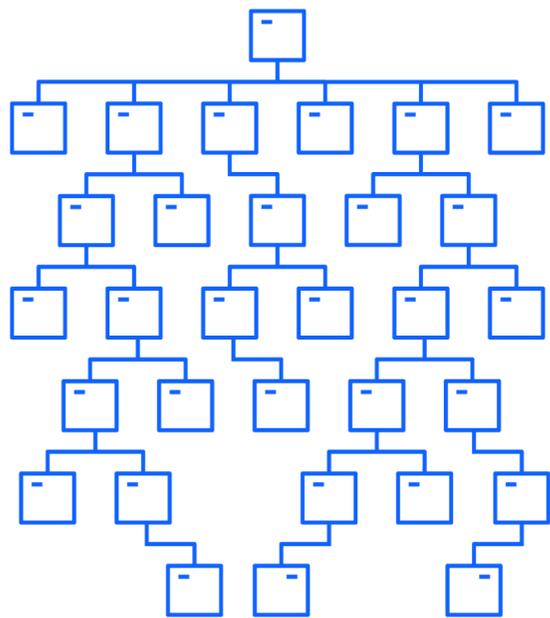
the average cost of an hour of downtime when a revenue generating production service is impacted



Current Landscape: Management Complexity

76% of companies use 2 or more public clouds

Organizations are using an average of over 1,000 applications across multiple clouds

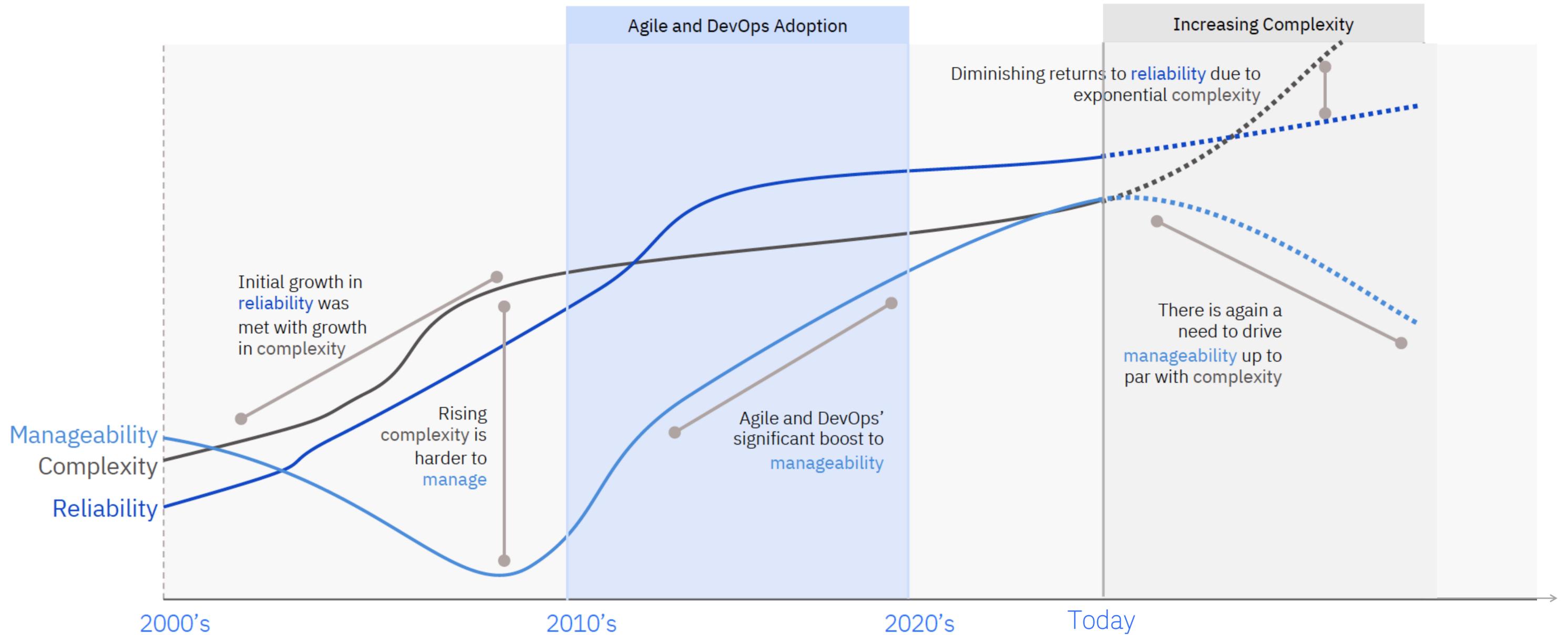


*There's **too much data** for one person to handle*

- Businesses need **real-time visibility** into their infrastructure and application estates to leverage actionable insights to **automate and enhance overall IT operations**
- Current **break-fix**, reactive approaches to IT management simply **cannot scale**
- Adopting **piecemeal** software solutions results in inconsistencies and inefficiencies, **undermining** integrated workflows and automations and **reducing visibility**

Why AIOps?

Modernization Accelerates Complexity



Example Technology Adoption

Legacy, Monolith Apps

Enterprise Apps

Web Applications

Mobile

IoT

Hyperscaler Cloud

5G, Edge

Distributed Cloud

AI Training & Inferencing

NTN

Quantum

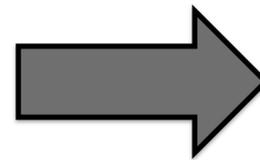
The capabilities of an AIOps Platform



Gartner defines an AIOps Platform as **using machine learning to conglomerate insight, toward intelligent, AI powered Correlation & Automation solutions** in the following areas:

AIOps Capabilities

- + Cross-domain data ingestion and integration
- + Topology generation
- + Event correlation and analytics
- + Incident and pattern recognition
- + Augmented remediation



Business Outcomes

- + Consolidate tools, teams and domains to work together and share understanding
- + See your entire IT estate and understand how incidents originate and propagate
- + Remove the toil of manual investigations, saving time and expanding operations capacity
- + Save time on repetitive fixes or deployments and empower operations to tackle complex problems

AIOps - Two IBM Z perspectives

“ZAIOps” – z/OS scope

- Encompasses z/OS monitoring & management solutions including the OMEGAMON suite, IBM Z Anomaly Analytics, IBM Z Operational Log and Data Analytics, IBM Z System Automation, and more.

“Hybrid Cloud” AIOps – Broader scope

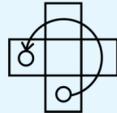
- Encompasses solutions that support Linux on IBM Z, distributed platforms, containers, public clouds, and more.
- Solutions include Instana, Turbonomic, IBM Cloud Pak for AIOps, SevOne, Apptio, and more.

These are not mutually-exclusive perspectives.

They work hand-in-hand to break down silos and bring IBM Z and z/OS into broader AIOps environments.

Observability & AIOps

Application & Infrastructure Monitoring 

Proactive Incident Resolution 



Cloud Pak for AIOps 

Enterprise Observability

Enhance visibility and comprehension with full stack scalable application, infrastructure and network health and performance monitoring

Incident Management

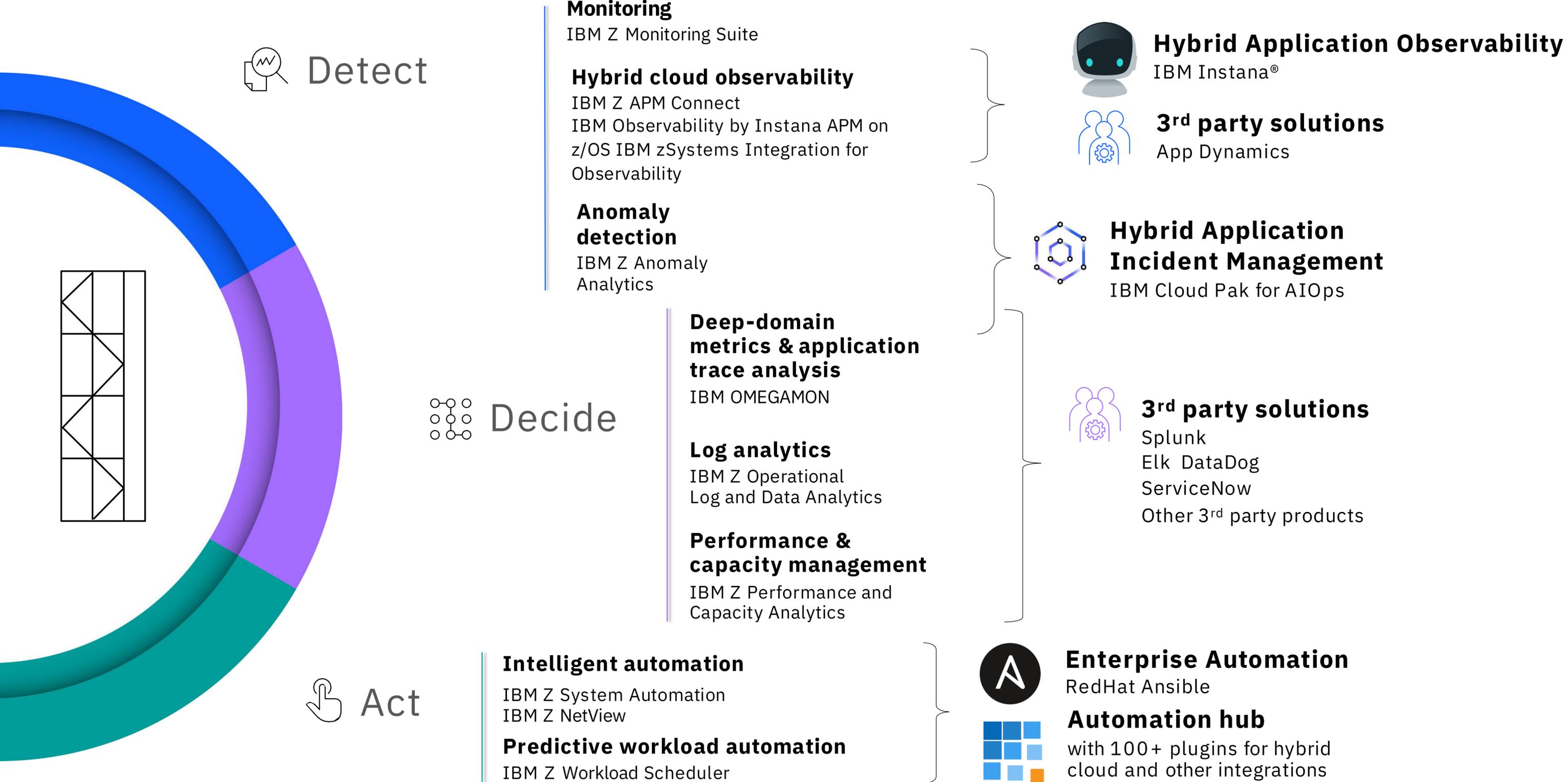
Automate and manage end-to-end IT and network operations at scale with efficiency and resiliency

Integrated AI-powered IT Operations



Platforms | Hybrid Multicloud Networks | Data & Operations

Better together – Hybrid Cloud Integrations



IBM Observability by Instana

The challenge of enterprise observability

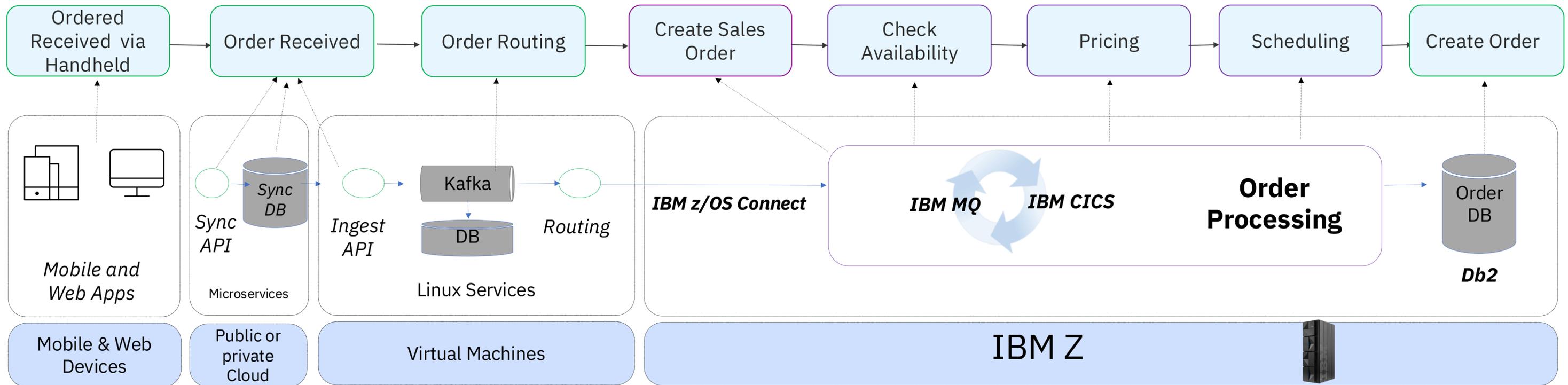


Application Owner

Site Reliability Engineers / IT Operations



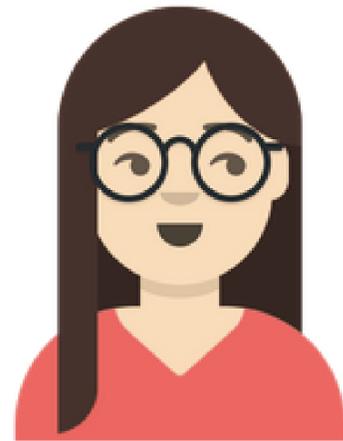
Mainframe Subject Matter Experts



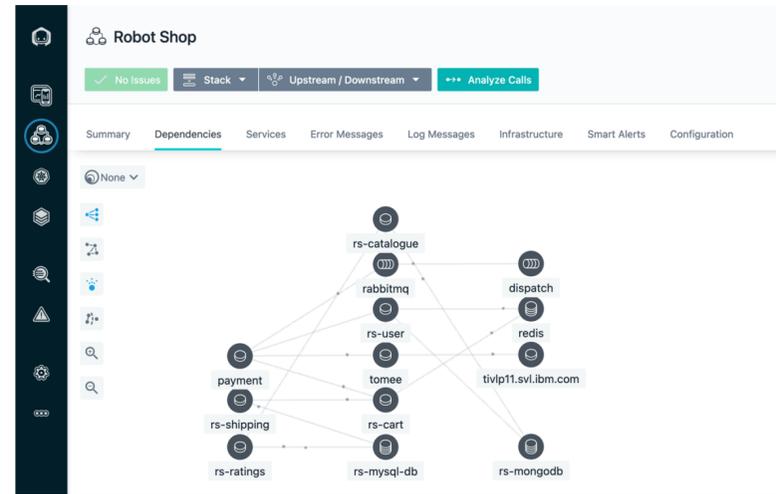
The mainframe is essential to the successful operations and business workflows of major enterprises...

Yet the majority of IBM Z users **lack integration of this key platform** into their enterprise-wide observability strategy

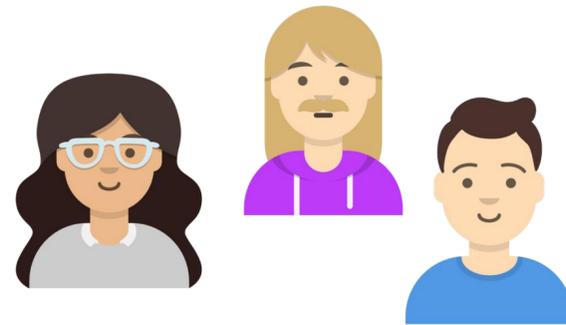
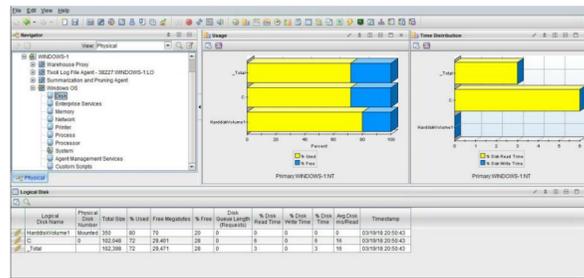
The ongoing challenge of Enterprise Observability



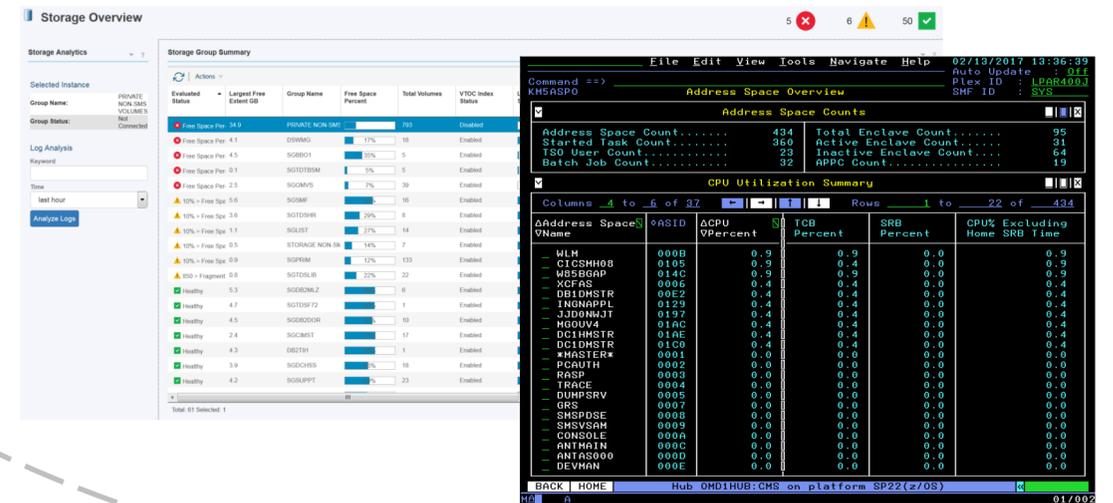
Application owner / SRE



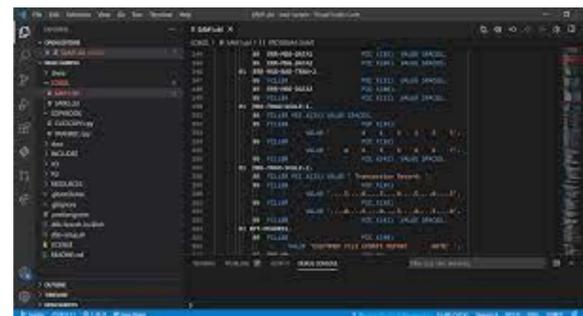
Mainframe Subject Matter Experts



Application development

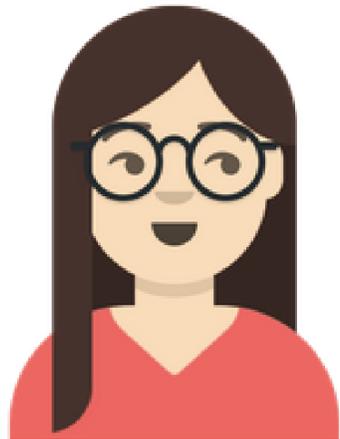


(Non-zSystems) IT operations

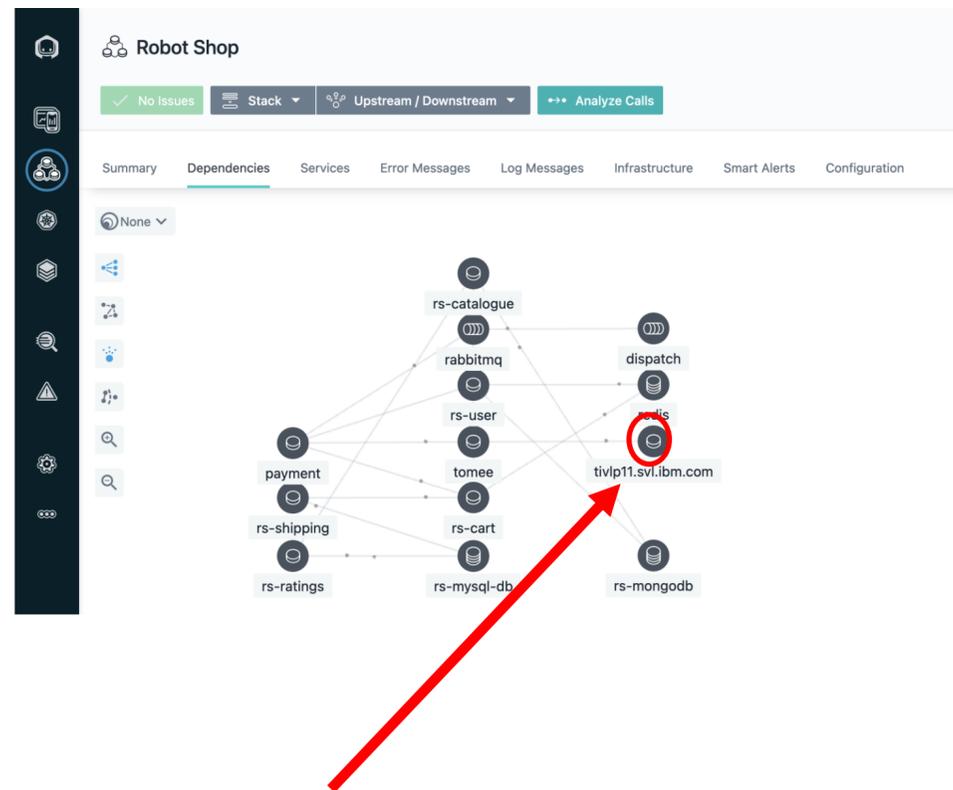


The absence of end-to-end observability...

The response time of our principal customer-facing application has increased significantly over the past 30 minutes...**it looks like the mainframe is where the slowdown is occurring, but I can't see any details.**



Application Owner



MQ is looking good according to my dashboards. Not our problem. Have you spoken to the IMS team?



MQ SME

No problems with IMS. I don't think IMS is part of this application.



IMS SME

Uh-oh. One of our CICS regions is experiencing a slowdown. I'll fix it right now



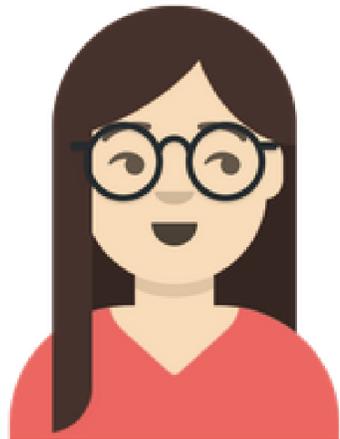
CICS SME

Improved experience with enterprise observability

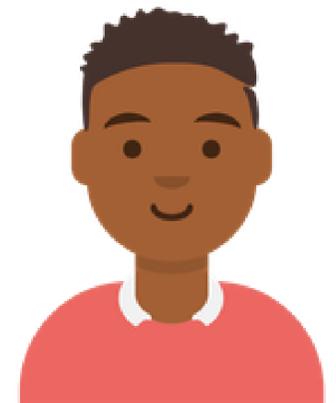
The response time of our principal customer-facing application has increased significantly over the past 30 minutes...**it seems there is a slowdown coming from CICS.** It appears to be stemming from *CICST11A* and task *56177* is associated.

Thanks for the heads up.

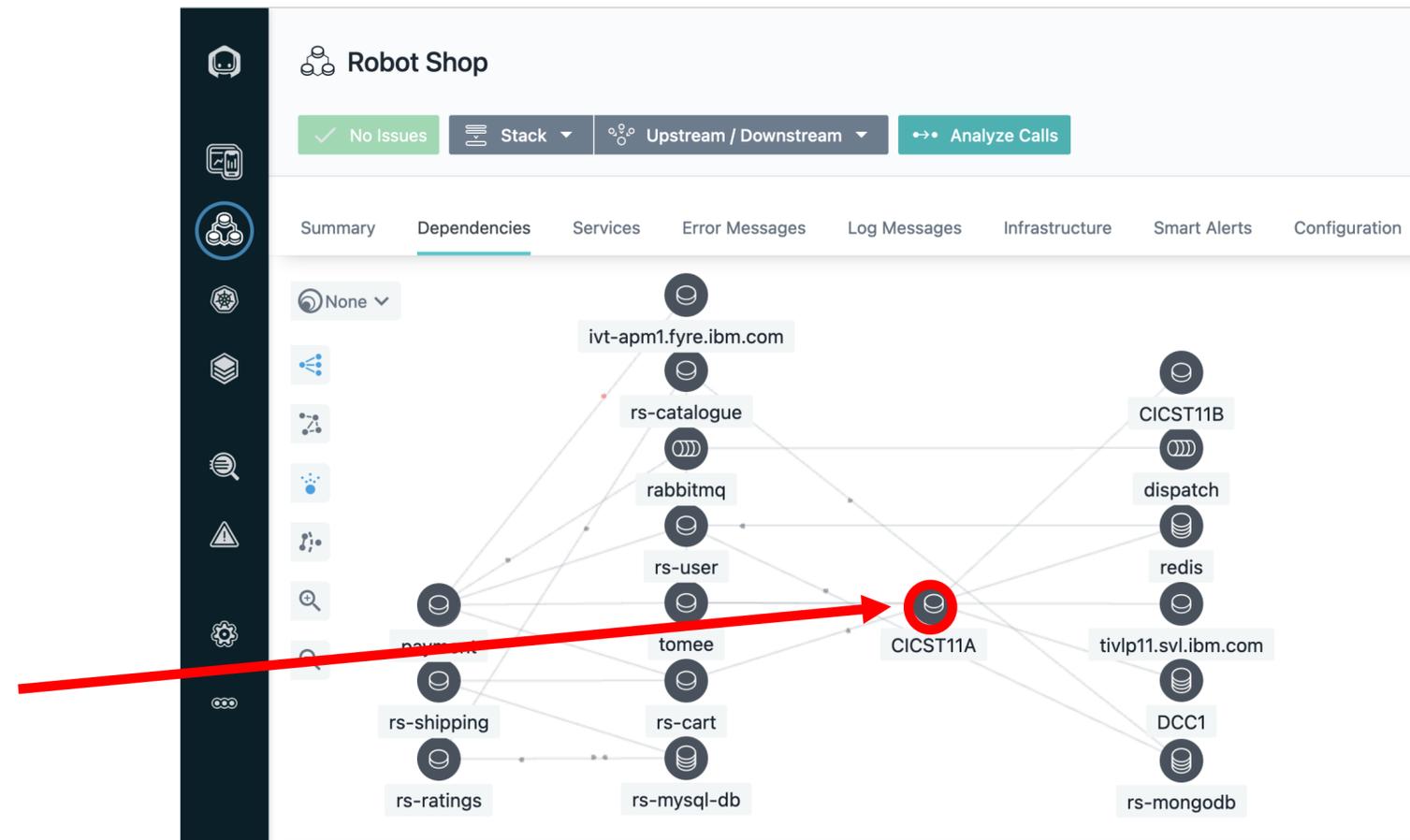
I'm going to look at that CICS region in OMEGAMON, review the CICS task history, and take action immediately.



Application Owner

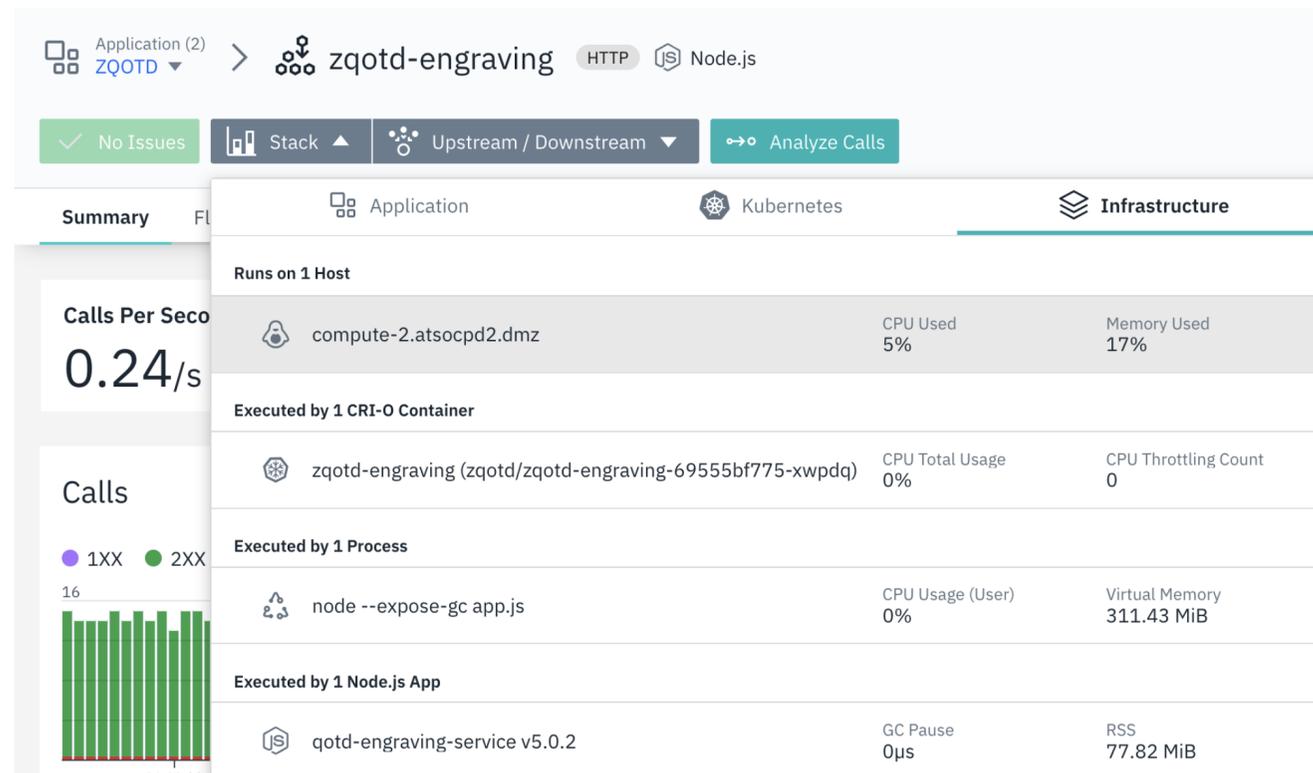


CICS SME



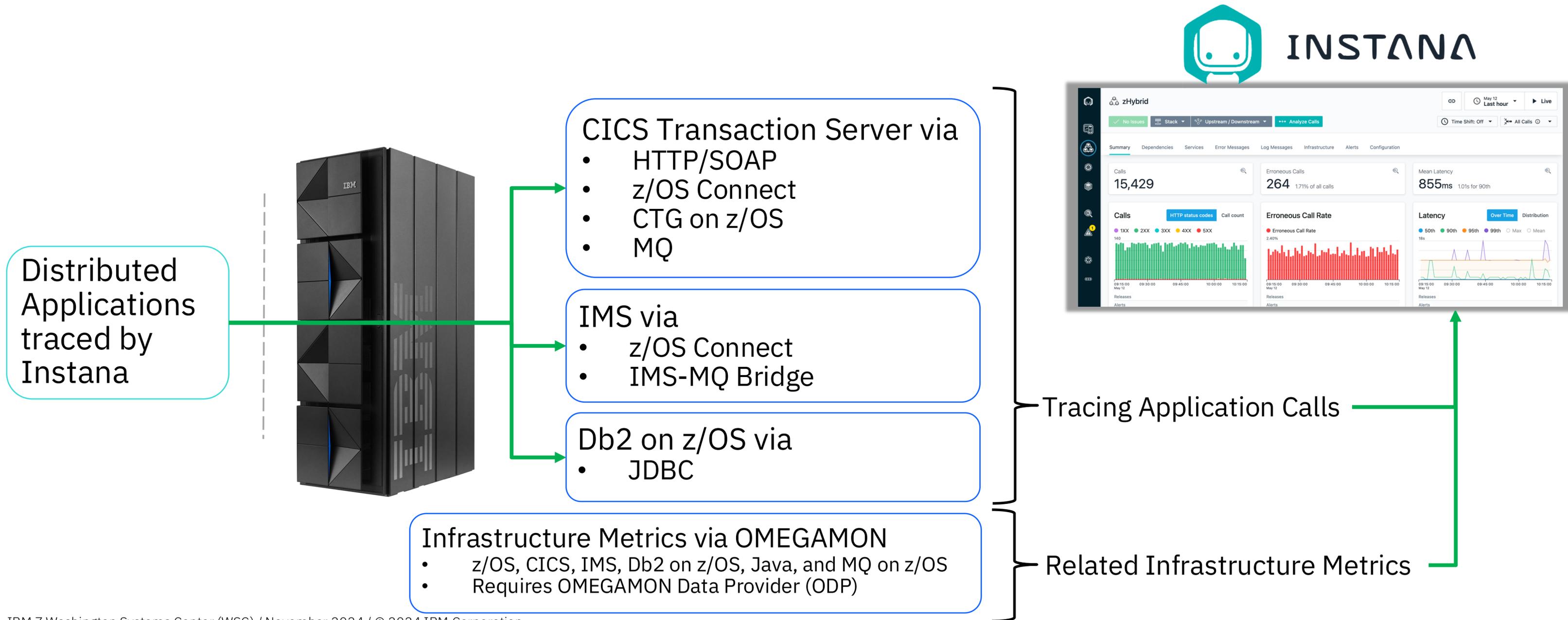
Collect accurate data in context

Real-time detection and mapping of all interdependencies reduces risk and decreases MTTR (Mean Time to Restore) by ensuring that you're always looking at accurate information.



Instana Capabilities on z/OS

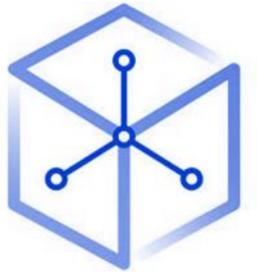
- Designed to observe hybrid applications that start on distributed systems and call into z/OS transactions
- Instana tracing isolates the location of the problem and provides data about the likely cause
- Integration with OMEGAMON shows correlated metrics related to the problem in Instana (Optional)



IBM Cloud Pak for AIOps

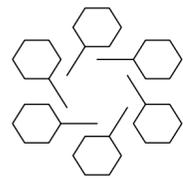
IBM Cloud Pak for AIOps

Proactive problem determination, remediation and avoidance



Proactive incident resolution using AI to eliminate unnecessary down time

Cross Domain Data Ingestion



Events, metrics, alerts, topology, CMDB

Tickets, defects, CI/CD events

On-Prem, Cloud, SaaS, VM's and containers, systems, apps, network

Event Correlation



Correlate across all relevant data sources

Detect hidden anomalies, group based on patterns

Find deviations in performance metrics

Proactive Incident Management



Prioritize incidents based on business criticality

Dynamically update application topologies

Recommend fixes based on analysis of past tickets

Runbook Automation



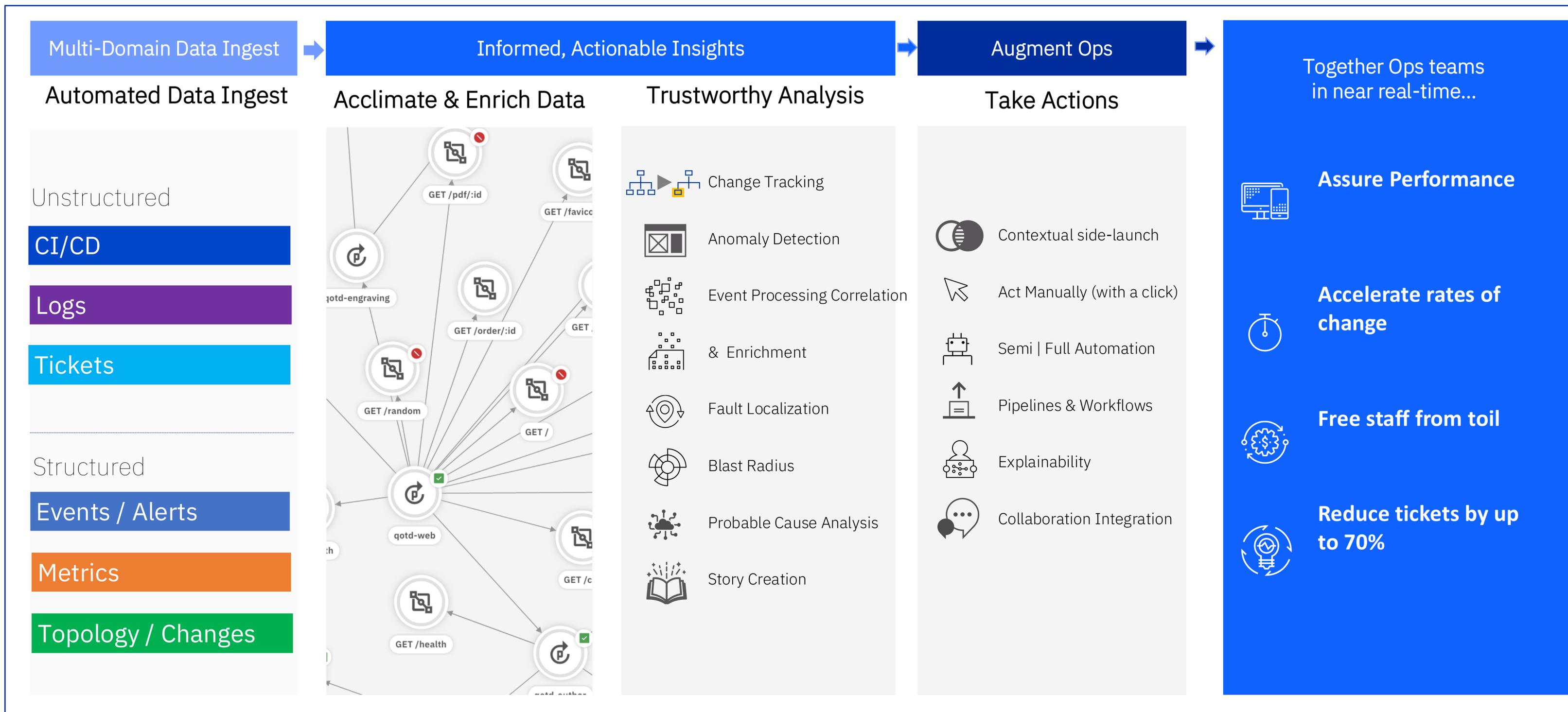
Create runbooks to automate recurring remediations

ChatOps and prescriptive next best actions

Centralize policies across cloud and VM environments



Comprehensive AIOps approach to Real Business Outcomes



Environment and Tooling Data Connectors



Data and tool connections

Add connection +

Connect to your tools to provide data that will help gather insights for your environment.

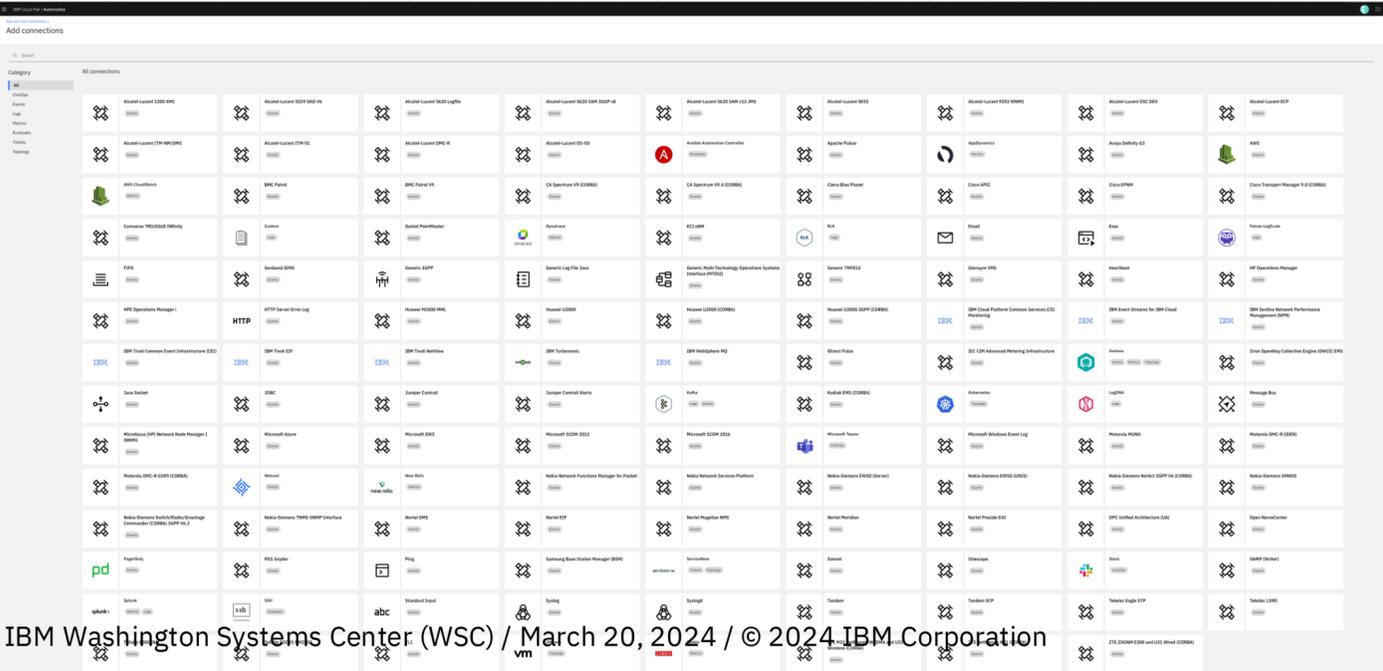
Learn more ▾

Manage connections		Schedule connections	
Search			
Connection type	Total connections	Connection status	Categories
ELK	1	✓ 1	Logs
Instana	2	✓ 2	Events Metrics ...
ServiceNow	1	✓ 1	Tickets Topology
Slack	1	✓ 1	ChatOps
SSH	1	✓ 1	Runbooks

Over 160 industry standard connectors out-of-the-box

Ingest Events & Alerts, Metrics, Topology and Logs from across your estate and tooling

Create your own custom connectors using generic connectors and SDKs



Leverage your existing Netcool Probes

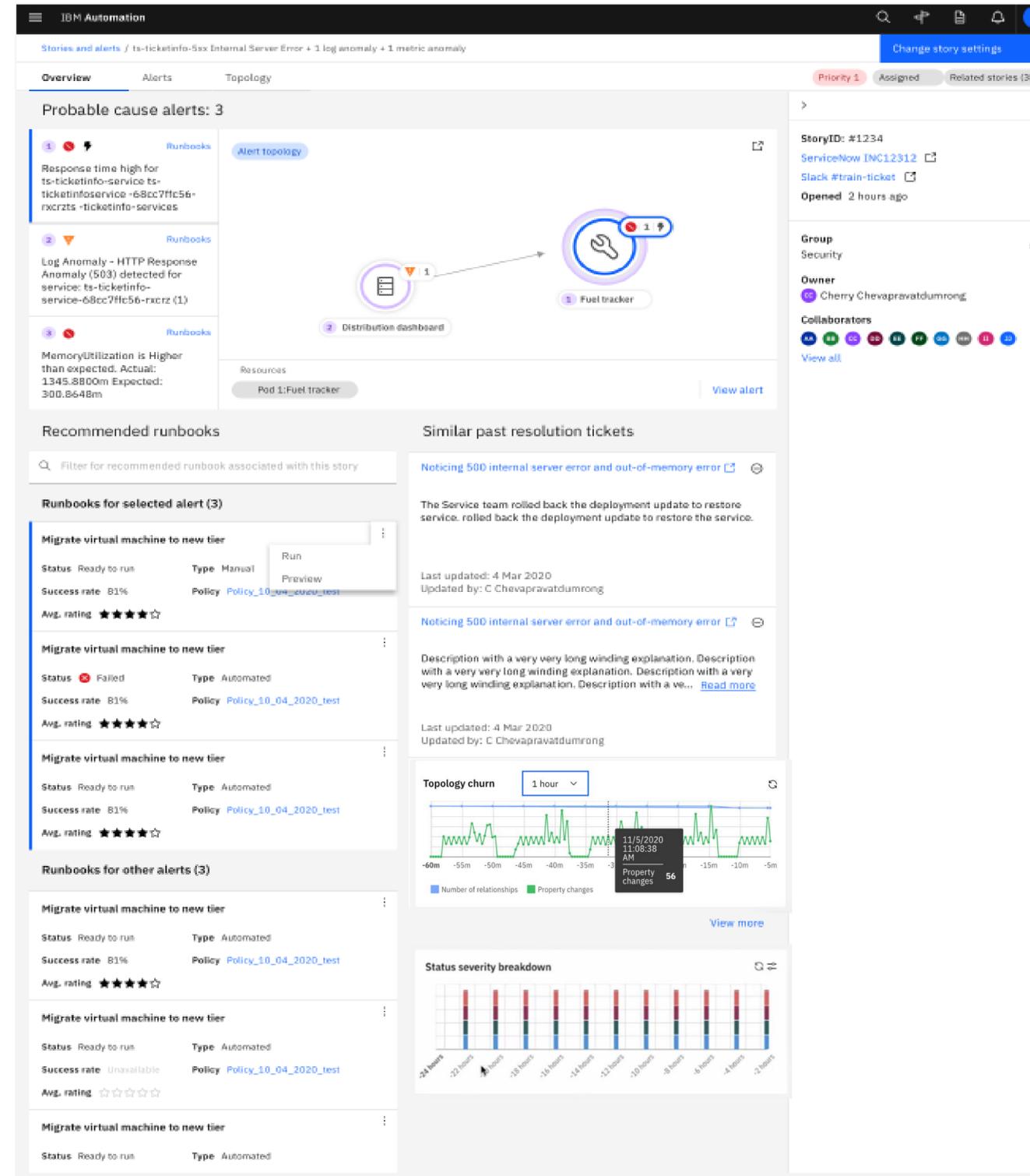
Easy configuration and management

AIOps Incident View

Probable Cause alerts are prominently displayed and ordered by likelihood, with additional details only one click away.

Topology view of affected and associated resources, and historical change tracking to quickly pinpoint the source of an incident and its impact

Recommended runbooks based on incident context and user feedback.



Access to ChatOps for team coordination and shortcuts to actions

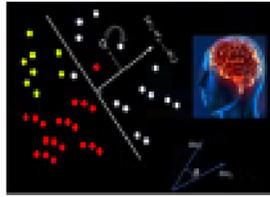
Direct link to ServiceNow ticket or other ITSM systems

Similar incident tickets, to inform operators of rapid resolution steps as well as tracking recurring types of incidents.



AI Analytics in Cloud Pak for AIOps

Log Anomaly Detection



Detect anomalies from log messages

- Anomalous time period prediction
- Entity mentions in error logs
- Explanation & Pointer to log messages from anomalous time periods

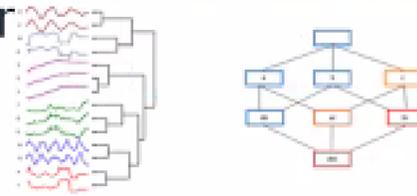
Metric Anomaly Detection



Detect anomalies from time series metrics

- Deviation from normal operating range
- Change from variable to flat
- High & low range changes
- Exceed previous range
- Exceed normal range variance

Event Grouping with Entity Linkir



Group events, alerts, anomalies to reduce tickets

- Topological: Group events that are related and/or connected (e.g. "runs on").
- Temporal: To automatically discover events that tend to co-occur
- Scope: Automatically group events based on scope
- Super-Group: Group of Groups

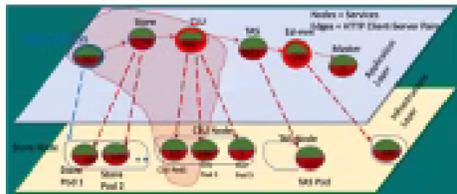
Event Seasonality



Automatically discovers events that occur with a regular pattern

- Identify chronic issues that may go un-detected
- Provide valuable insights into problem solving
- Continual learning over days, weeks, months, and years

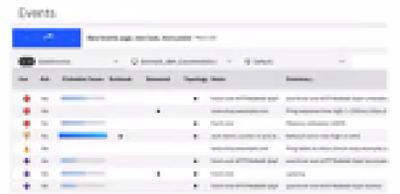
Fault Localization & Blast radius



Derive full scope of components using vertex-weighted topology graph traversal and a Reasoning engine to understand the meaning of the topology relationships

- Blast-radius via directional dependency analysis of the related components that interact with the localised source of the issue.

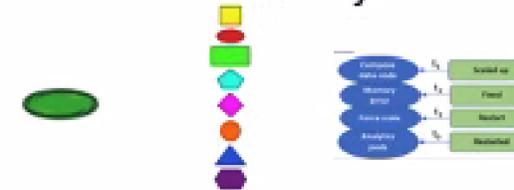
Probable Cause



Derive probable fault component using vertex-weighted topology graph traversal and a Reasoning engine to understand the meaning of the topology relationships

- Probable Cause localisation to the most likely source of an issue within the application topology

Incident Similarity



For a given problem description, find top k ranked similar incidents from the past. Helps understand the current issue and previous successful resolve actions. Consumes tickets and any data from the ticket progression to closure including human written investigation and resolution actions.

Uses Entity-Action extraction and Action sequence mining to understand tickets and summarize what was done.

Change Risk Prediction



Assess the risk for each proposed change based on issues caused by historical changes.

- Harvest and analyse the change ticket history to identify changes that implicitly failed when applied.
- Identify changes that resulted in subsequent issues if they rolled out

AI Management



AI model management

Training Application coverage Data assets

Models-generating algorithms

Change risk
 Training started: 8/4/2022 8:38:54 PM
 Version trained: v10
 Data quality: No tickets data available

Log anomaly detection - natural language
 Last trained: 7/17/2022 1:47:46 PM
 Version trained: v4
 Data quality: Good

Metric anomaly detection
 Last trained: 6/28/2022 6:13:19 AM
 Version trained: v5
 Data quality: -

Similar incidents
 Discovers details about similar messages, anomalies, and events that occurred in the past and are impacting the current application.
 Tickets

Temporal grouping
 Last trained: 7/5/2022 4:06:39 AM
 Version trained: v2
 Data quality: -

Online algorithms

Log anomaly detection - statistical baseline
 Discovers abnormal behavior in log data using a statistical moving average.
 Logs: On

Probable cause
 Analyzes across domain and application boundaries to determine the likelihood of an alert being the cause of an incident.
 Events, topology: Enabled

Log anomaly detection - natural language

Overview Versions Coverage

Training status

3 of 3 complete

Models created

- Training started: 7/17/2022, 01:47 PM
- Queued
- Preparing data
- Training

Log data

Name: OGvqDYIBVPLMfCLDWy1F
 Start date: 07/16/2022 4:00 PM UTC
 End date: 07/17/2022 8:00 PM UTC

Data quality

Good

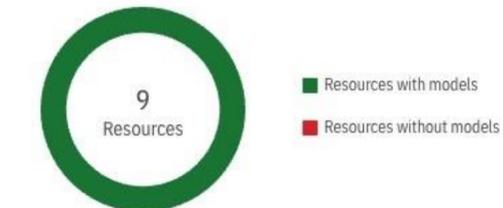
3 recommendations

Your data was inspected and looks good for training.

We have detected that a portion of this data is in an unsupported language and could impact the quality of this model.

We recommend that you remove any data containing unsupported languages. Then, run training again.

Models



Start training

Deploy v4

Delete configuration

Overview details

AI type: Log anomaly detection - natural language
 Version: v4
 Version deployed: v3
 Created on: 6/21/2022, 9:35:26 AM
 Created by: jconallen

AI model management

AI algorithms Manage Coverage Data assets

Trained AI algorithms

These are your most recently trained AI algorithms.

Name	Version	Deployed version	AI algorithms	Schedule	Last trained	Status
similar_incidents_configuration	v1	v1	Similar incidents	Run manually	3/24/2022 9:50:32 AM	Training complete
change_risk_configuration	v1	v1	Change risk	Run manually	3/24/2022 9:52:44 AM	Training complete
metric_anomaly_detection_configuration	v2	v2	Metric anomaly detection	Run manually	3/25/2022 10:10:44 AM	Training complete

Items per page: 10 1-3 of 3 items

1 of 1 page

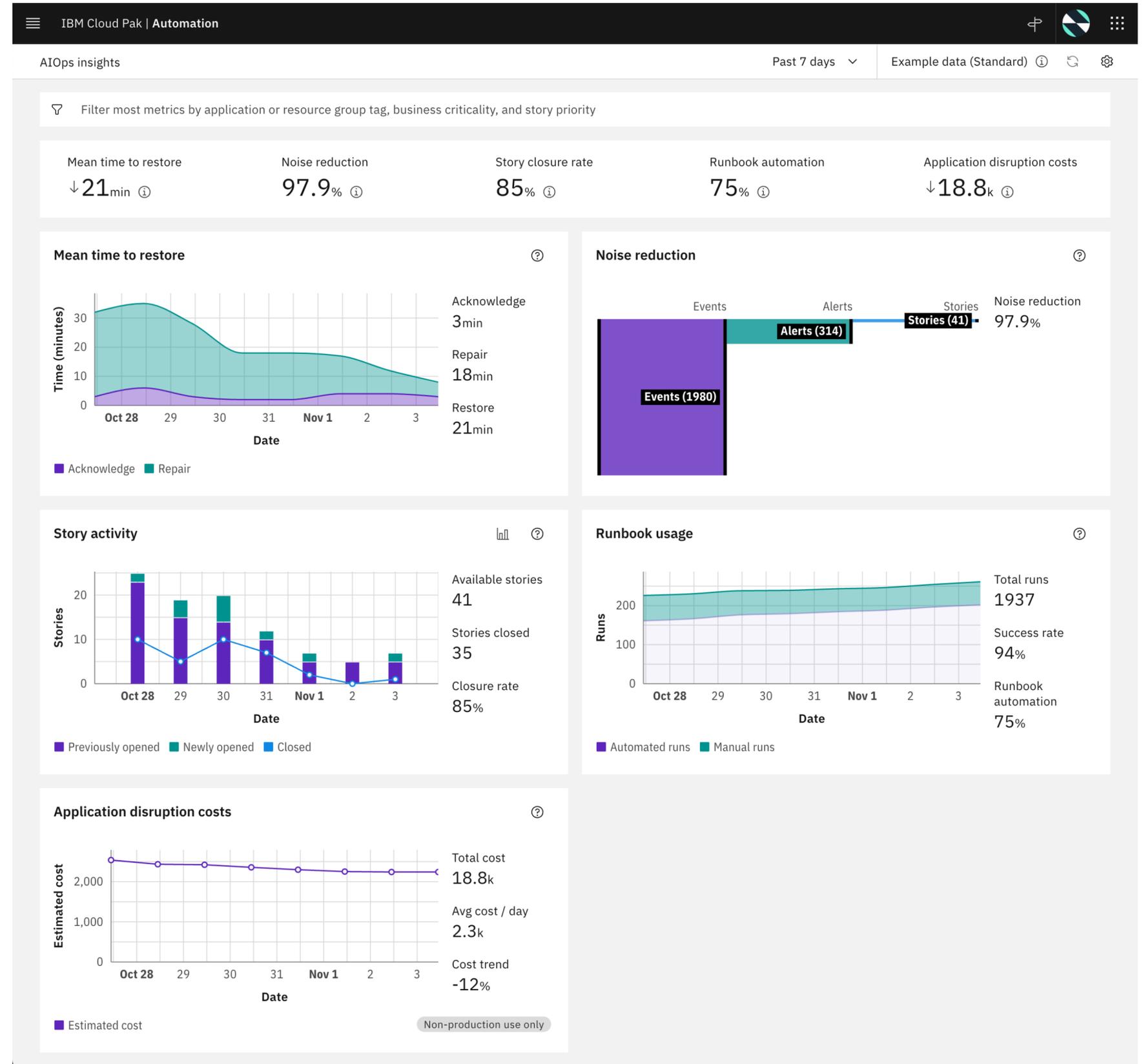
AIOps Insights Dashboard

Understanding Operations Performance

Track KPI's and automation utilization to ensure operations teams are benefiting from AIops and identify new opportunities for automation.

Observe trends and understand application and service performance over time.

Analyze cost impacts of outages, and savings realized with AIops (Tech Preview)



Next steps/more information

– Want to learn more?

- Reach out to me for a live demo or deep-dive presentation (matt.mondics@ibm.com)

– Interested in a POC of CP4AIOps running on the IBM Z platform?

- Reach out to me

– Join the IBM AIOps for IBM Z community ([Link](#))

Thank you

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Client examples are presented as illustrations of how those clients have used IBM products and the results they may have achieved. Actual performance, cost, savings or other results in other operating environments may vary.

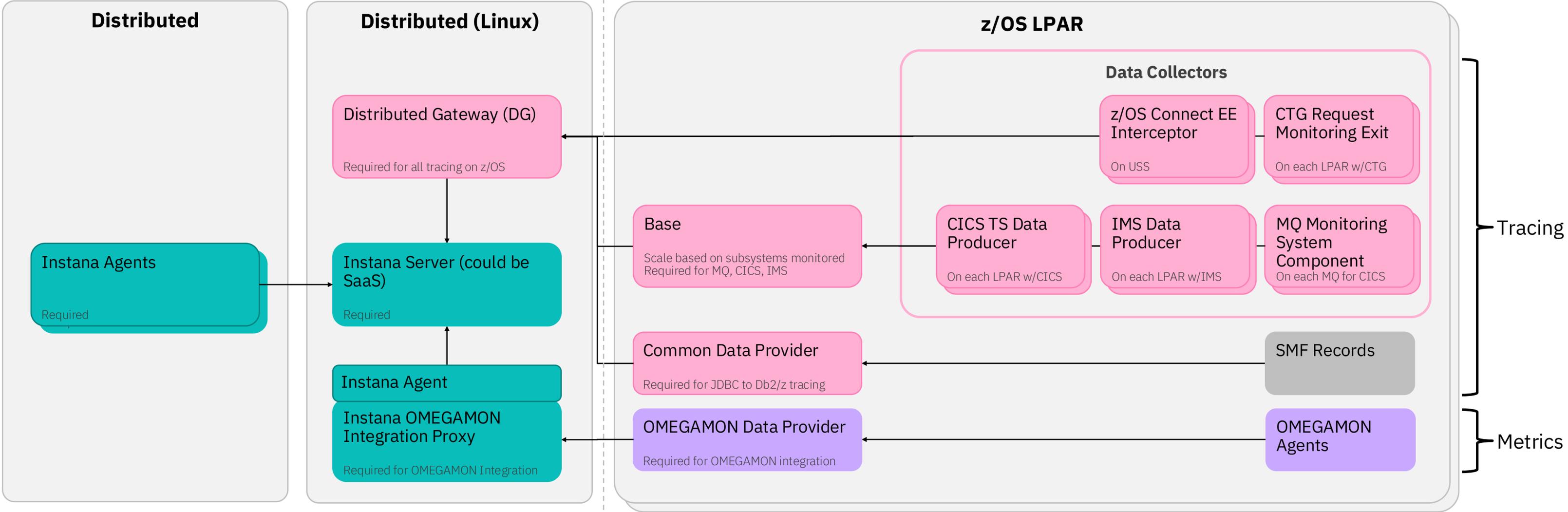
Not all offerings are available in every country in which IBM operates.

It is the user's responsibility to evaluate and verify the operation of any other products or programs with IBM products and programs.

The client is responsible for ensuring compliance with laws and regulations applicable to it. IBM does not provide legal advice or represent or warrant that its services or products will ensure that the client is in compliance with any law or regulation.



Basic architecture for ingesting z/OS telemetry into Instana



What's in the Box?

The Instana on z/OS PID includes the following components:

- Instana self-hosted server
- “Z APM Connect” components
 - Distributed Gateway
 - Base
 - Data Collectors
- Common Data Provider
- [Instana on z/OS prerequisites](#)

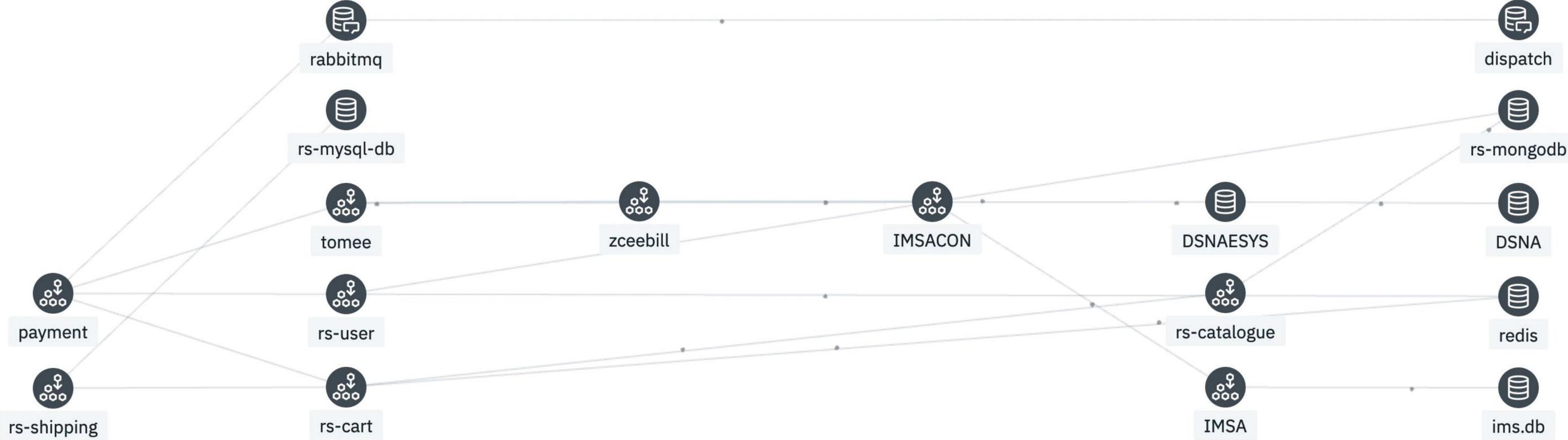
For OMEGAMON integration, the following additional components are required:

- OMEGAMON agents
 - OMEGAMON Data Provider
 - Instana Integration Proxy
- NOT provided by Instana on z/OS

Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

Monitor your: End-to-end application with distributed (x86) Linux services & z/OS



Monitor your: End-to-end application with distributed (x86) Linux services & z/OS

IBM Instana Get answers ?

Robo Z Shop May 08 Last hour ▶ Live

✓ No Issues
Stack ▾
Upstream / Downstream ▾
Analyze Calls
Time Shift: Off ▾
All Calls ⓘ ▾

[Summary](#)
[Dependencies](#)
[Services](#)
[Error Messages](#)
[Log Messages](#)
[Infrastructure](#)
[Synthetic Monitoring](#)
[Smart Alerts](#)
[Configuration](#)

Services

Analyze Services Type... Technology...

Name	Types	Technologies ↑	Endpoints	Calls	Erroneous Calls	Erroneous Call Rate	Latency	Health
DSNAESYS	DATABASE	DB2 DB2	2	356	0	0.00%	1ms	✓
DSNA	DATABASE	DB2 DB2	1	337	0	0.00%	< 1ms	✓
dispatch	MESSAGING	Go	1	60	0	0.00%	120ms	✓
ims.db	DATABASE	IBM IMS	1	53	0	0.00%	0ms	✓
IMSACON	RPC	IBM IMS	1	53	0	0.00%	0ms	✓
IMSA	RPC	IBM IMS	1	53	0	0.00%	0ms	✓
zceebill	HTTP	IBM z/OS Connect	1	60	0	0.00%	9ms	✓
rs-shipping	HTTP	Spring Boot	4	243	0	0.00%	105ms	ADD SMART ALERT

Monitor your: End-to-end application with OpenShift on IBM Z containers, MongoDB on LinuxONE, and OracleDB on LinuxONE

The screenshot displays the IBM Instana monitoring interface for an application named 'acmeair'. The interface includes a top navigation bar with the 'acmeair' application name, a 'Get answers' link, and a 'Live' status indicator for 'May 08 Last hour'. Below this, there are filters for 'No Issues', 'Stack', 'Upstream / Downstream', and 'Analyze Calls'. The main content area shows a dependency graph with nodes for various services and databases. The nodes are: 'MongoDB@27017 on zdbl01', 'acmeair-flight-service', 'acmeair-authservice-java', 'acmeair-customerservice-java', 'OracleDB@1521 on lnrg4170', 'acmeair-bookingservice-java', 'acmeair-flightservice-java', and 'acmeair_flightdb'. The graph shows dependencies between these services, with 'acmeair-flight-service' depending on 'MongoDB@27017 on zdbl01' and 'acmeair-flightservice-java'. 'acmeair-authservice-java' and 'acmeair-customerservice-java' both depend on 'acmeair-flight-service'. 'acmeair-bookingservice-java' and 'acmeair-flightservice-java' both depend on 'acmeair-authservice-java'. 'acmeair-customerservice-java' and 'acmeair_flightdb' both depend on 'acmeair-customerservice-java'. 'OracleDB@1521 on lnrg4170' depends on 'acmeair_flightdb'. A search bar is located in the top right of the graph area, and an 'ADD SMART ALERT' button is in the bottom right.

Monitor your: OracleDB

IBM Instana Get answers ?

Map > ... (2) > OracleDB @acmeair

OracleDB @acmeair OracleDB

🔗 May 08 Last hour ▶ Live

✓ No Issues | Stack ▾ | Upstream / Downstream ▾

Oracle SID
acmeair

Service Names
acmeair

Port
1521

Started At
2024-03-07, 09:30:29 (2mo 3d 6h 29m)

CPU Count
4

Max Sessions
504

DB Block Size
8192

Services ▾

Process Utilization

● Max Utilization ● Current Utilization

320

Process Limit Usage

● Process Limit

20.00%

Active Sessions (More Than 10 Mins)

● Count

1.00

DB Time per Second

● DB ● DB CPU ● SQL Execute ● Parse

360.00ms

DB / CPU Time

● Ratio

213.72%

Monitor your: Linux on IBM Z/LinuxONE virtual machine

IBM Instana Get answers ?

Map > Inrg4170.dmz

May 08
Last hour
 Live

No Issues
 Stack
 Upstream / Downstream

System ^

OS
Linux 4.18.0-372.9.1.el8.s390x (s390x)

CPU
4 x

Memory
7.65 GiB

Max Open Files
6,815,744

Hostname
Inrg4170

FQDN
Inrg4170.dmz

Machine ID
3aee9a9a458c46e69dd8f6a0445e438d

Boot ID
7a01737e-9072-4fb2-a95b-b37ffa00161d

Started At
2023-11-17, 18:31:40 (5mo 21d 22h 30m)

CPU Usage
1%

Memory Usage
61%

CPU Load
0.12

CPU Usage

● User ● System ● Wait ● Nice ● Steal

Context Switches

● Context Switches

CPU Load

● Load

Interfaces (1) v

- Instana Agent (1) v
- OracleDB (1) v
- Process (1) v

Individual CPU Usage Search...

	CPU ↑	User	System	Wait	Nice	Steal
v	CPU 1	0%	0%	0%	0%	0%
v	CPU 2	1%	0%	0%	0%	0%

Monitor your: IBM Z Hardware (from HMC API)

IBM Instana
Get answers ?

zHMCs > wschmc.dmz > FSYS

zHMC FSYS 🔗 May 08 Last hour ▶ Live

Summary | Environmental And Power | Partition | Channel | Adapter | Network

HMC Version
2.16.0

API Version
4.10

CPC Processor Usage
5.00%

Power Consumption (Watts)
15,932

All CPU Processor Usage

● IIP Processor Usage ● IFL Processor Usage ● ICF Processor Usage

14.00%

Releases

Shared CPU Processor Usage

● IFL Processor Usage ● ICF Processor Usage

14.00%

Releases

Dedicated CPU Processor Usage

● IFL Processor Usage ● ICF Processor Usage

100.00%

Releases

Overall Processor Usage

Search... 🔍

Name ↓	Overall Processor Usage	SMT Usage	Thread 0 Usage	Thread 1 Usage
SAP2A	1.00%	—	—	—
SAP29	1.00%	—	—	—

Monitor your: OpenShift cluster

The screenshot shows the IBM Instana monitoring interface for a Kubernetes cluster named 'vader-qotd2 (cluster)'. The dashboard includes a navigation sidebar on the left with icons for home, overview, details, events, nodes, namespaces, deployments, daemonsets, statefulsets, cron jobs, k8s services, pods, and infrastructure. The main content area features a top navigation bar with 'Kubernetes > vader-qotd2 (cluster)' and a 'Get answers' link. Below this, the cluster name 'vader-qotd2 (cluster)' is displayed along with its version 'v1.11.0+d4cacc0' and 'OpenShift Cluster' label. A status bar shows 'No Issues' and options for 'Stack', 'Upstream / Downstream', and 'Analyze Calls'. A time selector is set to 'May 08 Last hour' with a 'Live' button and a 'Time Shift: Off' dropdown. A horizontal menu lists various resource types: Summary (selected), Details, Events, Nodes (1), Namespaces (19), Deployments (18), Deployment Configs (4), DaemonSets (8), StatefulSets (2), Cron Jobs (0), K8s Services (34), Pods (326), and Infrastructure (1). The dashboard is divided into several sections: 1. Summary Metrics: Five cards showing resource usage percentages: CPU Requests (20.87%), CPU Limits Alloc. (45.56%), Memory Requests (29.92%), Memory Limits Alloc. (52.50%), and Pods Alloc. (16.80%). 2. Resource Charts: Three line charts for 'CPU Resources', 'Memory Resources', and 'Pods'. Each chart plots 'Requests' (purple), 'Limits' (blue), and 'Capacity' (pink) over time from 16:09:00 to 17:09:00 on May 08. The CPU chart shows a value of 8, the Memory chart shows 17.00 GiB, and the Pods chart shows 260. 3. Logs: A section at the bottom for viewing logs, with filters for Error (red), Warn (yellow), and Info (blue).

Monitor your: z/OS LPAR (via OMEGAMON)

The screenshot shows the IBM Instana monitoring interface for an ESYSMVS:MVS1:MVSSYS LPAR. The dashboard includes a left-hand navigation menu with icons for home, map, and various monitoring tools. The main content area features a breadcrumb trail (Map > ESYSMVS:MVS1:MVSSYS > ESYSMVS) and a header with a 'Get answers' link. Below the header, there are controls for 'No Issues', 'Stack', and 'Upstream / Downstream'. A row of five summary cards displays key metrics: CPU Usage (13%), LPAR MSU Capacity (13%), Average Unused Group MSUs (0), Four Hour MSUs (55), and Hiperdispatch Management (On). The central chart, titled 'Average Workload CPU', shows a line graph with a legend for Average CPU, Average IFA, Average IFA on CP, Average zIIP, Average zIIP on CP, and MVS Overhead. The x-axis represents time from 16:15:59 to 17:15:59 on May 08. Below the chart, there is a section for 'Undispatched Tasks'.

Monitor your: CICS region (via OMEGAMON)

IBM Instana Get answers ?

Map > ESYSMVS:MVS1:MVSSYS > MVS1:CICSTIVA

MVS1:CICSTIVA IBM CICS for z/OS

🔗
🕒 May 08 Last hour
▶ Live

✓ No Issues
📊 Stack
🔄 Upstream / Downstream

IBM CICS for z/OS

Origin Node
MVS1.CICSTIVA

System ID
MVS1

CICS Region Name
CICSTIVA

CICS Version
7.2.0

CICSplex Name
DEMOPLEX

CPU Utilization
0.00%

Storage Violations
0

Enqueue Waits
0

AIDS
0

ICES
6

SOS
No

Transaction Rate

● Transaction Rate

26

16:14:14 16:24:14 16:34:14 16:44:14 16:54:14 17:04:14 17:14:14

Releases

Maximum Tasks Percent

● Maximum Tasks Percent

2

16:14:14 16:24:14 16:34:14 16:44:14 16:54:14 17:04:14 17:14:14

Releases

Rates

● CPU Utilization ● IO Rate ● Page Rate

1

Performance

● Worst Region Performance Index ● Queued Remote Requests

4 kiB

Monitor your: Db2 on z/OS database (via OMEGAMON)

IBM Instana Get answers ?

Map > ESYSMVS:MVS1:MVSSYS > DB2 DSNA:MVS1

DB2 DSNA:MVS1 IBM Db2 for z/OS 🔗 May 08 Last hour ▶ Live

✓ No Issues | Stack ▼ | Upstream / Downstream ▼

IBM Db2 for z/OS

- MVS System: MVS1
- Origin Node: DSNA:MVS1:DB2
- Db2 Subsystem: DSNA
- Product Code: kd5

Metric	Value
Lock Conflict Count	2
Current Thread Count	10
Page Reads	6
Storage	1 B

The dashboard features several monitoring panels with time-series graphs (from 16:17:10 to 17:17:10 on May 08):

- Lock Conflict Count:** Shows a constant value of 2.
- Current Thread Count:** Shows a constant value of 10.
- Db2 System States:** Shows Current Thread Count (10) and Transactions Per Second.
- Page Reads:** Shows Pages Read From BPS and Pages Read From DASD.
- Storage:** Shows ECSA Used By DB2 and Real Storage Used By Db2.

Example tracing into Db2 on z/OS

Analytics > Calls 7d Oct 16 - Oct 23 Live

2 Calls SELECT * FROM SYSADM.VOLTB 2022-10-21, 15:30:05 32,507ms
SELECT * FROM SYSADM.VOLTB WIT... 2022-10-18, 15:54:02 76ms

GET /JdbcServlet2/JdbcServlet2 Trace ID: f376ab8f2e012aad

Timeline Colorize by Endpoint Technology

Started: 2022-10-18, 15:54:02

381ms
GET /JdbcServlet2/JdbcServlet2
CONNECT SELECT * FROM SY...

Calls Colorize by Endpoint Technology

381ms
GET /JdbcServlet2/JdbcSe... HTTP 381ms
To GET /JdbcServlet2 of zapm-instana-tomee

226ms
CONNECT DATABASE
To CONNECT of DBC1

1ms
DBC1 DATABASE
To DBC1 of DBC1

76ms
SELECT * FROM S... DATABASE
To SYSADM.VOLTB of DBC1

< 1ms
DBC1 DATABASE
To DBC1 of DBC1

SOURCE zapm-instana-tomee

Details & Stack Trace

Type: JDBC Call
Category: database

Statement: SELECT * FROM SYSADM.VOLTB WITH UR Copy

Connection: jdbc:db2://VM30025.svl.ibm.com:5050/DBC1 Copy

StackTrace

```
executeQuery in com.ibm.db2.jcc.am.kj:687
doGet in com.ibm.zapm.test.jdbcServlet2.JdbcServlet2:199
service in javax.servlet.http.HttpServlet:634
doFilter in org.apache.tomcat.websocket.server.WsFilter:53
invoke in org.apache.catalina.core.StandardContextValve:96
invoke in org.apache.tomcat.websocket.server.WsFilter:53
invoke in org.apache.catalina.core.StandardContextValve:96
invoke in org.apache.catalina.authenticator.AuthenticatorBase:490
invoke in org.apache.catalina.core.StandardHostValve:139
invoke in org.apache.catalina.valves.ErrorReportValve:92
invoke in org.apache.tomcat.websocket.server.WsFilter:53
invoke in org.apache.catalina.valves.AbstractAccessLogValve:678
invoke in org.apache.catalina.core.StandardEngineValve:74
service in org.apache.catalina.connector.CoyoteAdapter:343
service in org.apache.coyote.http11.Http11Processor:408
process in org.apache.coyote.AbstractProcessorLight:66
process in org.apache.coyote.AbstractProtocol$ConnectionHandler:836
doRun in org.apache.tomcat.util.net.NioEndpoint$SocketProcessor:1839
run in org.apache.tomcat.util.net.SocketProcessorBase:49
runWorker in java.util.concurrent.ThreadPoolExecutor:1128
run in java.util.concurrent.ThreadPoolExecutor$Worker:628
```

Example timeout delay in Db2 on z/OS

Analytics > Calls
7d Oct 16 - Oct 23
Live

2 Calls

- SELECT * FROM SYSADM.VOLTB
2022-10-21, 15:30:05 32,507ms
- SELECT * FROM SYSADM.VOLTB WIT...
2022-10-18, 15:54:02 76ms

GET /JdbcServlet2/JdbcServlet2 Trace ID: 6fdde4b50d956e81

Download

Started: 2022-10-21, 15:30:04

Calls Colorize by Endpoint Technology

blocker-conn	SERVER
blocker-corr_id	TIMEOUT_APPL
blocker-instance	C7F9F2C5F5F1C5F...
blocker-lock_duration	commit
blocker-lock_flags	X'A0'
blocker-lock_state	exclusive
blocker-member	DBC1
blocker-owning_wor...X'005C009C0C519...	
blocker-plan_name	DISTSERV
blocker-primauth	SYSADM
blocker-stmt_id	X'00000000000000...
blocker-stmt_type	X'8000'
blocker-transact	QUERY_APPL
blocker-uow_type	HOLDER
blocker-ws_name	6fdde4b50d956e81...

Link from transaction trace to infrastructure

The screenshot displays the IBM Z Systems Center interface, divided into several sections:

- Top Panel:** Shows 'Analytics > Calls' with a '5 Calls' list on the left and a detailed 'Unspecified' call trace (Trace ID: 35ef2239282a27ff) on the right. The trace includes a 'Calls' tree and a timeline.
- Left Panel:** Displays system information for 'JA0:CICS1AAA', including Origin Node, System ID, Region Name, Version, and CICSplex Name.
- Center Panel:** Features a dashboard with various metrics: CPU Utilization (0), Storage Violations (0), Enqueue Waits (0), AIDS (0), ICES (6), and SOS (N). Below these are four line graphs: 'Transaction Rate', 'Maximum Tasks Percent', 'Rates' (CPU, IO, Page), and 'Performance' (Worst Region Performance Index, Queued Remote Requests).
- Right Panel:** A 'Details' pane for the selected call, showing metadata like span.n, span.ec, span.kind, Type, Category, Host, Request Path, Method, and CICS Attributes (User ID, Task Number, Region).
- Bottom Panel:** A red box highlights the 'Infrastructure JA0:CICS1AAA' link, with a large red arrow pointing from it towards the center dashboard.

When there are issues, integrate with your existing platforms to notify the team or remediate the problem

Custom Dashboards



Alerting Integrations



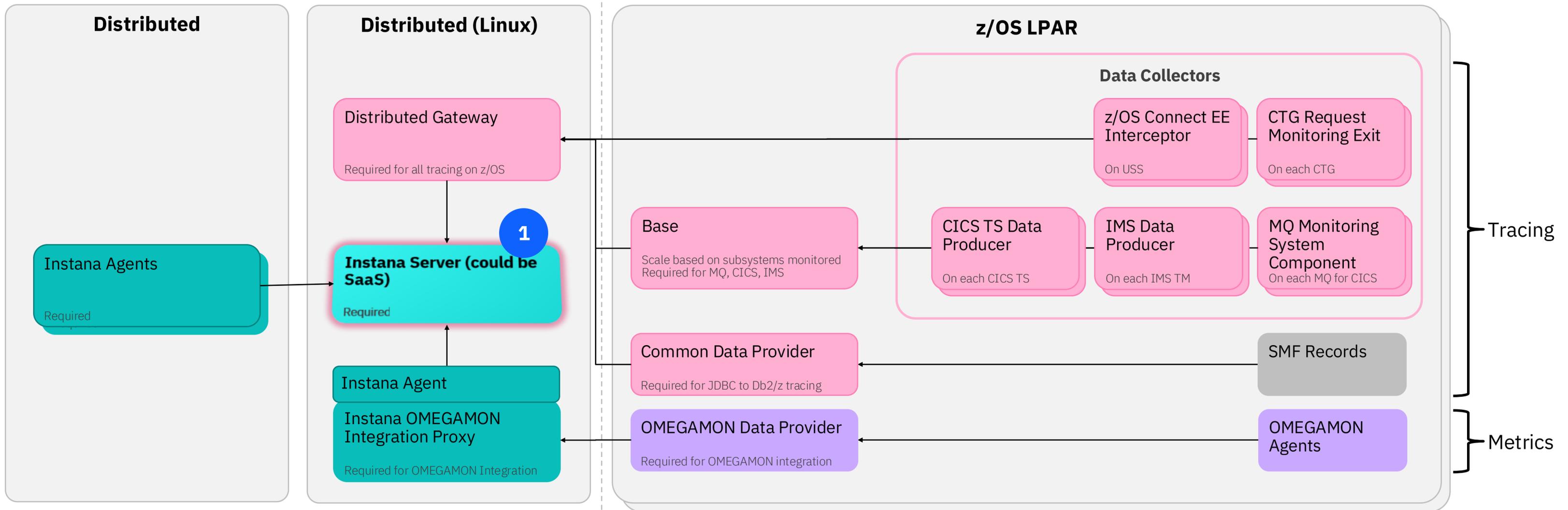
Events and Metrics



Logging Integrations



Instana Server



What is it?

- The backend server that consumes all telemetry data from all sources, including z/OS
- Stitches together tracing spans received from host agents on distributed platforms with related spans and metrics from z/OS for a cohesive end-to-end view

Is it Required? Where is it deployed?

Required: Yes, for all Instana on z/OS deployments

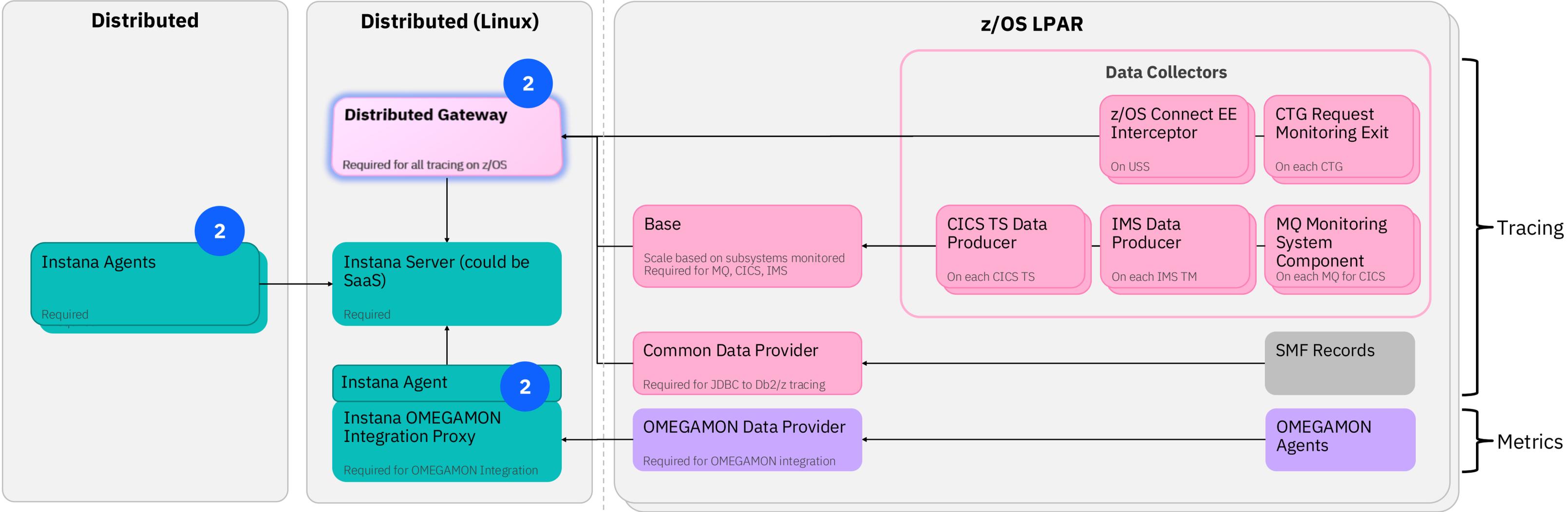
Deployment:

- SaaS based tenant/units are available to collect telemetry
- Can also be deployed for self-hosted scenarios on Linux (x86)
- [deployment of Instana self-hosted to zLinux is expected later in 2023]
- [Installing the Instana backend](#)

Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

Distributed Gateway



What is it?

- Bridge between the tracing components and the Instana Server
- Receives trace data from tracing components
- Formats the data into proper Instana tracing “spans”
- Sends spans to the Instana backend

Is it Required? Where is it deployed?

Required: Yes, for all Instana on z/OS deployments

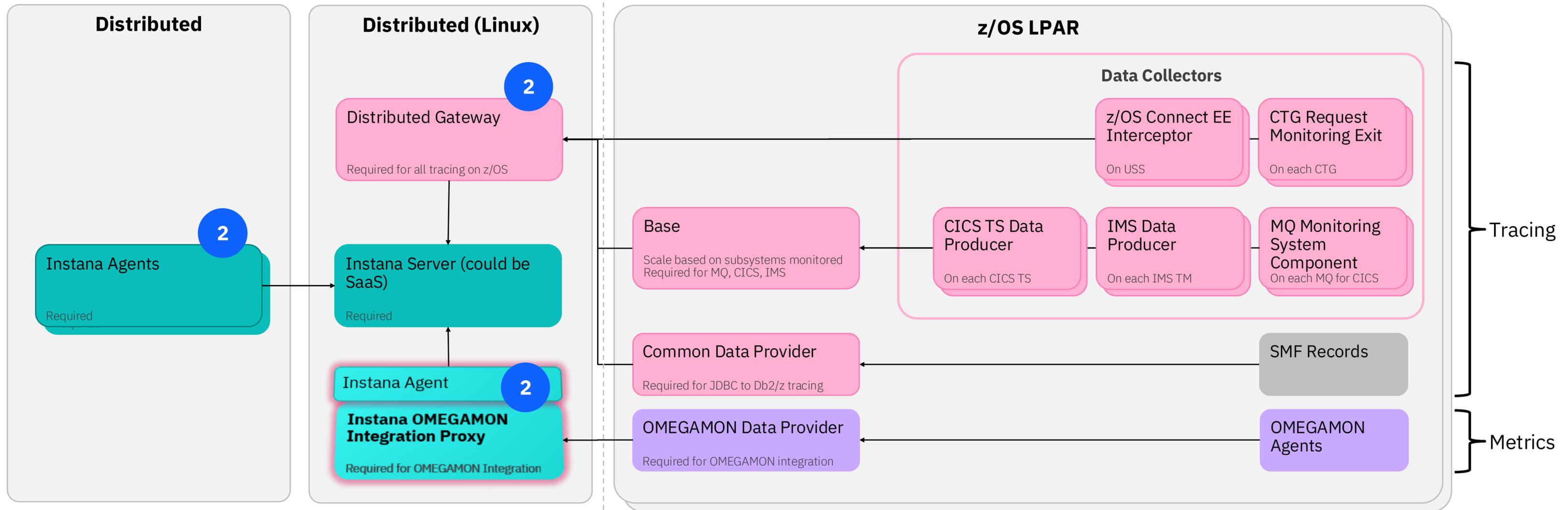
Deployment:

- On a Linux server – this offloads processing from z/OS
- Recommend a Kubernetes based deployment (like OpenShift) for scalability
- [Distributed Gateway installation prerequisites](#)
- [Deploying the Distributed Gateway](#)

Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

OMEGAMON Integration Proxy



What is it?

- Collects metric data from the OMEGAMON Data Provider
- Transforms it into a format that Instana can consume
- Sends metrics to a sensor in an Instana host agent named: `com.instana.plugin.ibmmapmproxy`
- The Instana host agent then sends the payloads to the Instana server where entities are created and metrics saved.

Is it Required? Where is it deployed?

Required: Only if planning to integrate OMEGAMON metrics within Instana. OMEGAMON is not a pre-req for transaction tracing.

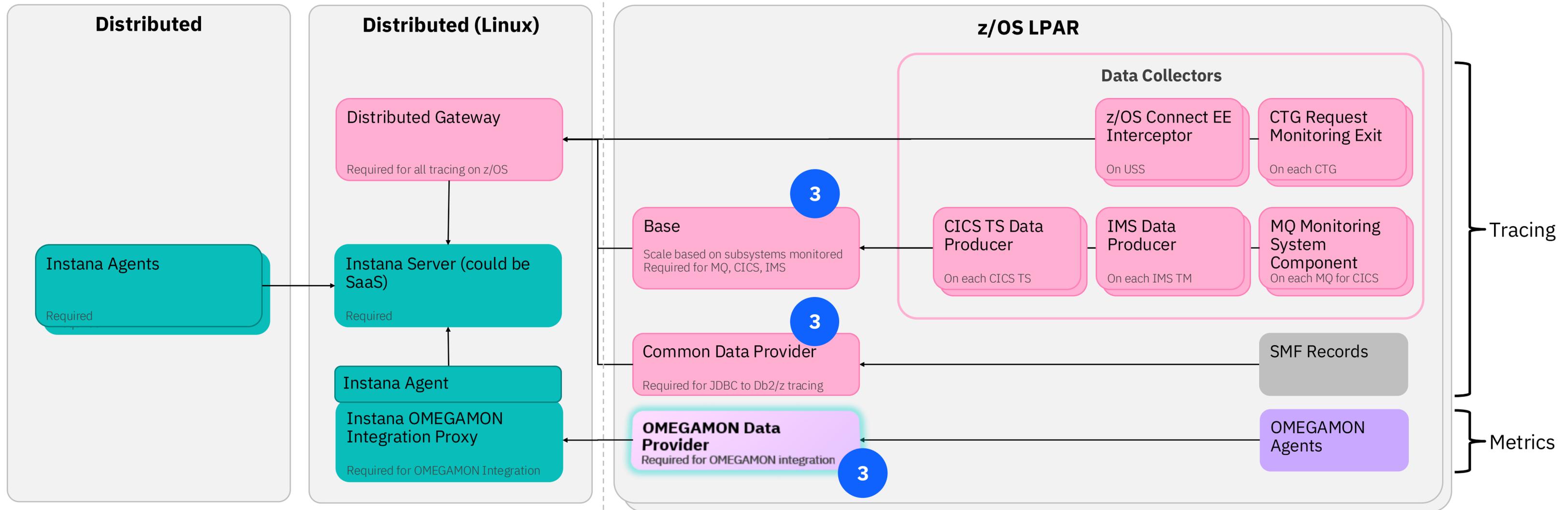
Deployment:

- The proxy is downloaded from Instana's GitHub repository (<https://github.com/instana/ibm-monitoring-integration>) and is deployed into a Kubernetes or OpenShift cluster
- [OMEGAMON Integration Proxy Prerequisites](#)
- [Integrating with OMEGAMON](#)

Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

OMEGAMON Data Provider



What is it?

- Streams selected metrics for key z/OS subsystems that OMEGAMON is collecting – selected to compliment Instana’s transacting tracing
- Metrics are streamed simultaneous to OMEGAMON and Instana’s Server

Is it Required? Where is it deployed?

Required: Only if planning to integrate OMEGAMON metrics within Instana. OMEGAMON is not a pre-req for transaction tracing.

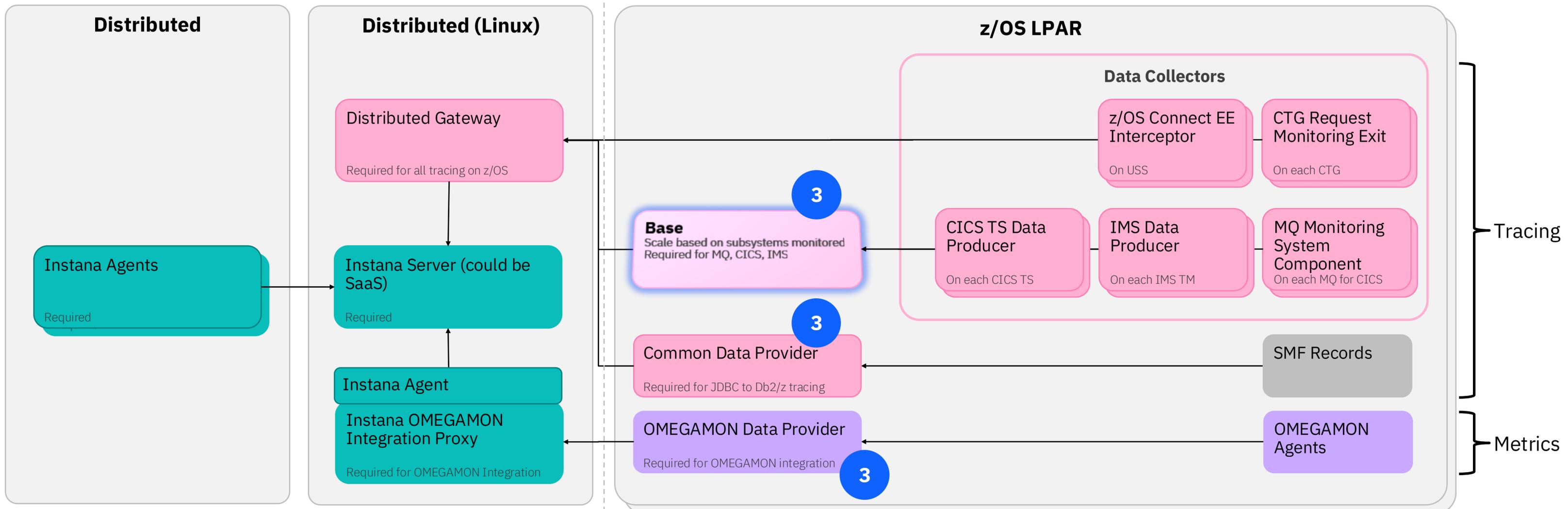
Deployment:

- Each LPAR to get data from OMEGAMON agents running on that LPAR
- A YAML file related to OMEGAMON’s Data Connect Process specifies which attributes will be streamed to Instana
- [OMEGAMON Data Provider Prerequisites](#)
- [Integrating Instana with OMEGAMON Data Provider](#)

Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

Base



What is it?

- Receives trace data from potentially high-volume subsystems like CICS, IMS, and MQ
- Internal architecture made up of “couriers” – number of couriers can be increased to handle more volume
- Is a z/OS “Started Task”

Is it Required? Where is it deployed?

Required:

- Yes – when tracing CICS, IMS or MQ
- No – when tracing distributed calls via JDBC into Db2 on z/OS

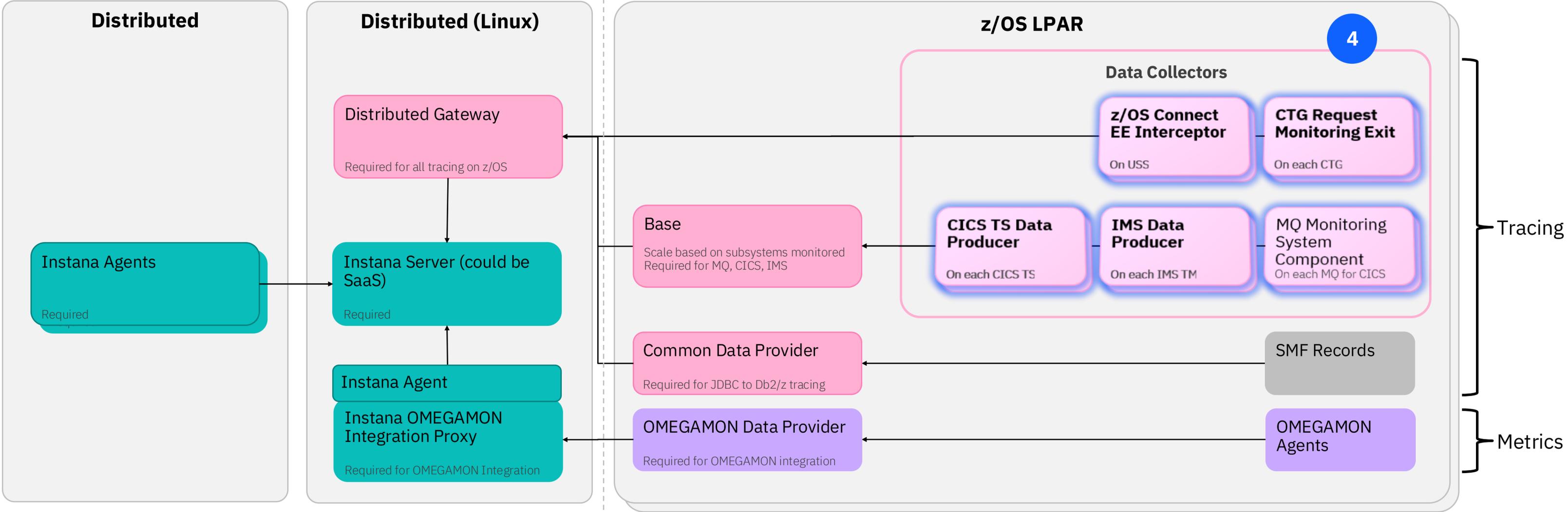
Deployment:

- To each LPAR where a CICS or IMS Data Collector is being used
- For high volume environments, multiple Bases may be started
- [Instana on z/OS Base prerequisites](#)
- [Installing Instana on z/OS Base](#)

Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

Data Collectors



What is it?

- Data Collectors gather trace data for all calls through the various z/OS subsystems supported
- Minimal data is captured for each call
- Data is sent to the DG for processing into Instana Spans

Is it Required? Where is it deployed?

Required:

- Yes – when tracing calls into CICS, IMS, or MQ via z/OS Connect or CTG
- No – when tracing distributed calls via JDBC into Db2 on z/OS

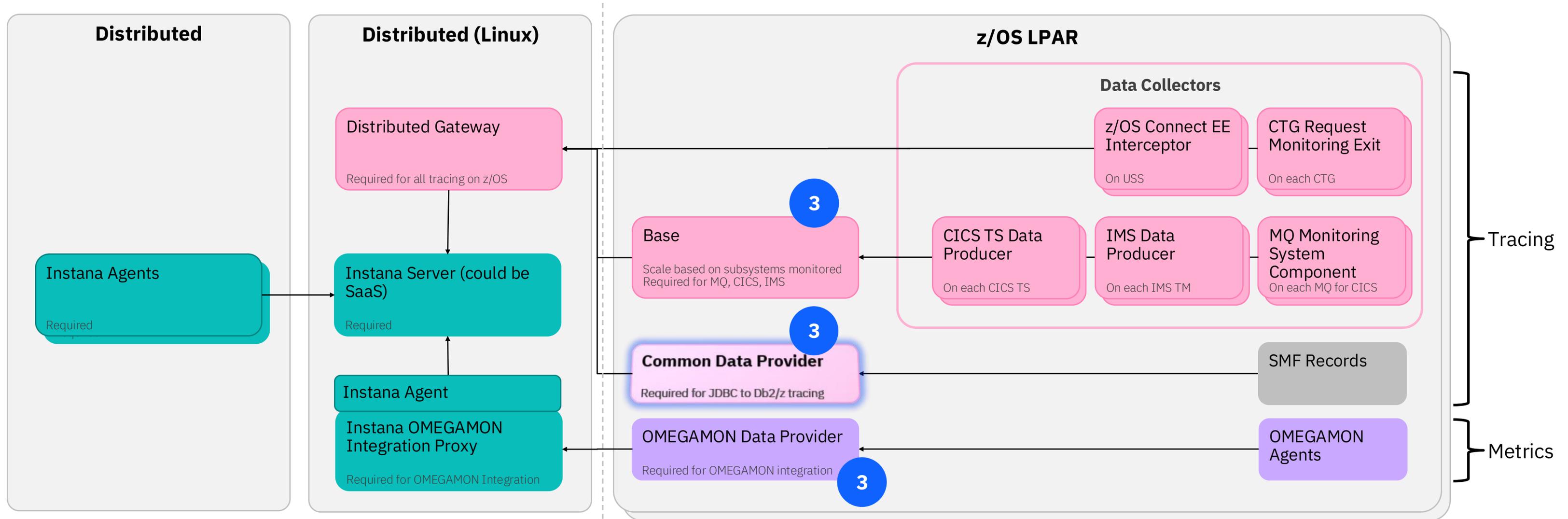
Deployment:

- In z/OS LPAR's, into the subsystems being observed
- One data collector will be deployed to each environment
- Prereqs: [CICS](#); [IMS](#); [z/OS Connect](#); [CTG 1](#); [CTG 2](#)
- Install: [CICS](#); [IMS](#); [MQ](#); [z/OS Connect](#); [CTG](#)

Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

Common Data Provider



What is it?

- Accesses operational data from z/OS systems stored in SMF
 - SMF records have Instana's trace context for filtering
- Collects, formats and filters transaction data related to JDBC requests to Db2 on z/OS
 - Performance metrics for SQL calls
 - Db2 timeouts and Db2 deadlocks
- Sends the filtered SMF data to the Distributed Gateway

Is it Required? Where is it deployed?

Required: Only when tracing distributed calls via JDBC into Db2 on z/OS

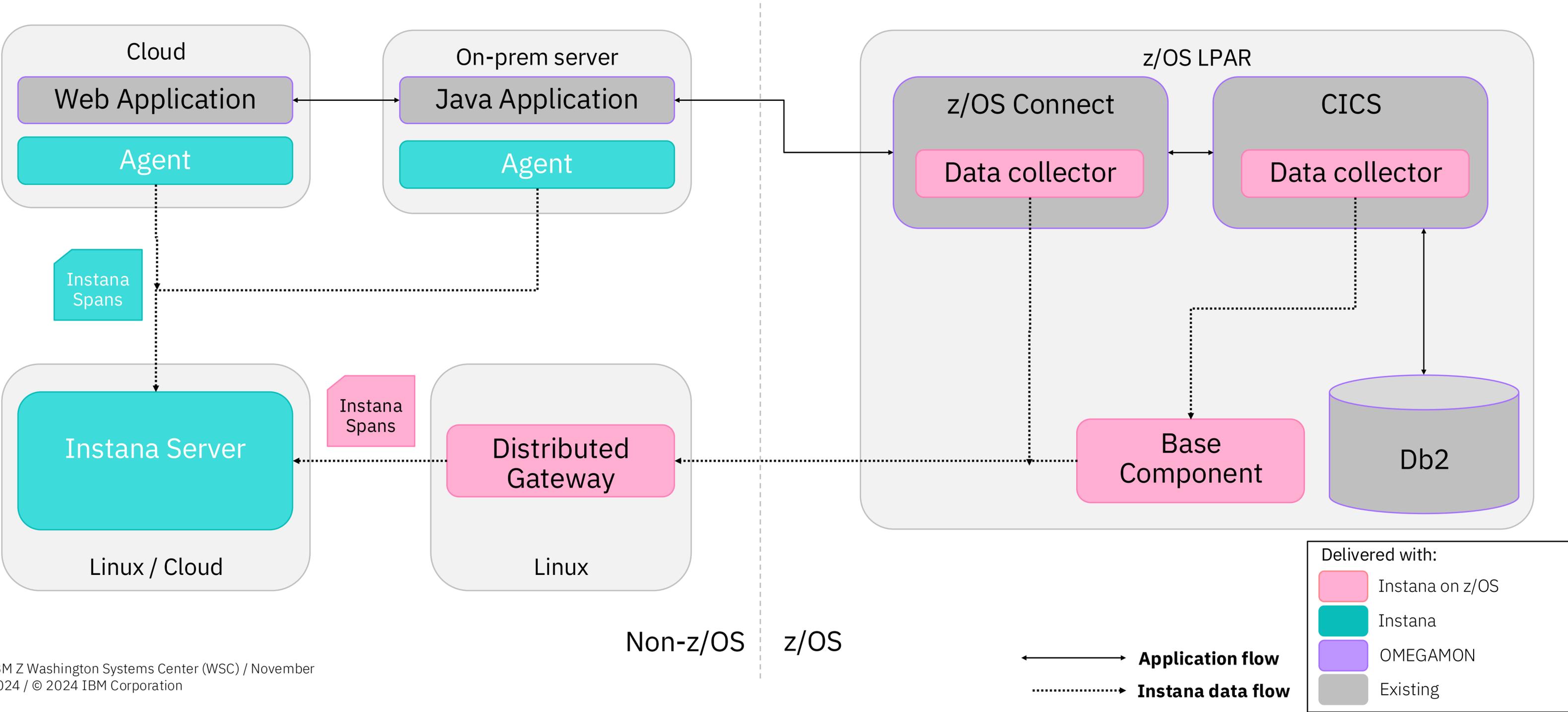
Deployment:

- In each LPAR where SMF 101/102 records will be needed to help provide details on Db2 on z/OS traces
- Already deployed CDP may be leveraged
- [Common Data Provider prerequisites](#)
- [Deploying Common Data Provider](#)
- [APAR/PTF requirements; Db2 for z/OS prerequisite](#)

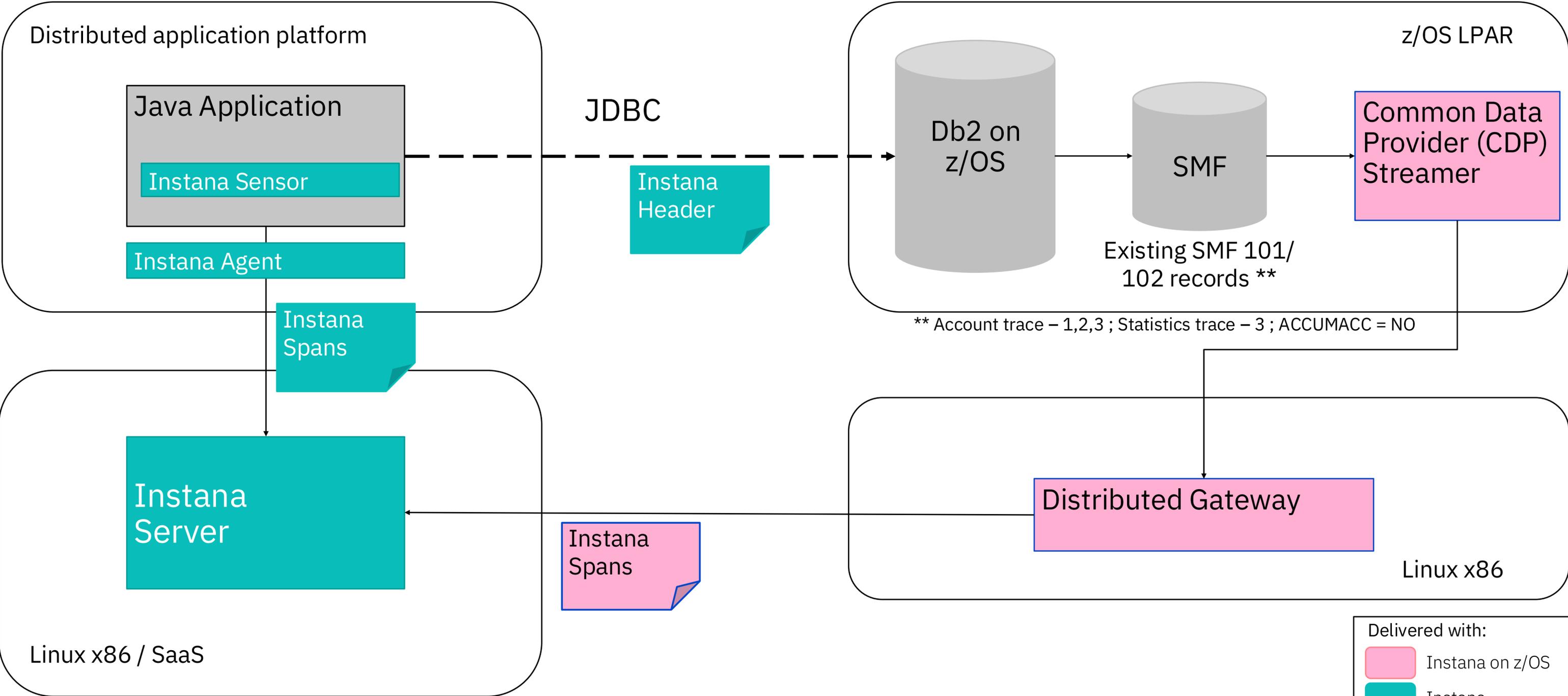
Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

Example Instana on z/OS flow for tracing



Flow for Db2 on z/OS via JDBC tracing



Delivered with:

- Instana on z/OS
- Instana
- OMEGAMON
- Existing

Instana + OMEGAMON flow

