

IBM Z AIOps Lab Series 2020

Z APM Connect Hands-on Lab Guide

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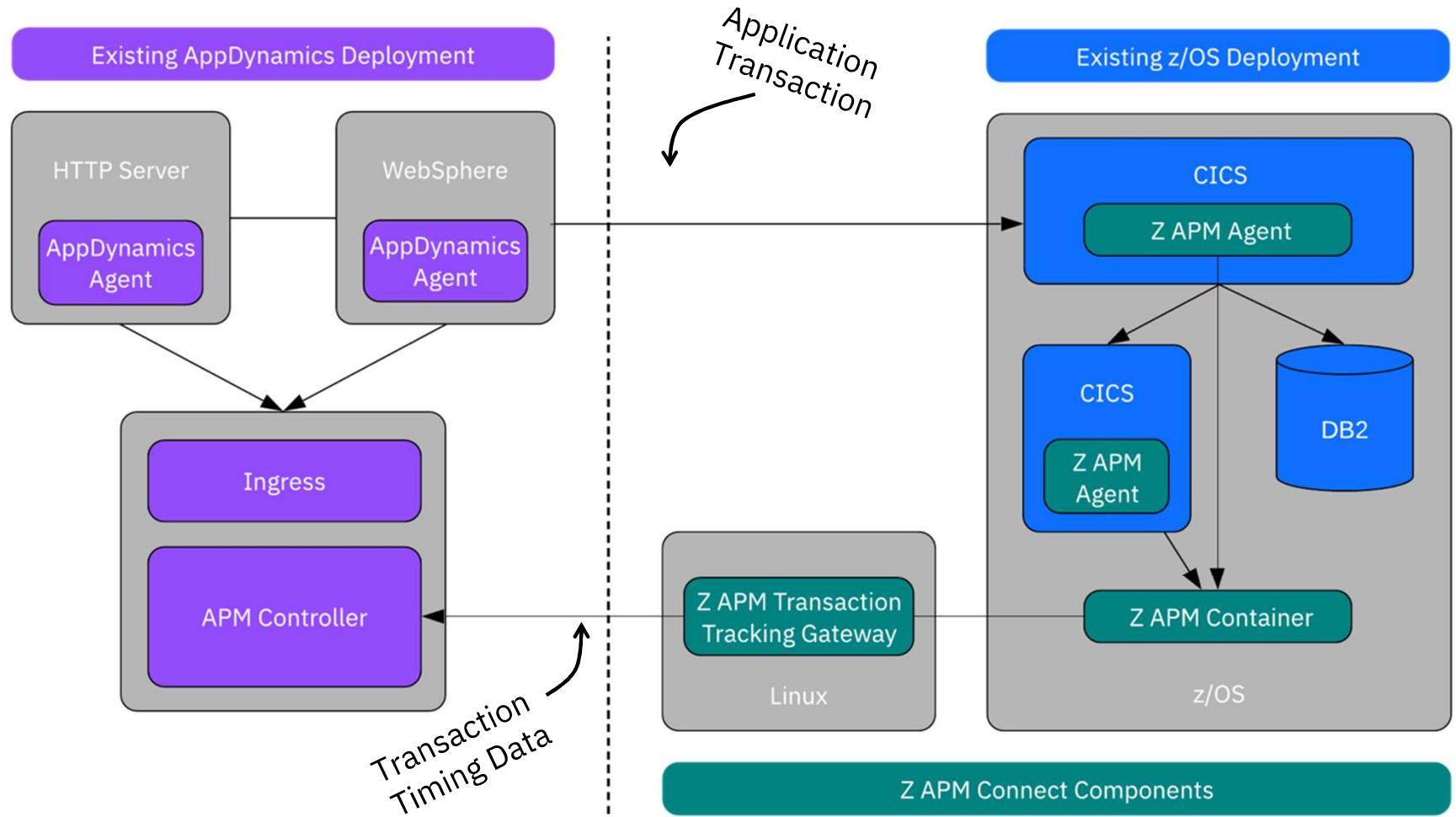
Session Objective

- Learn how **IBM Z APM Connect** extends mainframe transactional response time to enable AppDynamics APM with enterprise application flow visibility.
- Explore end-to-end Application Performance Monitoring via AppDynamics APM **transaction tracking features** across the platforms.

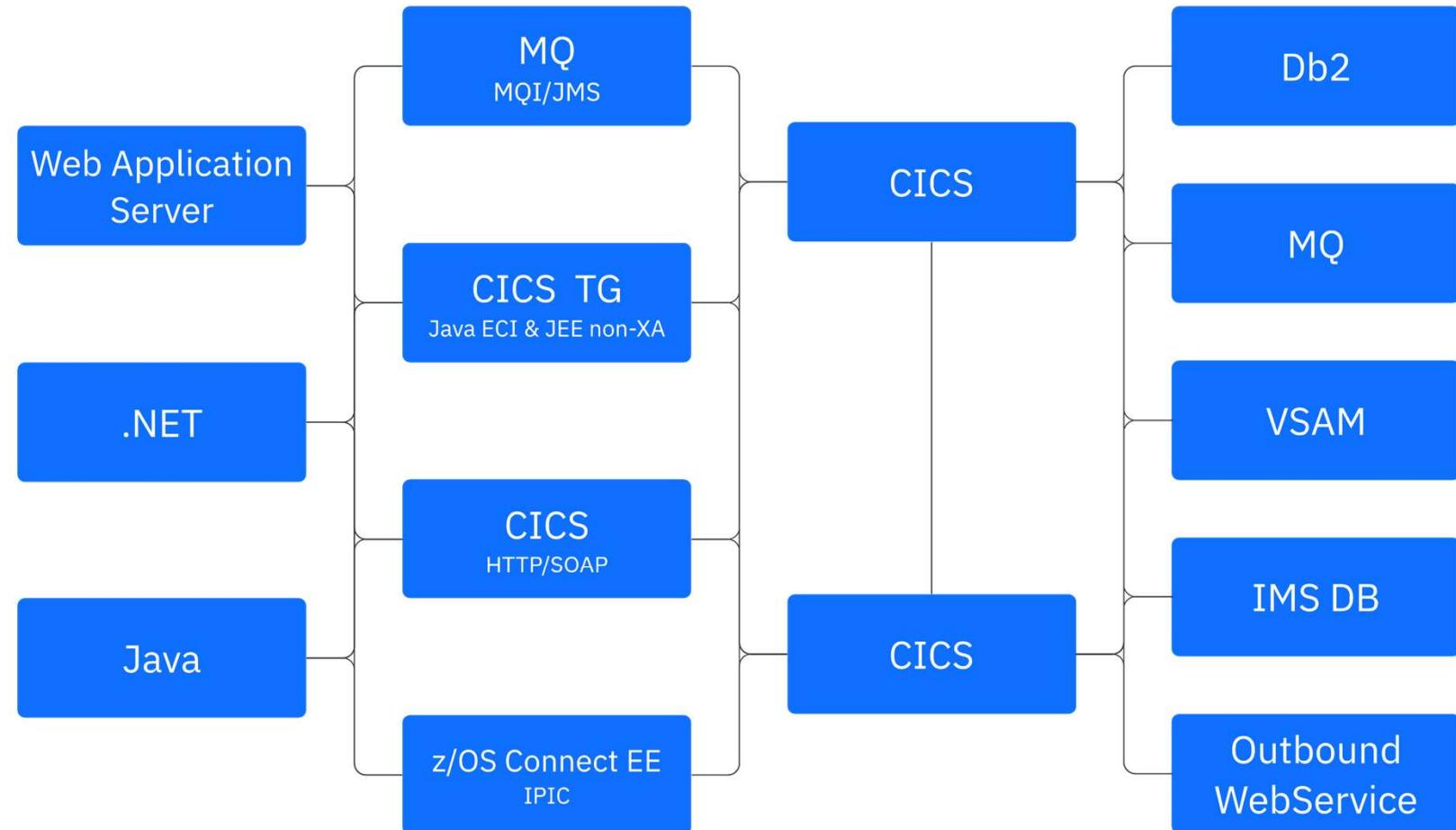
IBM Z APM Connect + AppDynamics APM

Introduction

APM for a Hybrid Application

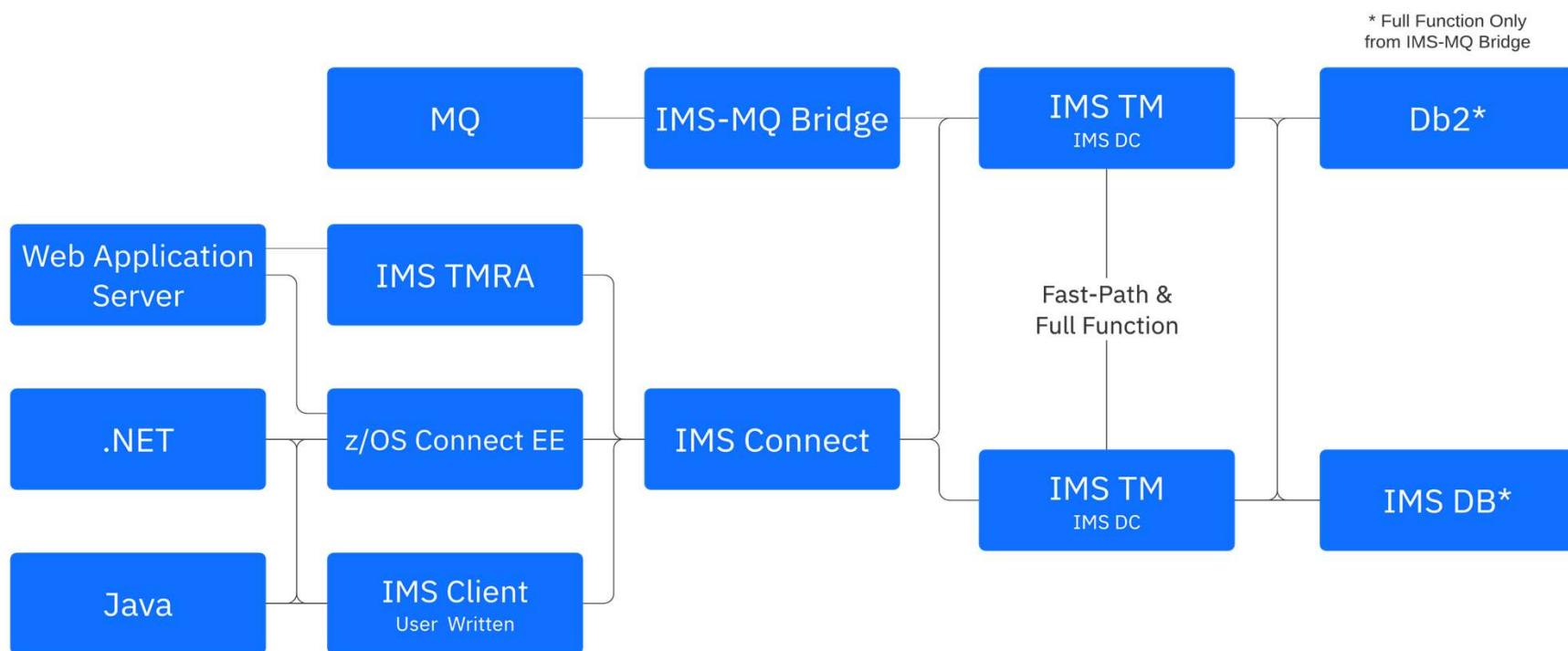


Flows Supported for CICS Customers



Flows Supported for IMS Customers

NEW



Lab System Notes

- Notice the following lab exercises are hosted on live AppDynamics and z/OS lab systems.
- The product usage flow and screen panels are identical to the software product design interfaces, though the drill down result data (such as performance statistic numbers) could be different because you are examining the live demo systems.

Acknowledgement: Special thanks to IBM development architect Aaron Young for his design and consultation for this Z APM Connect Lab application workload.

Table of Contents

- ❑ Exercise 1: Login
- ❑ Exercise 2: Application Flow Map
- ❑ Exercise 3: Business Transaction
- ❑ Exercise 4: Troubleshoot – slow response time, errors, DB calls
- ❑ Exercise 5: Transaction Score, Transaction Snapshot, etc.
- ❑ Exercise 6: Walk through a CICS-Db2 application scenario
- ❑ Exercise 7: Navigating to the error code & slowest DB calls

Exercise 1: Login

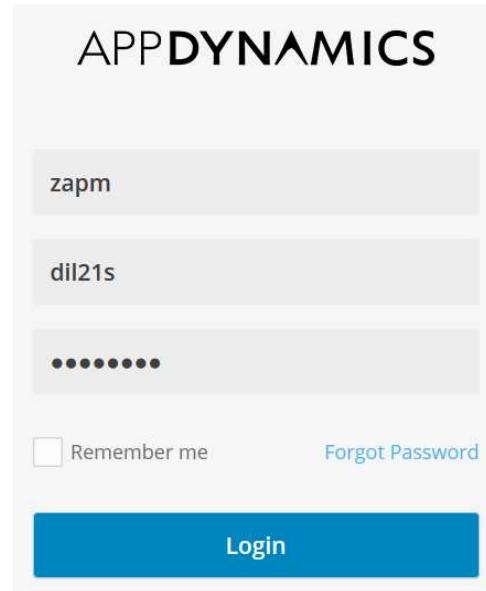
Login to AppDynamics Controller

Enter URL and user id / password (provided by the instructor)

Account: zapm

User name: dil21s

Password:



___ You are now Landing on the Home page – “Home” tab

There are many applications dynamically discovered by the AppDynamics. Look at the center “Applications” area, you are going to examine the application flow name “Inventory”.

___ Click on the “Applications” heading, it will take you to the Application Main Menu.

The screenshot shows the AppDynamics Home page. At the top, there is a navigation bar with tabs: APP DYNAMICS, Home (which is highlighted with a red box), Applications, User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. Below the navigation bar, there are several sections: "Recently Visited" (with links like Alert & Respond, Slow Response Times - Slow Transactions, Troubleshoot, More, Inventory - Dashboard, DEMOAPPS - Dashboard, GENAPP - Dashboard, and /Place Order Events), "Applications 18" (with a status bar showing 0 unknown, 0 critical, 1 warning, 17 normal, and a list of applications: DEMOAPPS, dotNET3, faststart-team1, faststart-team2, GENAPP, ICTTest, IMSForL2, and Inventory, where Inventory is highlighted with a yellow box), "User Experience" (with Browser Apps 1: daytrader), "Mobile Apps 0", "Databases 0" (No Databases), "Servers 0" (No Servers), and "Analytics". On the right side, there is a search bar with "last 1 hour" selected and a help icon.

_____ Landing on Application Overview Page

_____ Fly the mouse over the “View” action with three icons: Card View, Grid View, or Flow View

_____ Select the application “Inventory” and double click on “Inventory”.

The screenshot shows the AppDynamics Application Overview Page. At the top, there's a navigation bar with links: Home, Applications (which is the active tab, highlighted with a red box), User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. Below the navigation bar is a search bar and a gear icon. The main area is titled "Applications" and displays a grid of 18 application cards. Each card shows basic performance metrics: Response Time (ms), Calls, and Calls / min. The first card, "Inventory", has a red exclamation mark icon and is highlighted with a red border. A large red arrow points to the "View" icon in the toolbar above the grid. A yellow box highlights the "View" icon in the toolbar. The grid contains the following data:

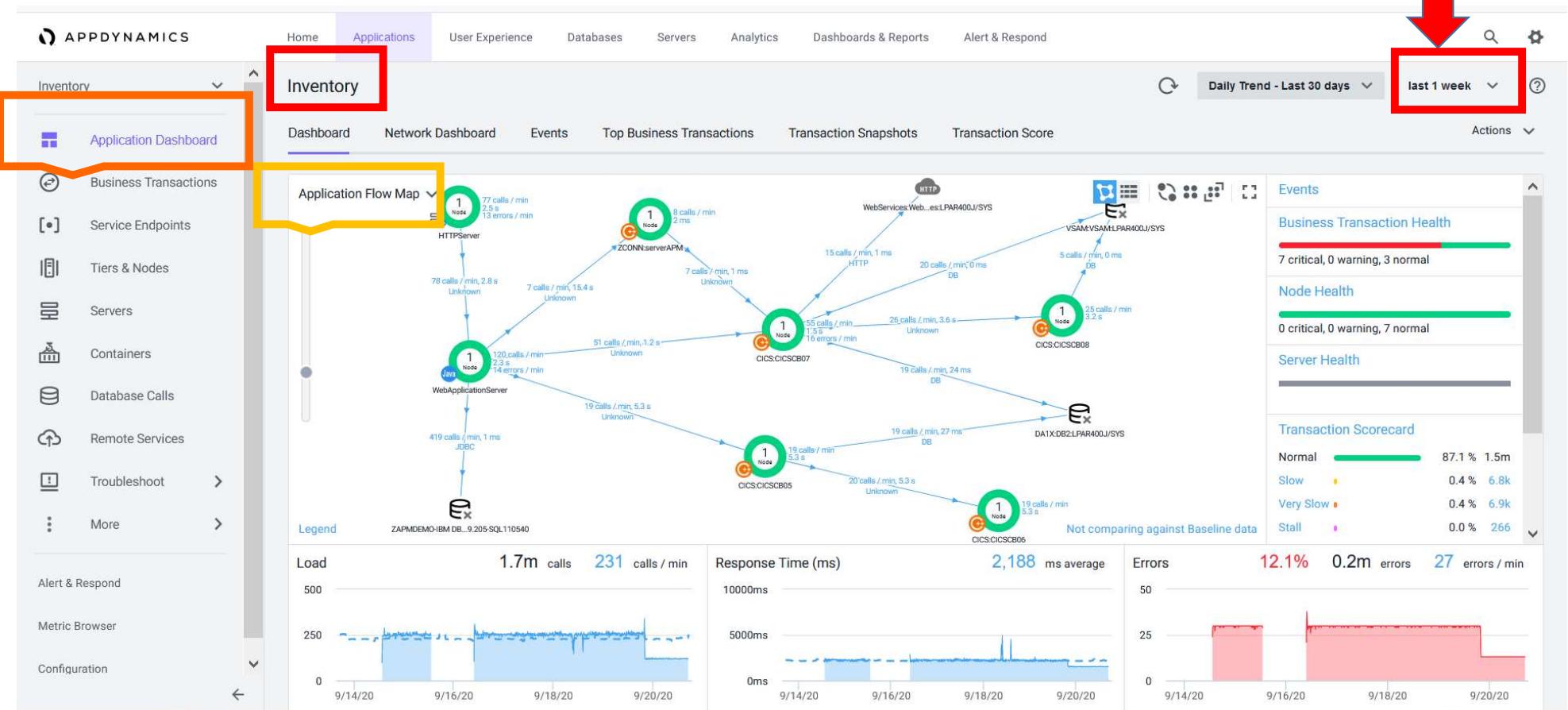
Application	Response Time (ms)	Calls	Calls / min
Inventory >	5.04k ms	1.97k	140
	Response Time (ms)	Calls	Calls / min
	21.0 %	413	30
	Error %	Errors	Errors / min
OnlineRetail-MPL >	47 ms	726	121
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
DEMOAPPS >	2 ms	1.06k	76
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
OnlineRetailAtMPL >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
NO_JMS_MQ >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
IMSForL2 >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
faststart-team2 >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
faststart-team1 >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
GENAPP >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
zOS Connect >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
ICTTest >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
multi_dotNET >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
dotNET3 >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
TT-FP3 >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
WASapp >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min
LGI_APPLICATION_USER1 >	0 ms	0	0
	Response Time (ms)	Calls	Calls / min
	0.0 %	0	0
	Error %	Errors	Errors / min

Exercise 2: Application Flow Map

— Landing at the “Inventory” Application

— Override the time range to “last 1 week” (or to “last 3 days”) to retrieve more sample data

— Default main page is “Application Flow Map”



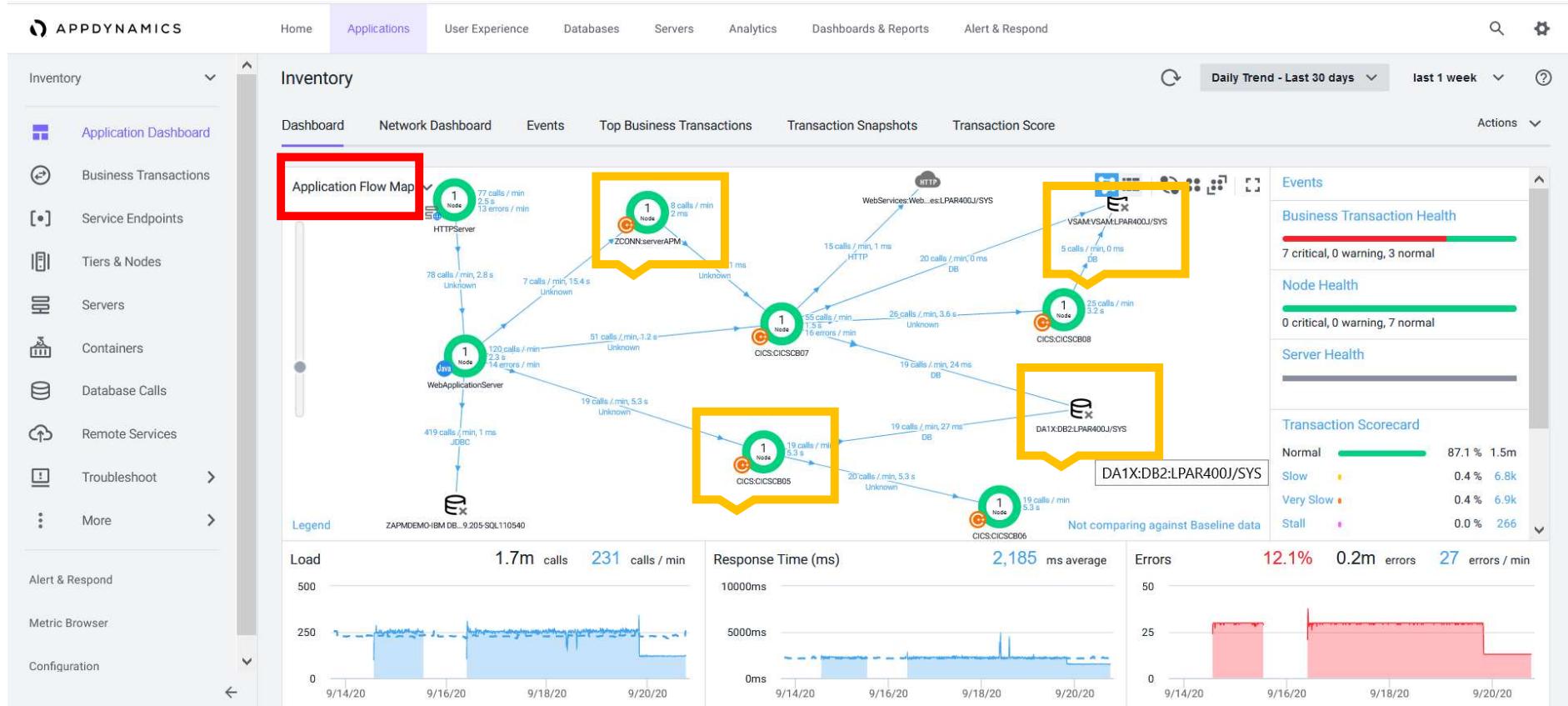
- Left side – Main Menu options
- Center - Dashboard Features
- Right side – Actions -> Events KPI
- Bottom – Trending – Load, Response Time, Errors



___ Can you find the touch points on mainframe?

___ CICS; ___ Db2; ___ VSAM; ___ z/OS Connect EE

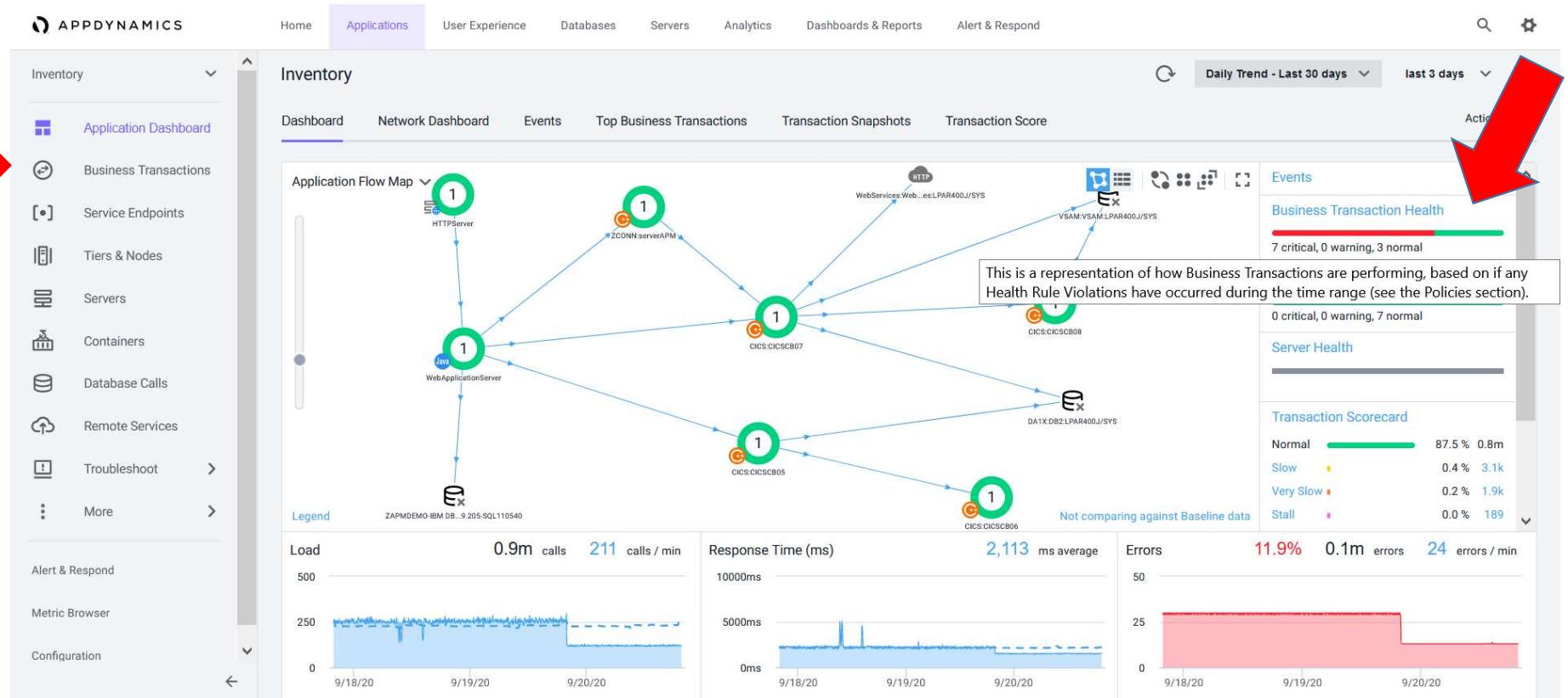
___ Fly the mouse over to each circle to see live metrics flowing to each end point



Exercise 3: Business Transactions

- AppDynamics employs the concept of “Business Transaction” (BT). A BT represents a service provided by your application that is invoked by the user. All involved subsystems and backends for a given BT are tracked and reported by AppDynamics.
- BTs are automatically discovered, and you can define your own BTs as well.

— Let's look at the **Business Transaction Health**
— or you can zoom in from the left side bar "Business Transactions"



Look at the **business transactions** → it displays a list of business logic service names in detail

Select “last 3 days”

The screenshot shows the AppDynamics interface. The left sidebar has a red box around the 'Business Transactions' link. A red arrow points from this link to the 'Business Transactions' section in the main content area, which is also highlighted with a red box. In the main content area, there is a table with various columns: Name, Health, Response Time (ms), Max Response Time (ms), Min Response Time (ms), Calls / min, Errors / min, % Errors, % Slow Transactions, % Very Slow Transactions, % Stalled Transactions, CPU Used (ms), and Wait Time (ms). The table lists several transaction names with their respective metrics. A yellow arrow points down to the 'last 3 days' filter in the top right corner of the main content area.

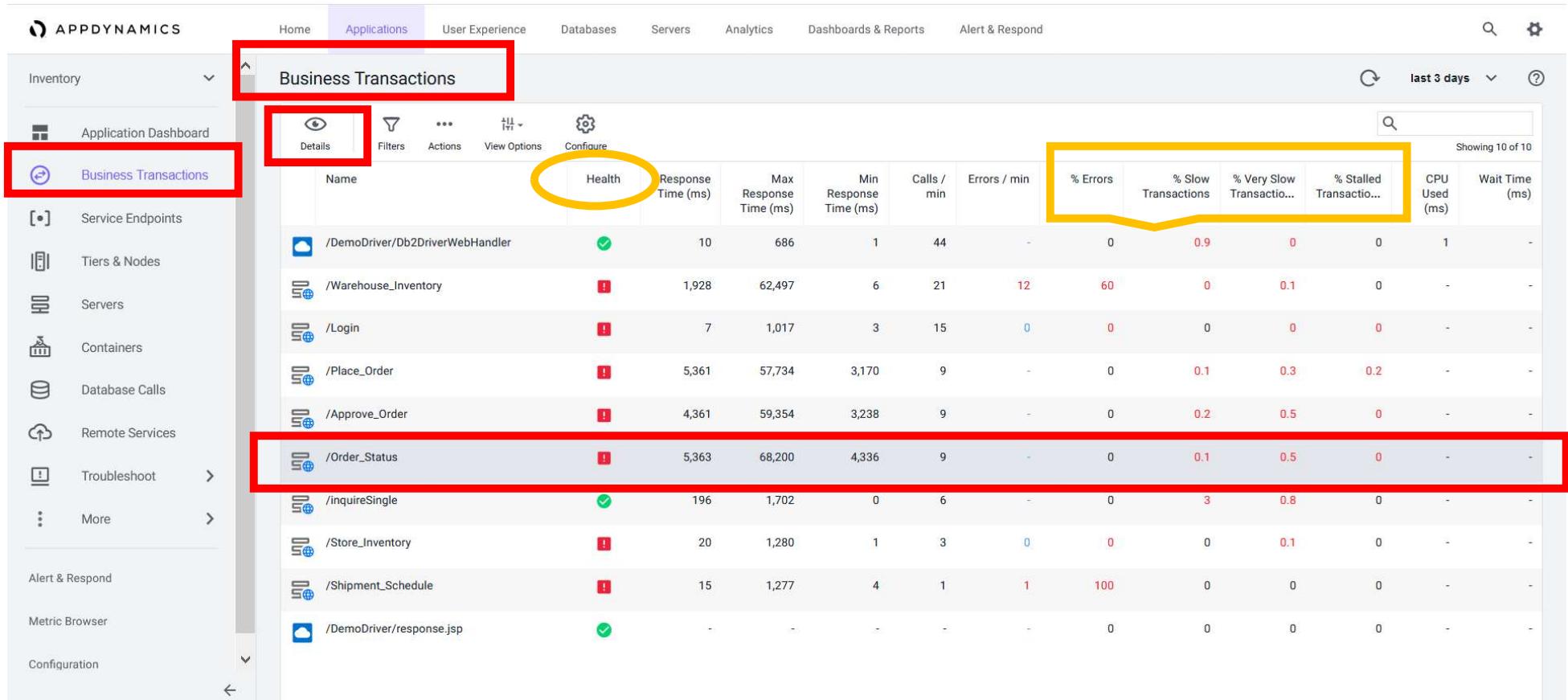
Name	Health	Response Time (ms)	Max Response Time (ms)	Min Response Time (ms)	Calls / min	Errors / min	% Errors	% Slow Transactions	% Very Slow Transactions	% Stalled Transactions	CPU Used (ms)	Wait Time (ms)
/DemoDriver/Db2DriverWebHandler	Green	10	686	1	44	-	0	0.9	0	0	1	-
/Warehouse_Inventory	Yellow	1,928	62,497	6	21	12	60	0	0.1	0	-	-
/Login	Yellow	7	1,017	3	15	0	0	0	0	0	-	-
/Place_Order	Yellow	5,361	57,734	3,170	9	-	0	0.1	0.3	0.2	-	-
/Approve_Order	Yellow	4,361	59,354	3,238	9	-	0	0.2	0.5	0	-	-
/Order_Status	Yellow	5,363	68,200	4,336	9	-	0	0.1	0.5	0	-	-
/inquireSingle	Green	196	1,702	0	6	-	0	3	0.8	0	-	-
/Store_Inventory	Yellow	20	1,280	1	3	0	0	0	0.1	0	-	-

- ___ Business Transaction overview gives **health** status, **response time**, **% errors**, **% Slow Transactions**
- ___ Adjust the column header width to display “**Health**” indicator
- ___ Select the service name “**/Order_Status**”, fly the mouse over to the “**Health** indicator”, red color shows critical violations.

The screenshot shows the AppDynamics Business Transactions dashboard. The left sidebar lists navigation options like Inventory, Application Dashboard, Service Endpoints, Tiers & Nodes, Servers, Containers, Database Calls, Remote Services, Troubleshoot, More, Alert & Respond, Metric Browser, and Configuration. The main area has tabs for Home, Applications (selected), User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. A search bar and settings gear are at the top right. The Applications tab shows a 'Business Transactions' section with a red box around it. Below is a table with columns: Name, Health, Response Time (ms), Max Response Time (ms), Min Response Time (ms), Calls / min, Errors / min, % Errors, % Slow Transactions, % Very Slow Transaction, % Stalled Transaction, CPU Used (ms), and Wait Time (ms). A yellow circle highlights the 'Health' column header. A blue arrow points from the 'Health' column to the '% Errors' row for the '/Order_Status' transaction, which has a red exclamation mark icon. A tooltip box appears over this row with the text: "There are Critical Health Rule Violations for this Business Transaction in the time range. Click for more details." The '/Order_Status' row is also highlighted with a red box. The table shows 10 transactions in total, with the last one being '/DemoDriver/response.jsp'.

Name	Health	Response Time (ms)	Max Response Time (ms)	Min Response Time (ms)	Calls / min	Errors / min	% Errors	% Slow Transactions	% Very Slow Transaction	% Stalled Transaction	CPU Used (ms)	Wait Time (ms)
/DemoDriver/Db2DriverWebHandler	Green checkmark	10	686	1	44	-	0	0.9	0	0	1	-
/Warehouse_Inventory	Red exclamation mark	1,928	62,497	6	21	12	60	0	0.1	0	-	-
/Login	Red exclamation mark	7	1,017	3	15	0	0	0	0	0	-	-
/Place_Order	Red exclamation mark	5,361	57,734	3,170	9	-	0	0.1	0.3	0.2	-	-
/Approve_Order	Red exclamation mark	4,361	59,354	3,238	9	-	0	0.2	0.5	0	-	-
/Order_Status	Red exclamation mark	5,363	68,200	4,336	9	-	0	0.1	0.5	0	-	-
/inquireSingle	Green checkmark	-	-	-	-	-	0.8	0	-	-	-	
/Store_Inventory	Green checkmark	-	-	-	-	-	0.1	0	-	-	-	
/Shipment_Schedule	Red exclamation mark	15	1,277	4	1	1	100	0	0	0	-	-
/DemoDriver/response.jsp	Green checkmark	-	-	-	-	-	0	0	0	0	-	-

- ___ Click once on a BT module name “**/Order_Status**” , it will bold “**Details**” option to let you drill down
 ___ Double click on “**/Order_Status**” to view **Detail** to determine why response time was high

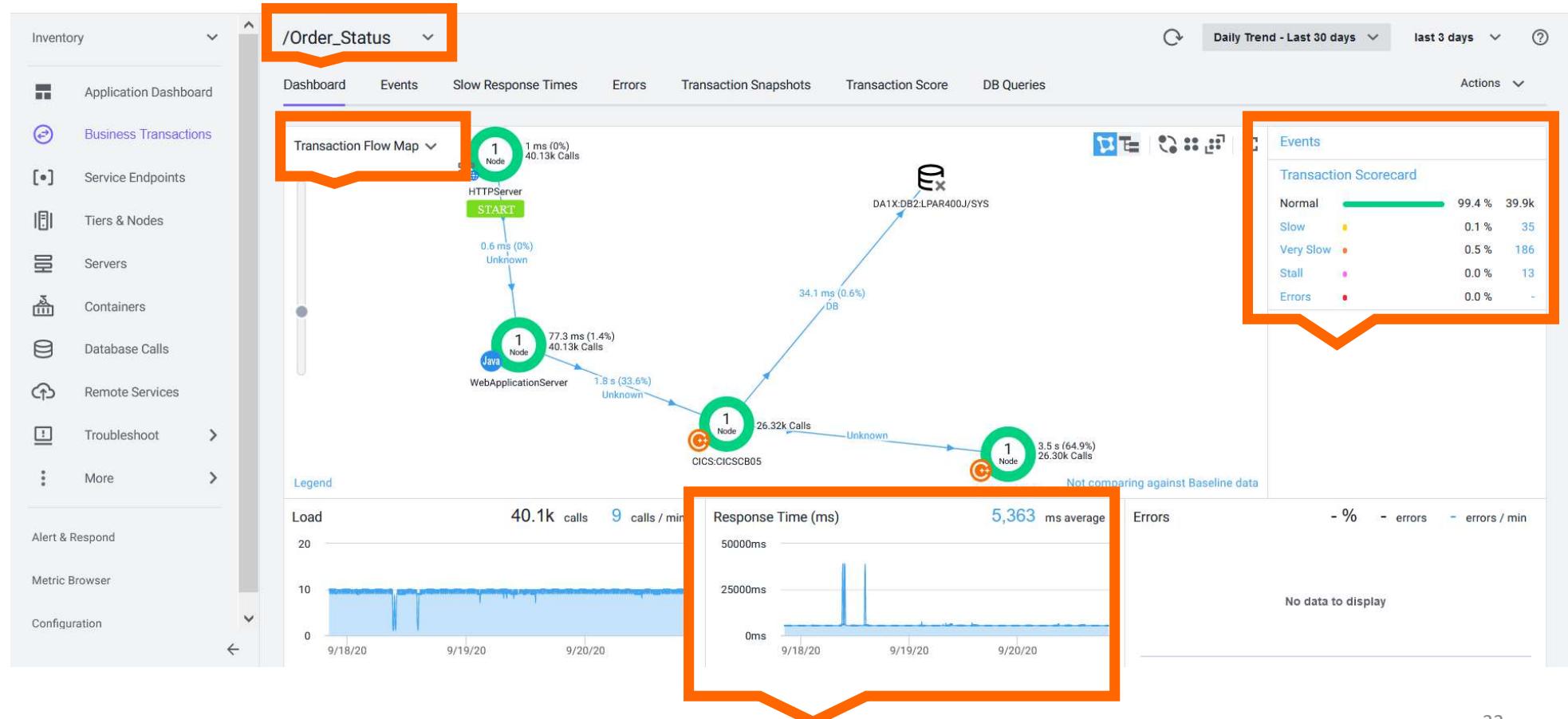


The screenshot shows the AppDynamics Business Transactions dashboard. The left sidebar lists categories like Inventory, Applications, User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. The Applications section is selected, showing sub-options for Application Dashboard, Business Transactions, Service Endpoints, Tiers & Nodes, Servers, Containers, Database Calls, Remote Services, Troubleshoot, and More. The Business Transactions option is highlighted with a red box.

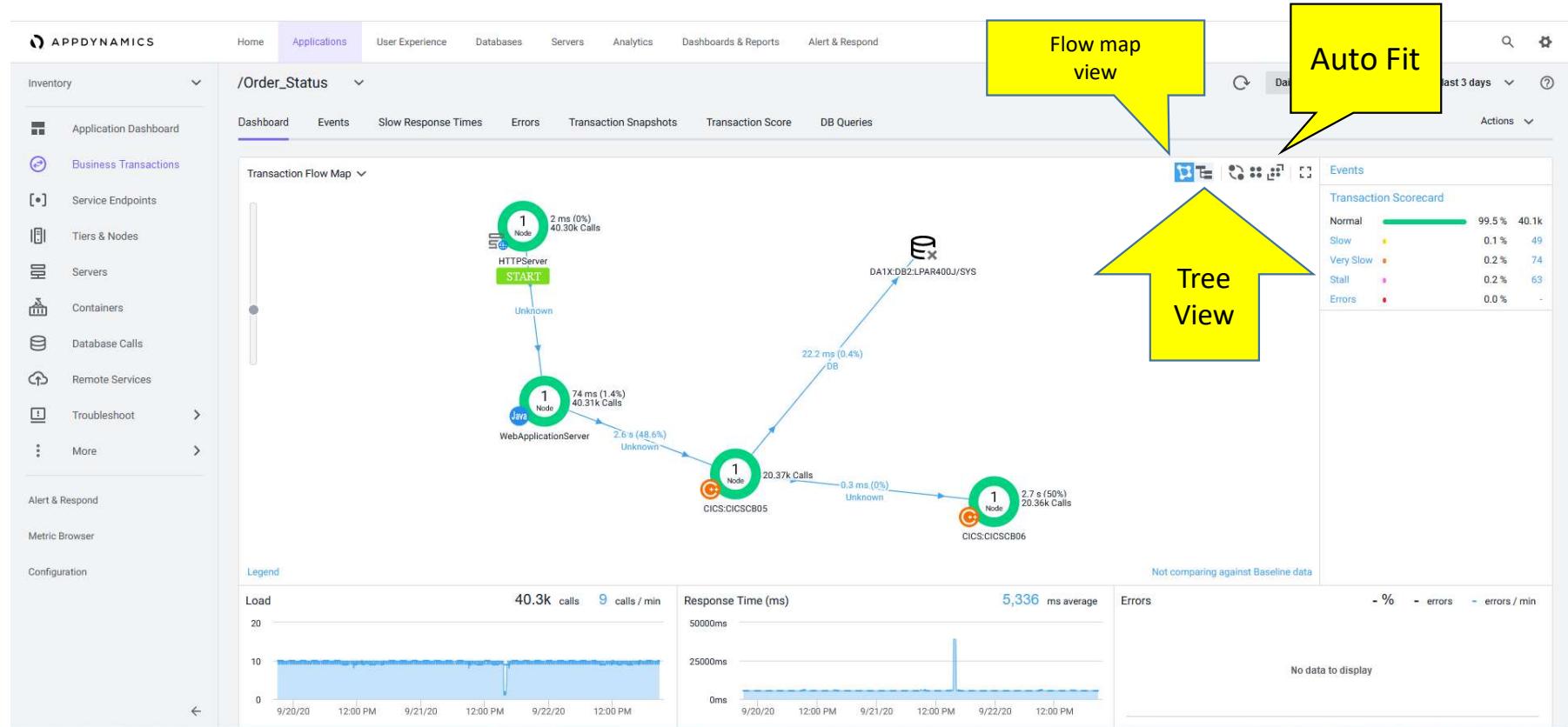
The main area displays a table of business transactions with the following columns: Name, Health, Response Time (ms), Max Response Time (ms), Min Response Time (ms), Calls / min, Errors / min, % Errors, % Slow Transactions, % Very Slow Transactions, % Stalled Transactions, CPU Used (ms), and Wait Time (ms). A yellow box highlights the first few columns and the error metrics. A red box highlights the entire row for the transaction named "/Order_Status".

Name	Health	Response Time (ms)	Max Response Time (ms)	Min Response Time (ms)	Calls / min	Errors / min	% Errors	% Slow Transactions	% Very Slow Transactions	% Stalled Transactions	CPU Used (ms)	Wait Time (ms)
/DemoDriver/Db2DriverWebHandler	Green	10	686	1	44	-	0	0.9	0	0	1	-
/Warehouse_Inventory	Yellow	1,928	62,497	6	21	12	60	0	0.1	0	-	-
/Login	Yellow	7	1,017	3	15	0	0	0	0	0	-	-
/Place_Order	Yellow	5,361	57,734	3,170	9	-	0	0.1	0.3	0.2	-	-
/Approve_Order	Yellow	4,361	59,354	3,238	9	-	0	0.2	0.5	0	-	-
/Order_Status	Yellow	5,363	68,200	4,336	9	-	0	0.1	0.5	0	-	-
/inquireSingle	Green	196	1,702	0	6	-	0	3	0.8	0	-	-
/Store_Inventory	Yellow	20	1,280	1	3	0	0	0	0.1	0	-	-
/Shipment_Schedule	Yellow	15	1,277	4	1	1	100	0	0	0	-	-
/DemoDriver/response.jsp	Green	-	-	-	-	-	0	0	0	0	-	-

- Now you are landing on **Transaction flow Map** gives a quick flow for “/Order_Status” application flow
- Look at the right side “**Transaction Scorecard**” to see any anomaly
- Look at the bottom “**Response Time**” to see any spike or abnormal trends

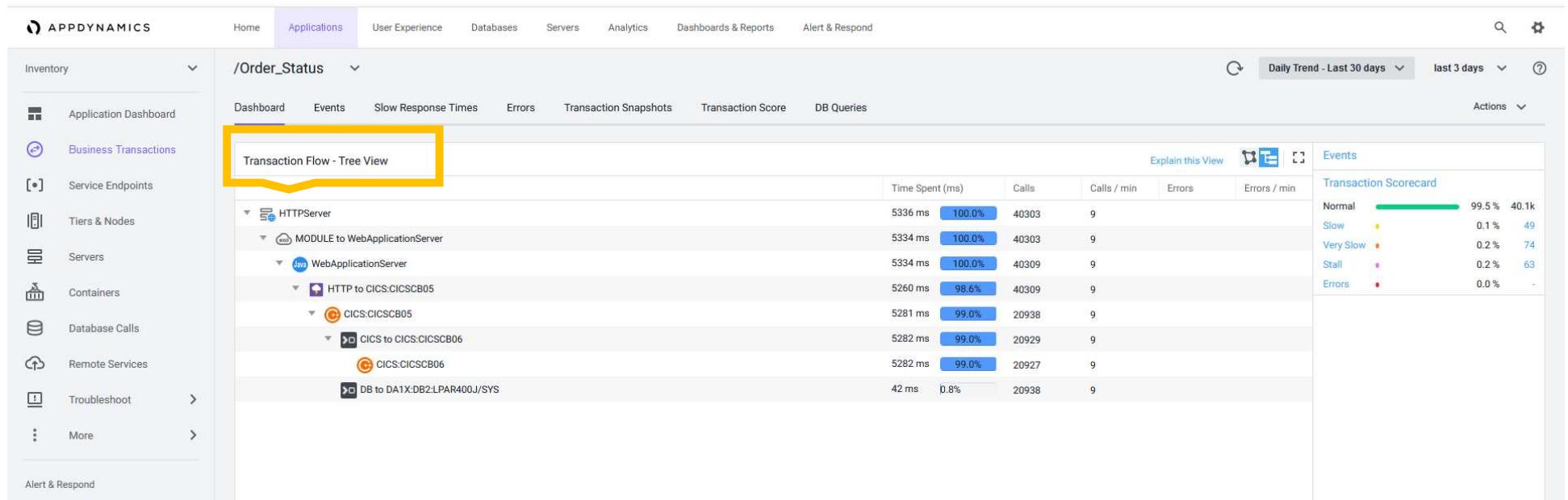


- Move your mouse over under each of those icons: Flow map, Tree view, to select Auto Fit option
- Transaction Flow Map** gives you the business application topology view
- If you click on the “**Tree View**”, it takes you to the cascading tree view of called modules in hierarchical chart



Tree View of a business logic service name “/Order_Status”

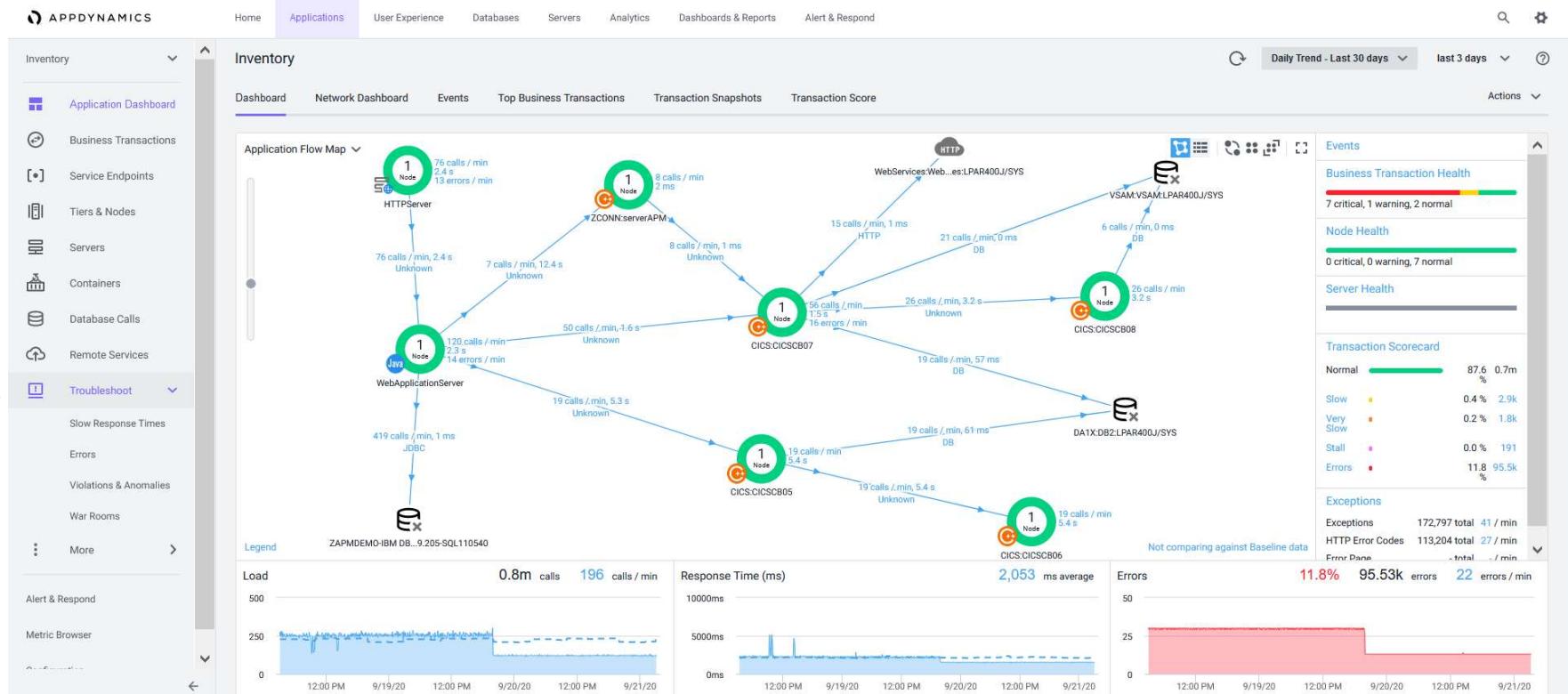
You can drill down by selecting any Tiers or Nodes from here. The user interface is quite flexible and logical paths are intuitive for problem isolation



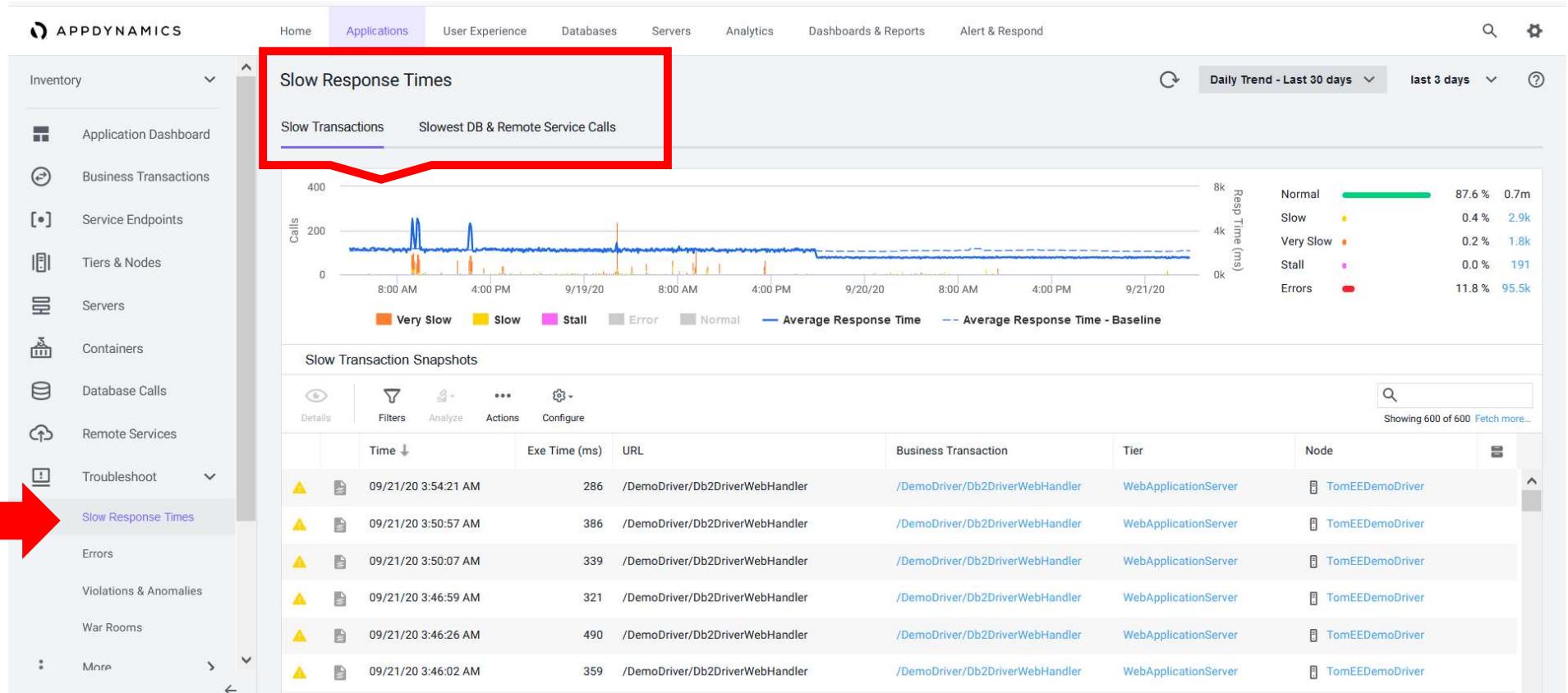
Exercise 4: Troubleshoot

- There are various navigation paths which can help identify slowest calls down to the application code level
- You can select options from the left side bar under Troubleshoot
 - Slow Response Times (breakdown at code level)
 - Errors (application return code)
 - Violations & Anomalies (with prescriptive suggestions)

Click on Left side bar - Troubleshoot option



Click on the left side “Troubleshoot -> Slow Response Times”



Click on the center “Slowest DB & Remote Service Calls”

The screenshot shows the AppDynamics interface with the 'Applications' tab selected. On the left, a sidebar menu under 'Inventory' includes 'Slow Response Times'. The main content area displays 'Slow Response Times' with a sub-section titled 'Slowest DB & Remote Service Calls'. This section is highlighted with a red box. A callout arrow points from the text 'Slowest DB & Remote Service Calls' to the red box. Below this, a table lists various calls with their details:

Call	Avg. Time per Call (ms)	Number of Calls	Max Time (ms)	Snapshots
HTTP://WLAG.SVL.IBM.COM:53998/CATALOGMANAGER/ITEM/10	115,342.3	944	127,421	View Snapshots
HTTP://WLAG.SVL.IBM.COM:53998/CATALOGMANAGER/ITEM/20	114,128	963	127,412	View Snapshots
HTTP://9.30.238.55:40577/CICS/CWBA/CHU\$WB1G	6,774.2	2,227	62,494	View Snapshots
HTTP://9.30.238.55:40575/CICS/CWBA/CHU\$WB1D	9,604.1	1,313	60,783	View Snapshots
STAGE:HANDLER,MODULE:MOD_PROXY.C	4,129.5	1,099	9,002	View Snapshots
HTTP://WLAG.SVL.IBM.COM:40577/CICS/CWBA/CHU\$WB1H	374.6	36	1,277	View Snapshots

To identify slow database calls

___ Click on the left side bar “Database Calls”

___ You may select any DB call and drill down to see more details

The screenshot shows the AppDynamics web interface. At the top, there's a navigation bar with links: Home, Applications (which is highlighted in purple), User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. Below the navigation bar is a search bar and a gear icon.

The main content area is titled "Database Calls". On the left, there's a sidebar under "Inventory" with the following items: Application Dashboard, Business Transactions, Service Endpoints, Tiers & Nodes, Servers, Containers, Database Calls (this item has a red arrow pointing to it), Remote Services, Troubleshoot (with sub-links: Slow Response Times and Errors), and a "Slow Response Times" link at the bottom.

The "Database Calls" section displays a table with three rows of data:

Name	Type	Response Time (ms)	Calls	Calls / min	Errors	Errors / min
ZAPMDEMO-IBM DB2 DB-9.30.219.205-SQL110540	JDBC	1	1,759,838	419	0	0
DA1X:DB2:LPAR400J/SYS	DB	61	87,028	37	0	0
VSAM:VSAM:LPAR400J/SYS	DB	0	62,122	27	0	0

You may also select “**Tiers & Nodes**” to drill down for details

The screenshot shows the AppDynamics web interface. The top navigation bar includes links for Home, Applications (which is selected), User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. Below the navigation is a search bar and a filter set to 'last 3 days'. On the left, a sidebar menu lists Inventory, Application Dashboard, Business Transactions, Service Endpoints, Tiers & Nodes (selected and highlighted with a red box), Servers, Containers, Database Calls, Remote Services, Troubleshoot (with Slow Response Times and Errors sub-options), and Errors. The main content area is titled 'Tiers & Nodes' (also highlighted with a red box). It features a 'Health' dropdown menu with 'Details' and 'Actions' options, and a 'View' button. A table displays seven nodes with columns for Name, Tier, Health, App Agent Status, App Agent Version, JVM Version, Last JVM Restart Time, and Machine Agent Status. The nodes listed are CICSCB05:LPAR400J/SY..., CICSCB06:LPAR400J/SY..., CICSCB07:LPAR400J/SY..., CICSCB08:LPAR400J/SY..., ApacheWebServer1, TomEEDEmoDriver, and serverAPM:wlag:Inventory.

Name	Tier	Health	App Agent Status	App Agent Version	JVM Version	Last JVM Restart Time	Machine Agent Status
CICSCB05:LPAR400J/SY...	CICS:CICSCB05	✓	↓ 54%	4.5.3.0 compatible with 4.4.1 -		09/16/20 2:07:49 PM	↓ 0%
CICSCB06:LPAR400J/SY...	CICS:CICSCB06	✓	↓ 54%	4.5.3.0 compatible with 4.4.1 -		09/16/20 2:07:53 PM	↓ 0%
CICSCB07:LPAR400J/SY...	CICS:CICSCB07	✓	↓ 54%	4.5.3.0 compatible with 4.4.1 -		09/16/20 2:07:53 PM	↓ 0%
CICSCB08:LPAR400J/SY...	CICS:CICSCB08	✓	↓ 54%	4.5.3.0 compatible with 4.4.1 -		09/16/20 2:07:54 PM	↓ 0%
ApacheWebServer1	HTTPServer	✓	↑ 98.6%	Proxy v4.4.0.9 GA SHA-1:0 #: java.vm.name=Java HotSpot	09/16/20 9:55:35 AM		↓ 0%
TomEEDEmoDriver	WebApplicationServer	✓	↑ 98.6%	Server Agent #20.5.0.30113 OpenJDK 64-Bit Server VM 1	09/16/20 9:55:38 AM		↓ 0%
serverAPM:wlag:Inventory	ZCONN:serverAPM	✓	↓ 40.9%	4.5.3.0 compatible with 4.4.1 -		09/16/20 2:07:49 PM	↓ 0%

Node: A node is a monitored server, JVM, CICS Region, etc. Typically the node corresponds to an individual application server (physical or virtual).

Tier: A tier is a logical grouping of nodes generally relating to a particular business function.

Trouble Shoot – Violations & Anomalies

The screenshot shows the AppDynamics interface with the 'Applications' tab selected. On the left, a sidebar menu under the 'Troubleshoot' category has 'Violations & Anomalies' highlighted with a red arrow pointing to it. The main content area displays sections for 'Slow Response Times', 'Errors', 'Violations & Anomalies' (which is expanded), and 'War Rooms'. A 'Troubleshooting Basics' link is also visible.

APPDYNAMICS

Home Applications User Experience Databases Servers Analytics Dashboards & Reports Alert & Respond

Inventory Application Dashboard Business Transactions Service Endpoints Tiers & Nodes Servers Containers Database Calls Remote Services Troubleshoot Slow Response Times Errors Violations & Anomalies War Rooms More Alert & Respond Metric Browser

last 1 hour

Troubleshoot

Slow Response Times >

Troubleshoot slow Business Transactions, database calls, and remote service calls.

Errors >

Troubleshoot errors or exceptions and drill down to the root cause.

Violations & Anomalies >

Troubleshoot metrics behavior as revealed by Anomalies and Violations:

- An Anomaly is a pattern of abnormal behavior by ART or EPM or both, for one Business Transaction. Automated Root Cause Analysis identifies Top Suspected Causes for every Anomaly.
- A Violation occurs when metrics of any entity fail to satisfy the logical conditions of a Health Rule. AppDynamics provides a default set of Health Rules and you create additional Health Rules manually, as desired.

War Rooms >

Troubleshoot collaboratively in a War Room: a chat room where multiple users share a whiteboard and view streaming data in real time.

Violations & Anomalies

You may select any Violation/Anomaly to see more details

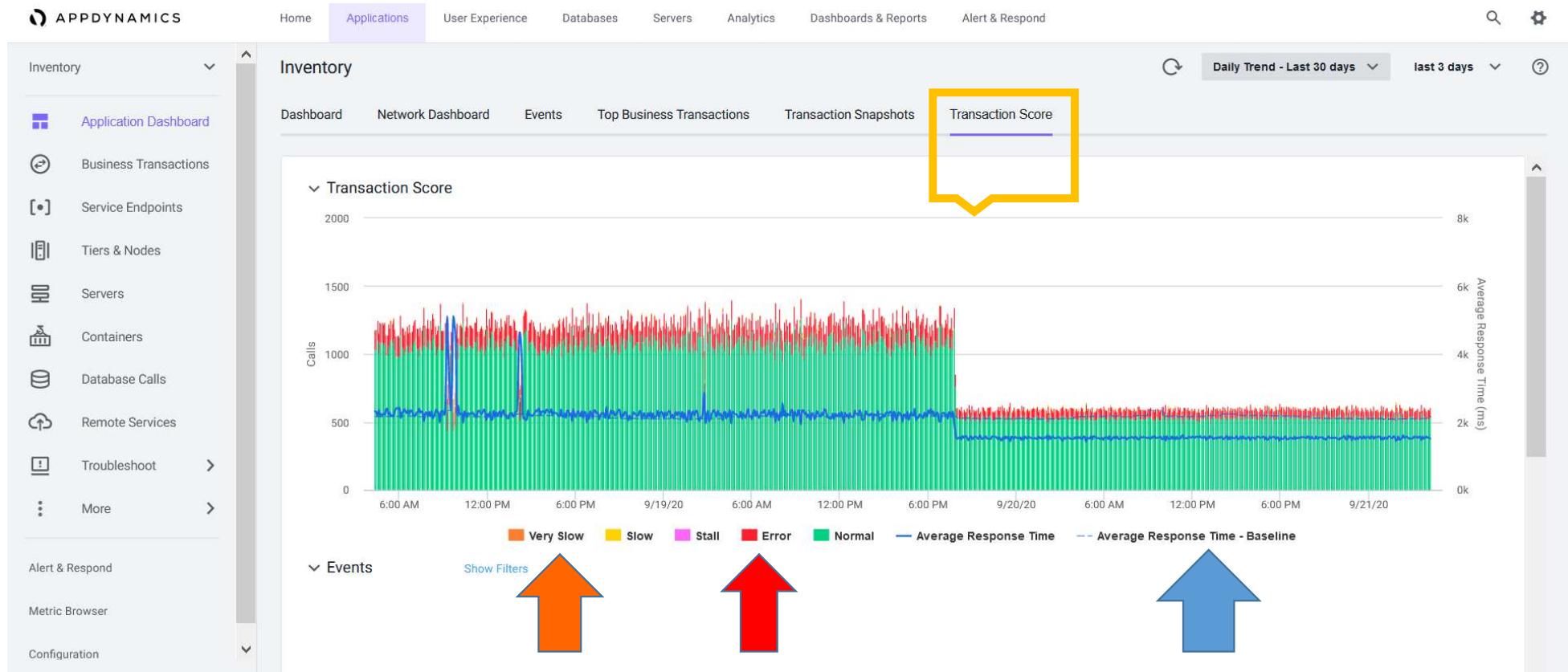
The screenshot shows the AppDynamics interface with the 'Violations & Anomalies' page selected. The left sidebar contains navigation links for Inventory, Applications, User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. The main content area displays a table of violations, with the first six rows visible. Each row includes a status icon (red for critical, yellow for warning), the violation type ('Business Transaction Health'), the affected URL ('/Warehouse_Inventory', '/Shipment_Schedule', etc.), the status ('Open'), a detailed description of the issue ('AppDynamics has detected a problem. Business Transaction Health is violating.'), and timestamp information ('Start Time: 09/21/20 10:35:55 AM'). A search bar at the top right allows filtering by time range ('last 1 hour') and a gear icon for configuration.

Violations / Anomalies	Affects	Status	Description	Start Time	End Time	Duration
Business Transaction Health	/Warehouse_Inventory	Open	AppDynamics has detected a problem. Business Transaction Health is violating. More	09/21/20 10:35:55 AM	-	6 hours, 28 minutes Ongoing
Business Transaction Health	/Shipment_Schedule	Open	AppDynamics has detected a problem. Business Transaction Health is violating. More	09/21/20 10:35:55 AM	-	6 hours, 28 minutes Ongoing
Business Transaction Health	/Approve_Order	Open	AppDynamics has detected a problem. Business Transaction Health is violating. More	09/21/20 3:37:55 PM	-	1 hour, 26 minutes Ongoing
Business Transaction Health	/Place_Order	Open	AppDynamics has detected a problem. Business Transaction Health is violating. More	09/21/20 3:37:55 PM	-	1 hour, 26 minutes Ongoing
Business Transaction Health	/Order_Status	Open	AppDynamics has detected a problem. Business Transaction Health is violating. More	09/21/20 3:38:55 PM	-	1 hour, 25 minutes Ongoing
Business Transaction Health	/Login	Open	AppDynamics has detected a problem. Business Transaction Health is violating. More	09/21/20 4:46:55 PM	-	17 minutes Ongoing

Exercise 5: Transaction Score

- This unit will highlight a few features for trend analysis. One can apply top-down approaches for fast problem determination
 - Transaction score
 - Transaction snapshots
 - Transaction response times

Transaction Score



Transaction Snapshot

The screenshot shows the AppDynamics Application Dashboard interface. The top navigation bar includes links for Home, Applications (which is selected and highlighted in purple), User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. A search and settings icon are also present.

The left sidebar has sections for Inventory (Application Dashboard, Business Transactions, Service Endpoints, Tiers & Nodes, Servers, Containers, Database Calls, Remote Services, Troubleshoot, More), Alert & Respond, Metric Browser, and Configuration.

The main content area is titled "Inventory" and features a "Transaction Snapshots" tab, which is currently active and highlighted with a yellow box. Other tabs include Dashboard, Network Dashboard, Events, Top Business Transactions, Transaction Score, All Snapshots, Slow and Error Transactions, Diagnostic Sessions, and Periodic Collection.

Below the tabs is a table with columns: Time, Exe Time (ms), URL, Business Transaction, Tier, and Node. The table displays 600 transaction snapshots from 09/21/20 4:21 AM to 09/21/20 4:22 AM. The first few rows show:

Time	Exe Time (ms)	URL	Business Transaction	Tier	Node
09/21/20 4:22:03 AM	294	/DemoDriver/Db2DriverWebHandler	/DemoDriver/Db2DriverWebHandler	WebApplicationServer	TomEEDemoDriver
09/21/20 4:21:59 AM	9	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
09/21/20 4:21:54 AM	10	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
09/21/20 4:21:53 AM	4,286	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
09/21/20 4:21:49 AM	12	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
09/21/20 4:21:47 AM	4,286	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
09/21/20 4:21:39 AM	9	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
09/21/20 4:21:34 AM	13	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
09/21/20 4:21:33 AM	8	/Shipment_Schedule	/Shipment_Schedule	HTTPServer	ApacheWebServer1
09/21/20 4:21:25 AM	4,286	/Approve_Order	/Approve_Order	HTTPServer	ApacheWebServer1
09/21/20 4:21:22 AM	397	/DemoDriver/Db2DriverWebHandler	/DemoDriver/Db2DriverWebHandler	WebApplicationServer	TomEEDemoDriver
09/21/20 4:21:19 AM	10	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1

Top Business Transactions

By “Load” and By “Response Time”

The screenshot shows the AppDynamics Application Dashboard under the 'Applications' tab. A large red arrow points down to the 'Top Business Transactions' section. Two yellow circles highlight the 'By Load >' and 'By Response Time >' links. The 'By Load' section displays a table of transactions based on call volume, while the 'By Response Time' section displays a table based on execution time.

By Load >

Name	Calls	Calls / min	Health
/DemoDriver/Db2DriverWebHandler	187,941	44	green
/Warehouse_Inventory	91,067	21	red
/Login	63,673	15	red
/Place_Order	40,151	9	red
/Approve_Order	40,139	9	red
/Order_Status	40,135	9	red
/inquireSingle	28,245	7	yellow

By Response Time >

Name	Time (ms)	Health
/Order_Status	5,363	red
/Place_Order	5,360	red
/Approve_Order	4,360	red
/Warehouse_Inventory	1,928	red
/inquireSingle	202	yellow
/Store_Inventory	20	red
/Shipment_Schedule	15	red

By Errors >

Name	Errors	Health

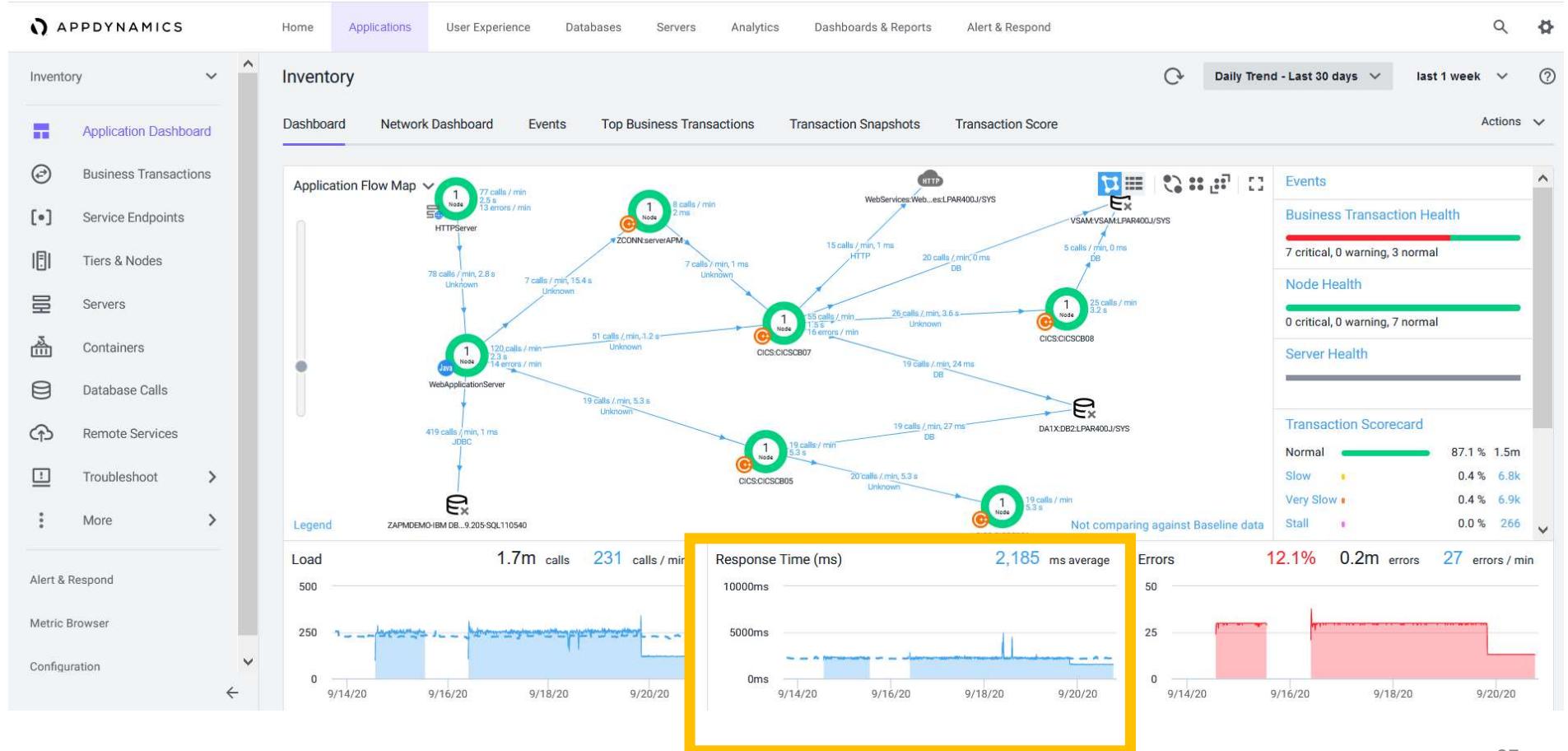
By Contribution to App Average Response Time >

Name	% Contribution

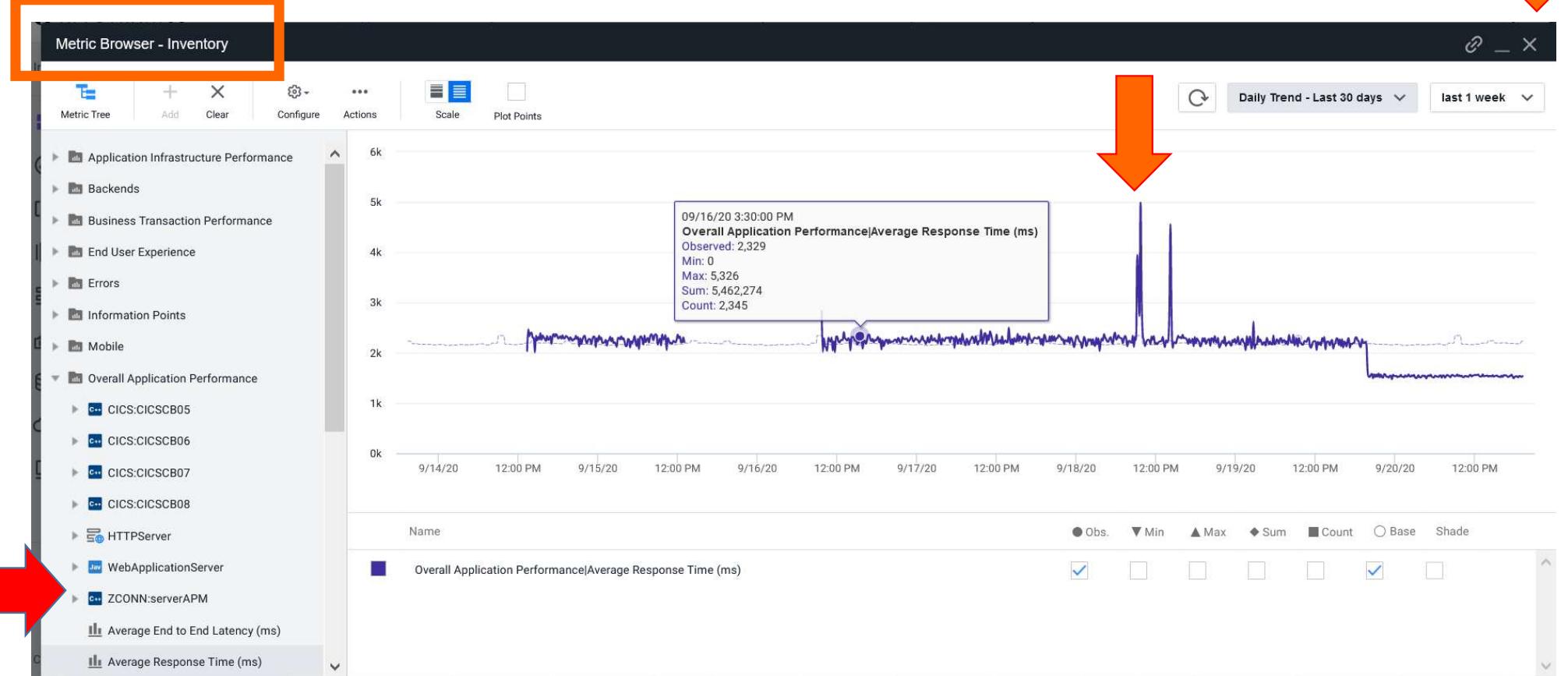
Another navigation path is to go back to the main page

— Fly the mouse over **Response Time** graph at the lower half of screen

— Double click on the detailed response time chart to drill in for more details

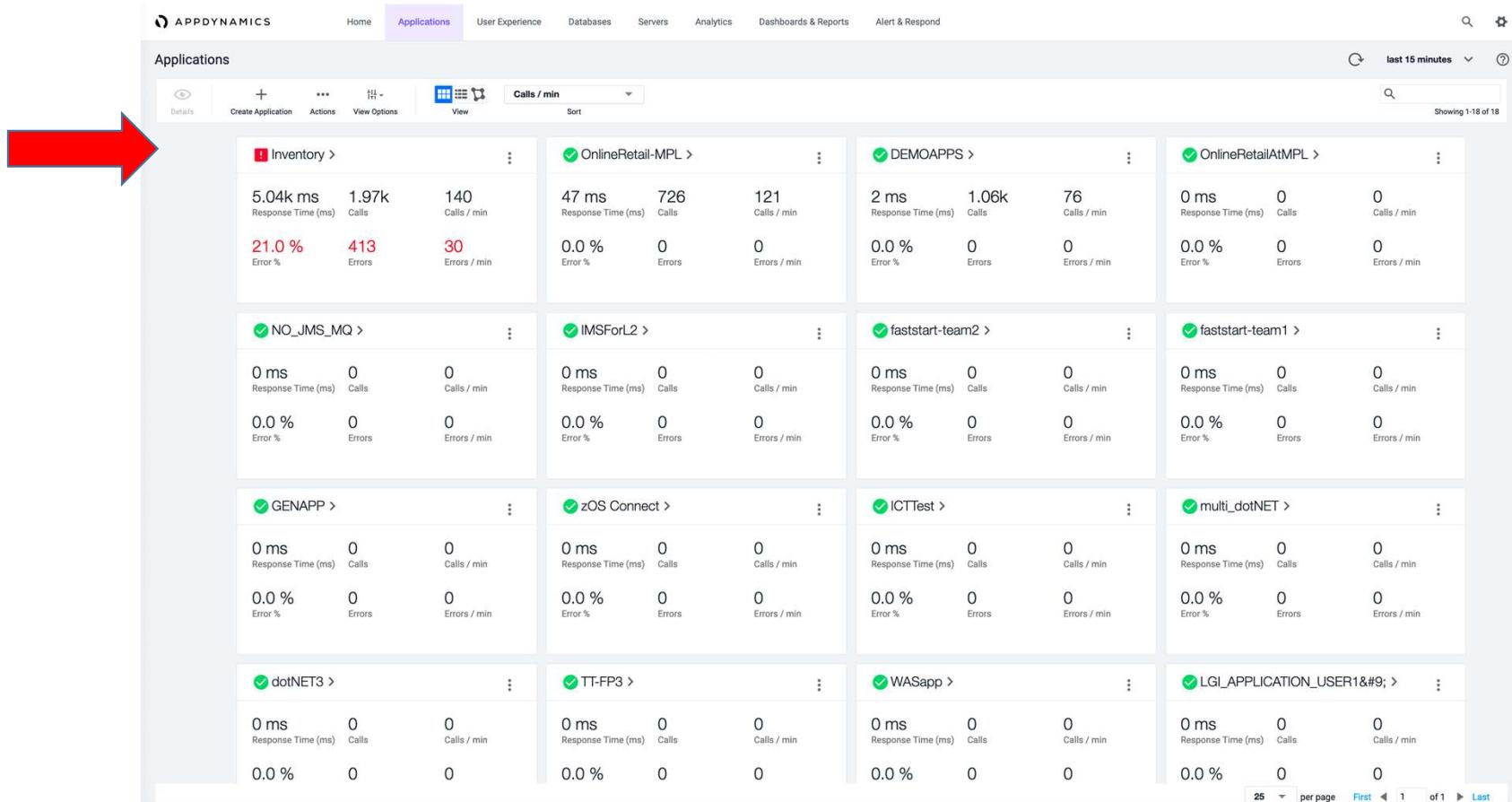


- Drill down for response time analysis
- Mouse over the spike for details
- Left side: expand the tree for more details for each mainframe node
- To exit, click the “x” sign on the upper right corner



Exercise 6: A CICS-Db2 application scenario

Return to the main “Applications” panel
Select Application name “Inventory”



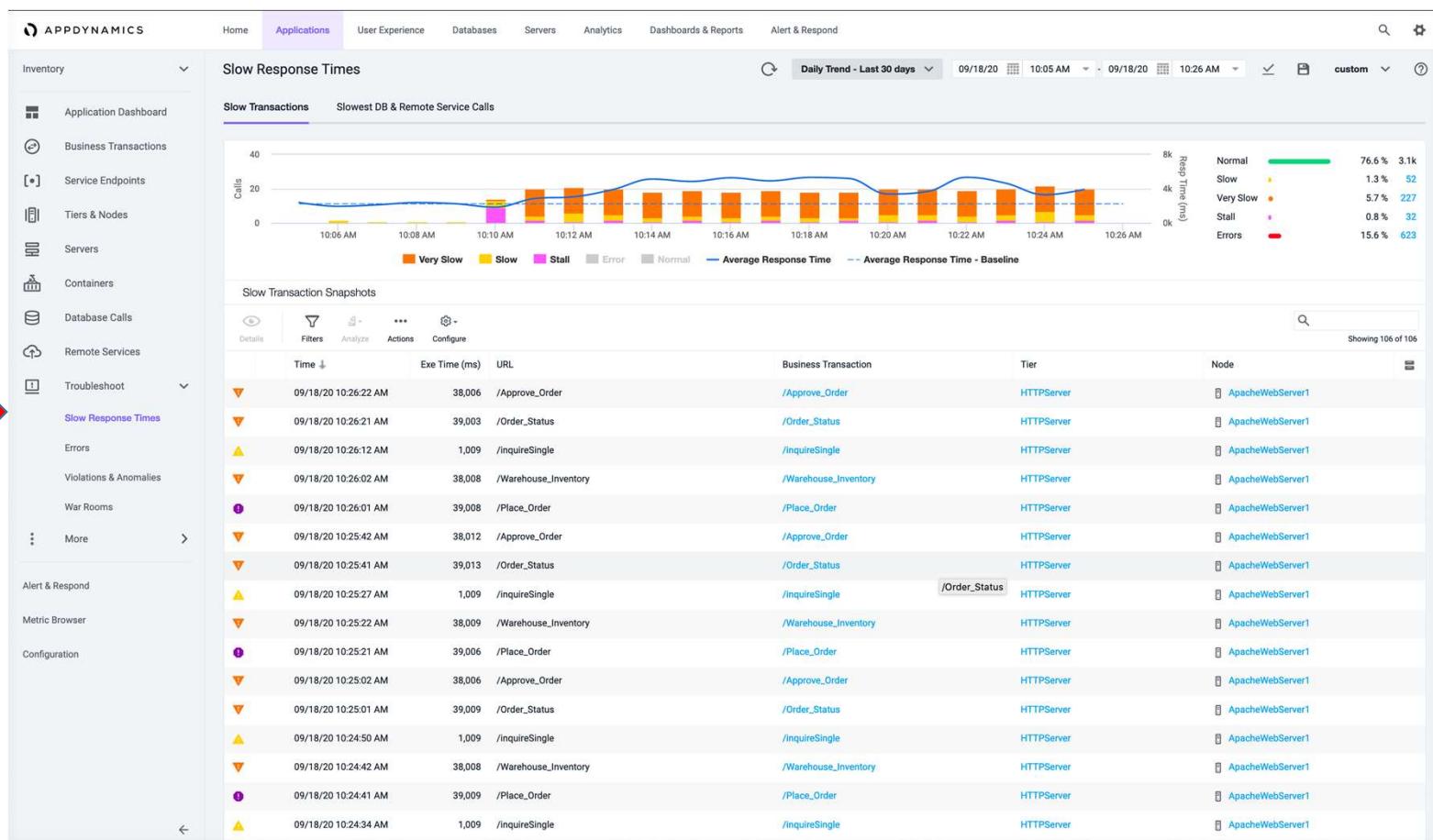
The screenshot shows the AppDynamics Applications dashboard. At the top, there's a navigation bar with links for Home, Applications (which is highlighted in purple), User Experience, Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. Below the navigation is a search bar and a refresh button. The main area is titled "Applications" and displays a grid of application performance metrics. The grid has four columns and five rows. The first column contains the application names: "Inventory", "OnlineRetail-MPL", "DEMOAPPS", "OnlineRetailAtMPL", "NO_JMS_MQ", "IMSForL2", "faststart-team2", "faststart-team1", "GENAPP", "zOS Connect", "ICTTest", "multi_dotNET", "dotNET3", "TT-FP3", "WASapp", and "LGI_APPLICATION_USER1". Each application entry includes three metrics: Response Time (ms), Calls, and Calls / min. The "Inventory" application is highlighted with a red arrow pointing to it. The "Inventory" row shows the following data:

Inventory >	OnlineRetail-MPL >	DEMOAPPS >	OnlineRetailAtMPL >
5.04K ms Response Time (ms)	47 ms Response Time (ms)	2 ms Response Time (ms)	0 ms Response Time (ms)
1.97k Calls	726 Calls	1.06k Calls	0 Calls
140 Calls / min	121 Calls / min	76 Calls / min	0 Calls / min
21.0 % Error %	0.0 % Error %	0.0 % Error %	0.0 % Error %
413 Errors	0 Errors	0 Errors	0 Errors
30 Errors / min	0 Errors / min	0 Errors / min	0 Errors / min

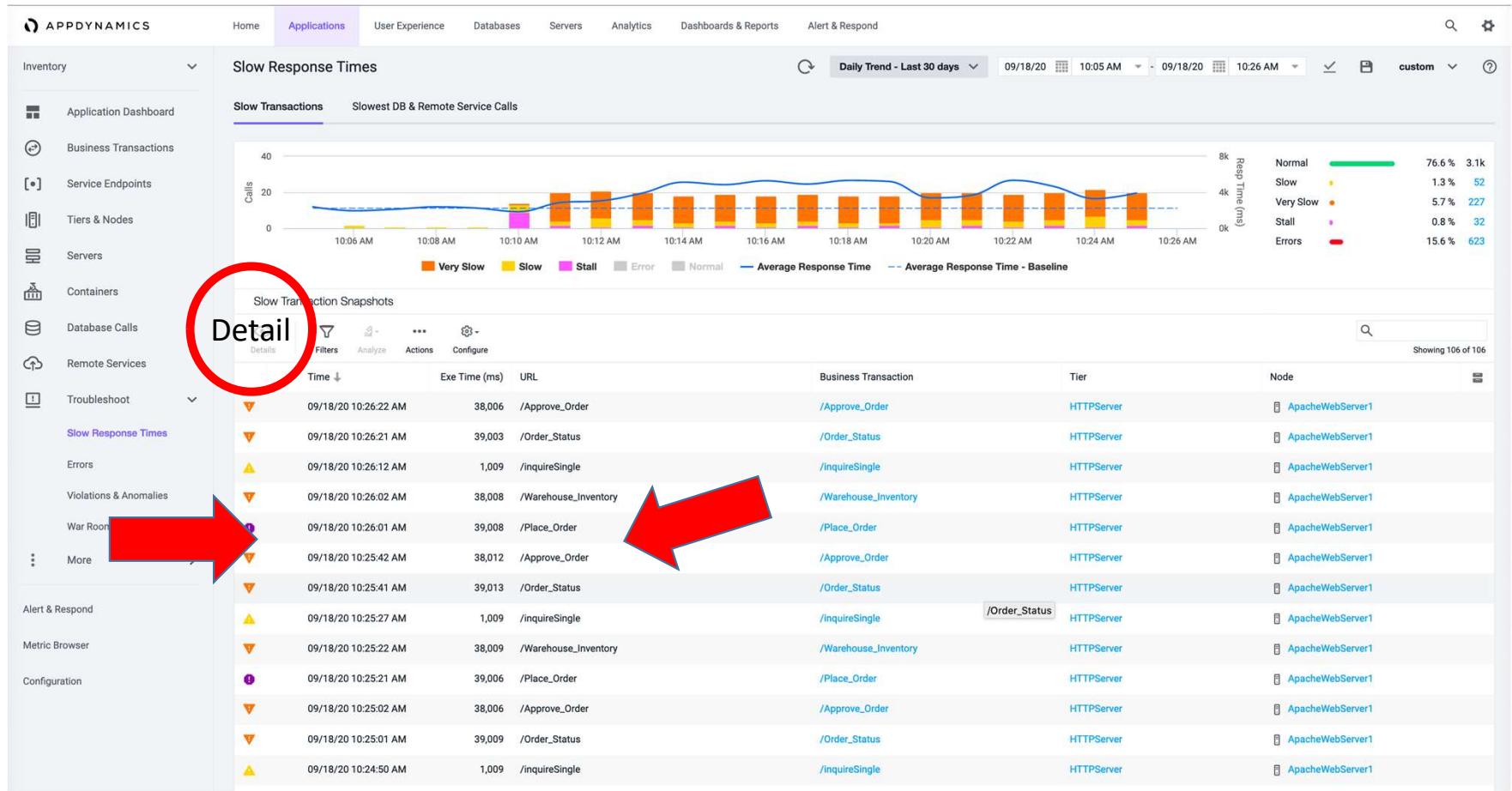
Override the time range from “last 15 minutes” to “last 1 hour”
The Application Flow Map shows red or yellow warnings



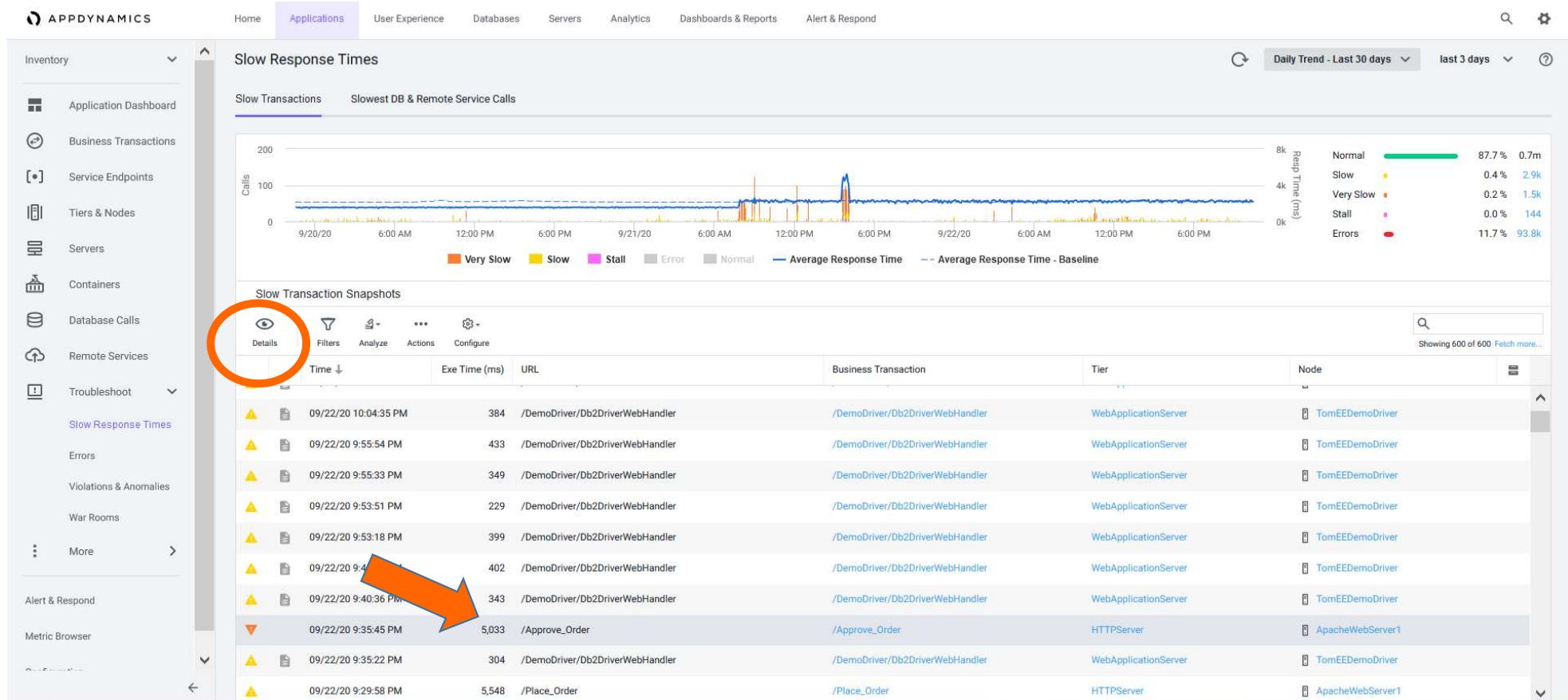
Click on the “Slow Response Times” under “Troubleshoot”



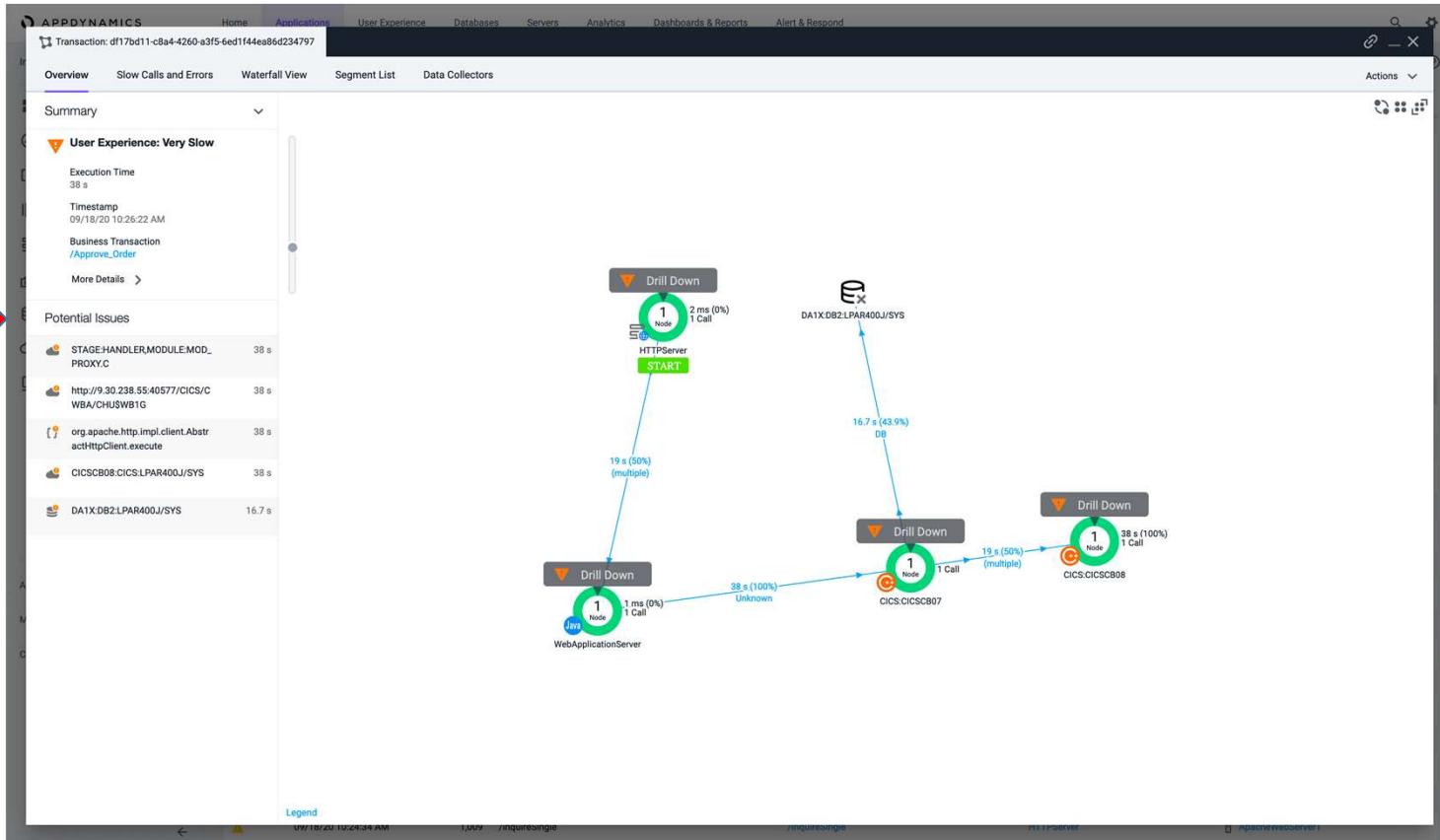
- ____ Select a business service name “/Approve_Order” (you may have to scroll down to find it)
- ____ Drill down or click once on the URL name “/Approve_Order”



To drill down, you may double click on the URL column named “/Approve_Order”
Or to drill down from the “Details” button under Center “Slow Transaction Snapshots”



___ This takes you to the application flow view for this business service “/Approve_Order”
___ Notice on the left side, a prescription of “Potential Issues”



- _____ Click on the “Data Collectors”, it displays the detailed **user id, task number, transaction name**
_____ to exit, click on the “x” sign to close out this workspace.

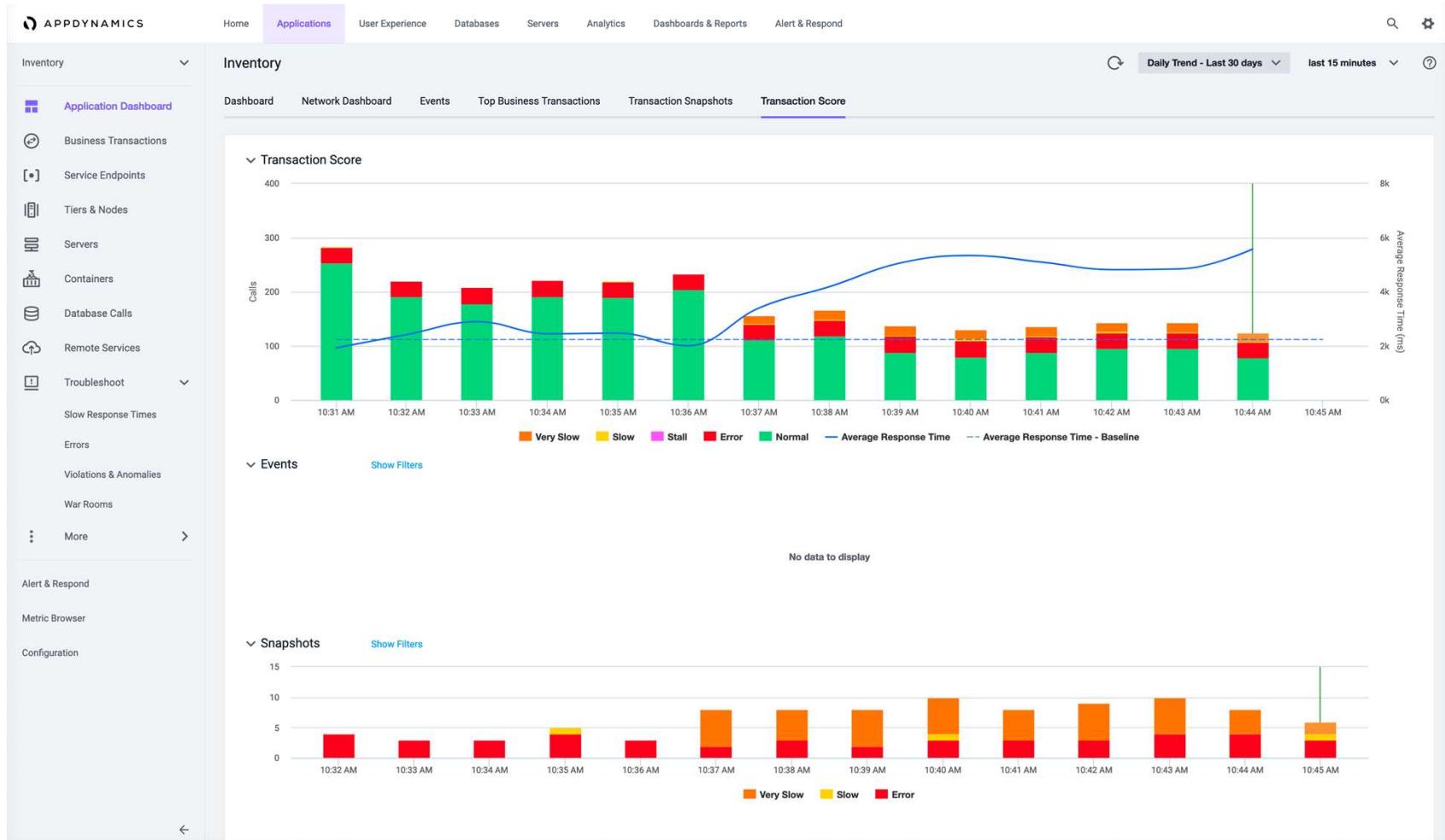
The screenshot shows the AppDynamics interface for the 'Data Collectors' workspace. The top navigation bar includes 'Home', 'Applications', 'User Experience', 'Databases', 'Servers', 'Analytics', 'Dashboards & Reports', and 'Alert & Respond'. A search bar at the top right shows '37,993 ms - CICS:CICSCB07'. The main content area has tabs: 'Overview', 'Slow Calls and Errors', 'Waterfall View', 'Segment List', and 'Data Collectors' (which is selected). Below these are buttons for 'Drill Down', 'Filters', 'Find Snapshots', and 'Actions'. A red arrow points up from the bottom left towards the 'Data Collectors' tab. Another red arrow points up from the bottom left towards the table header. A yellow arrow points down from the top right towards the 'X' button in the top right corner of the workspace. The table displays the following data:

Name	Value	Tier	Node
User ID	TDUSER	CICS:CICSCB07	CICSCB07:LPAR400J/SYS:Inventory
Task Number	43527	CICS:CICSCB07	CICSCB07:LPAR400J/SYS:Inventory
Inbound Caller	/CICS/CWBA/CHU\$WB1G	CICS:CICSCB07	CICSCB07:LPAR400J/SYS:Inventory
Transaction Name	CWBA	CICS:CICSCB07	CICSCB07:LPAR400J/SYS:Inventory
User ID	CICSCB08	CICS:CICSCB08	CICSCB08:LPAR400J/SYS:Inventory
Task Number	29246	CICS:CICSCB08	CICSCB08:LPAR400J/SYS:Inventory
Transaction Name	CSMI	CICS:CICSCB08	CICSCB08:LPAR400J/SYS:Inventory

You can also click the “Database Calls” on the left side bar to view Slowest Database Calls

The screenshot shows the AppDynamics interface for monitoring application performance. On the left, a sidebar menu is open, with a large red arrow pointing to the 'Database Calls' option under the 'Inventory' section. The main dashboard area displays a 'Backend Flow Map' for the application 'DA1X:DB2:LPAR400J/SYS'. The map shows two nodes, both labeled 'CICS:CICSCB07' and '1 Node', connected by a flow. The flow is labeled '7.calls /min, 5.1 s DB'. Below the map, there are several performance charts: a 'Load' chart showing 290 calls and 14 calls/min; a 'Response Time (ms)' chart showing an average of 5,214 ms; and an 'Errors' chart which is currently empty, stating 'No data to display'. At the bottom, a transaction ID 'df17bd11-c8a4-4260-a3f5-6ed1f44ea86d234797' is shown along with a timestamp from 10:05 AM to 10:25 AM.

Transaction Score



Transaction Snapshots

APPDYNAMICS

Home Applications User Experience Databases Servers Analytics Dashboards & Reports Alert & Respond

Inventory

Application Dashboard

Business Transactions

Service Endpoints

Tiers & Nodes

Servers

Containers

Database Calls

Remote Services

Troubleshoot

Slow Response Times

Errors

Violations & Anomalies

War Rooms

More

Alert & Respond

Metric Browser

Configuration

Inventory

Dashboard Network Dashboard Events Top Business Transactions Transaction Snapshots Transaction Score

All Snapshots Slow and Error Transactions Diagnostic Sessions Periodic Collection

Details Filters Analyze Actions Configure

Time ↓ Exe Time (ms) URL Business Transaction Tier Node

	Time ↓	Exe Time (ms)	URL	Business Transaction	Tier	Node
1	09/18/20 10:46:43 AM	12	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
1	09/18/20 10:46:38 AM	10	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
1	09/18/20 10:46:24 AM	7	/Shipment_Schedule	/Shipment_Schedule	HTTPServer	ApacheWebServer1
▲	09/18/20 10:46:17 AM	1,009	/InquireSingle	/InquireSingle	HTTPServer	ApacheWebServer1
▼	09/18/20 10:46:01 AM	38,003	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
▼	09/18/20 10:46:00 AM	39,004	/Place_Order	/Place_Order	HTTPServer	ApacheWebServer1
1	09/18/20 10:45:42 AM	10	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
▼	09/18/20 10:45:41 AM	38,007	/Approve_Order	/Approve_Order	HTTPServer	ApacheWebServer1
▼	09/18/20 10:45:40 AM	39,009	/Order_Status	/Order_Status	HTTPServer	ApacheWebServer1
1	09/18/20 10:45:39 AM	8	/Shipment_Schedule	/Shipment_Schedule	HTTPServer	ApacheWebServer1
1	09/18/20 10:45:37 AM	10	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
▼	09/18/20 10:45:21 AM	38,011	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
▲	09/18/20 10:45:07 AM	497	/DemoDriver/Db2DriverWebHandler	/DemoDriver/Db2DriverWebHandler	WebApplicationServer	TomEE Demo Driver
▼	09/18/20 10:45:00 AM	39,003	/Approve_Order	/Approve_Order	HTTPServer	ApacheWebServer1
▼	09/18/20 10:44:59 AM	40,005	/Order_Status	/Order_Status	HTTPServer	ApacheWebServer1
1	09/18/20 10:44:54 AM	7	/Shipment_Schedule	/Shipment_Schedule	HTTPServer	ApacheWebServer1
1	09/18/20 10:44:42 AM	11	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
▼	09/18/20 10:44:40 AM	39,005	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
▼	09/18/20 10:44:39 AM	40,011	/Place_Order	/Place_Order	HTTPServer	ApacheWebServer1
1	09/18/20 10:44:37 AM	9	/Warehouse_Inventory	/Warehouse_Inventory	HTTPServer	ApacheWebServer1
1	09/18/20 10:44:09 AM	7	/Shipment_Schedule	/Shipment_Schedule	HTTPServer	ApacheWebServer1

Showing 106 of 106

Troubleshoot → Violations & Anomalies

The screenshot shows the AppDynamics Applications dashboard with the 'Violations & Anomalies' section selected. The left sidebar includes links for Application Dashboard, Business Transactions, Service Endpoints, Tiers & Nodes, Servers, Containers, Database Calls, Remote Services, Troubleshoot (with sub-links for Slow Response Times, Errors, Violations & Anomalies, War Rooms, and More), Alert & Respond, Metric Browser, and Configuration.

The main area displays a table titled 'Violations & Anomalies' with the following columns: Details, Filters, Configuration, All Violations/Anomalies within Time Range, Show Data, Status, Description, Start Time, End Time, and Duration. The table lists five entries, all of which are 'Business Transaction Health' violations. Each entry includes a link to the specific transaction endpoint (e.g., /Approve_Order, /Warehouse_Inventory, /Order_Status, /Shipment_Schedule, /Place_Order) and a brief description of the performance issue (load, response time, slow calls, etc.). The status for all entries is 'Open'. The start and end times for all entries are 09/18/20 10:49:55 AM, and the duration is 34 seconds Ongoing. There are also 'More' links for each entry.

Details	Filters	Configuration	All Violations/Anomalies within Time Range	Show Data	Status	Description	Start Time	End Time	Duration
					Open	AppDynamics has detected a problem. Business Transaction Health is violating.	09/18/20 10:49:55 AM	-	34 seconds Ongoing
					Open	AppDynamics has detected a problem. Business Transaction Health is violating.	09/18/20 10:49:55 AM	-	34 seconds Ongoing
					Open	AppDynamics has detected a problem. Business Transaction Health is violating.	09/18/20 10:49:55 AM	-	34 seconds Ongoing
					Open	AppDynamics has detected a problem. Business Transaction Health is violating.	09/18/20 10:49:55 AM	-	34 seconds Ongoing

Exercise 7: Navigating to the error code or slowest DB & remote service calls

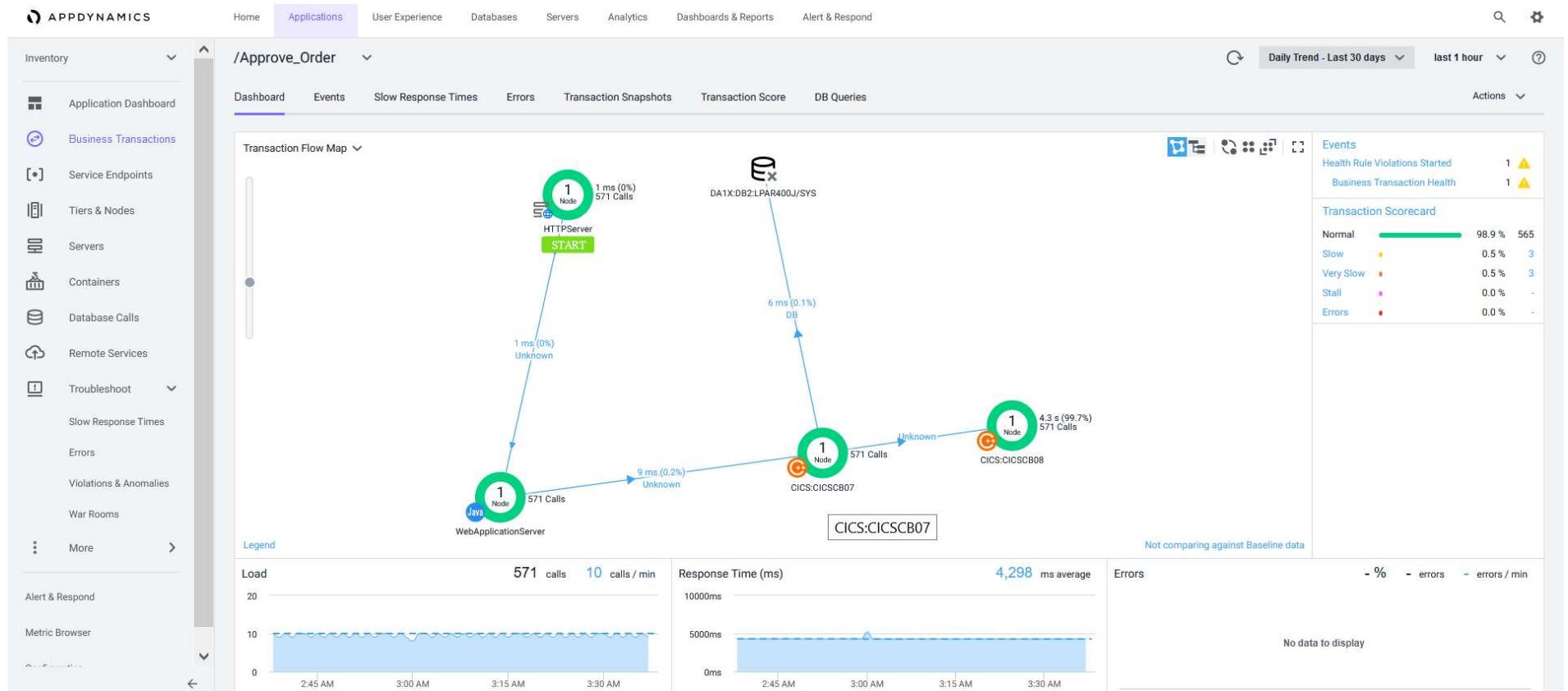
From Business Transactions

The screenshot shows the AppDynamics Business Transactions dashboard. On the left, a sidebar lists navigation options: Application Dashboard, Business Transactions (which is selected and highlighted with a blue background), Service Endpoints, Tiers & Nodes, Servers, Containers, Database Calls, Remote Services, Troubleshoot (with a dropdown arrow), Slow Response Times, Errors, Violations & Anomalies, and War Rooms. A red arrow points to the 'Business Transactions' link. Another red arrow points to the 'Approve_Order' transaction row in the main table.

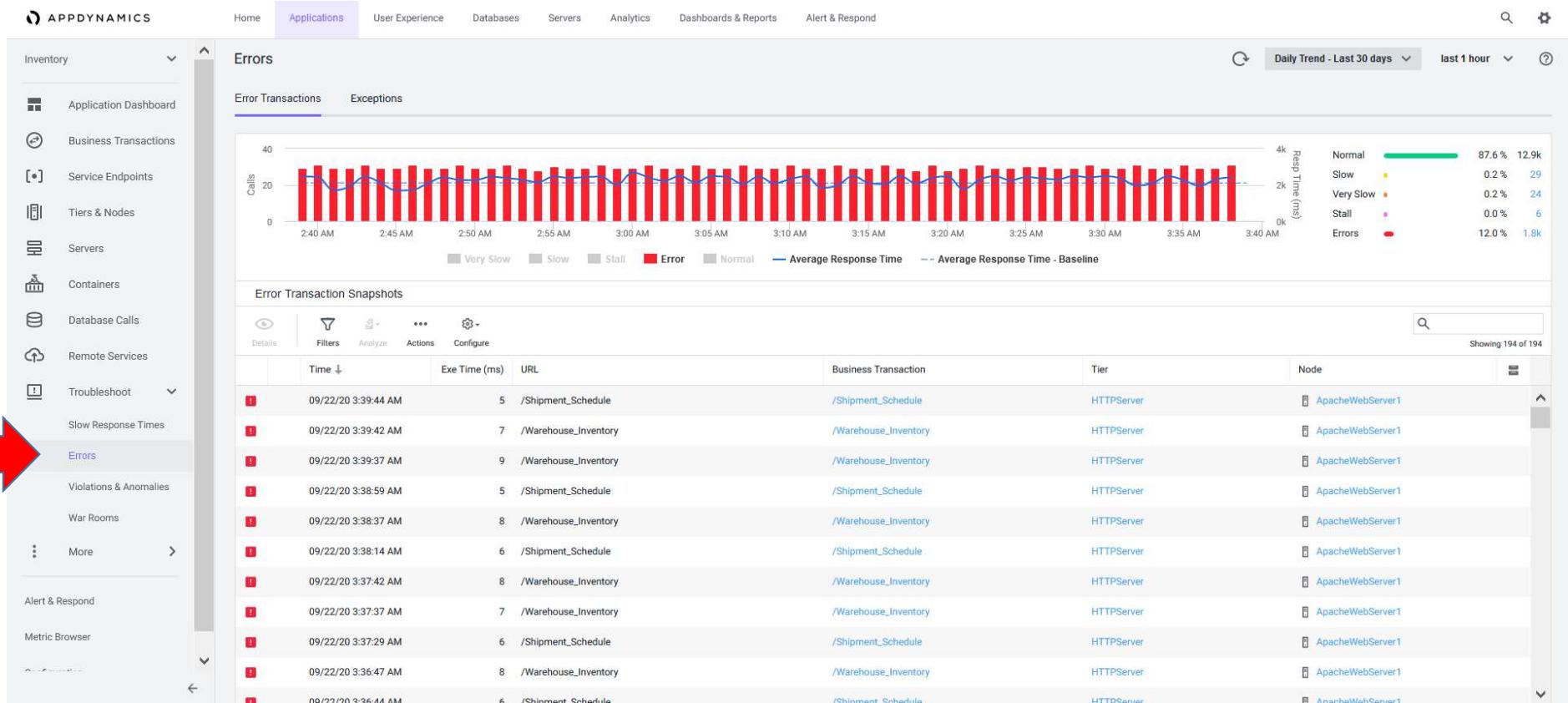
Business Transactions

Name	Health	Response Time (ms)	Max Response Time (ms)	Min Response Time (ms)	Calls / min	Errors / min	% Errors	% Slow Transactions	% Very Slow Transactions	% Stalled Transactions	CPU Used (ms)	Wait Time (ms)
/DemoDriver/Db2DriverWebHandler	Green	10	529	1	44	-	0	0.8	0	0	0	-
/Warehouse_Inventory	Yellow	1,908	7,714	6	21	12	60	0	0	0	-	-
/Login	Green	5	22	3	15	-	0	0	0	0	-	-
/Place_Order	Red	5,299	8,992	5,240	10	-	0	0.2	0.4	0.2	-	-
/Approve_Order	Red	4,299	7,999	3,783	10	-	0	0.5	0.5	0	-	-
/Order_Status	Red	5,299	8,706	5,246	10	-	0	0	0.4	0.2	-	-
/InquireSingle	Green	189	1,079	0	7	-	0	0	0	0	-	-
/Store_Inventory	Green	18	142	4	3	-	0	0	0	0	-	-
/Shipment_Schedule	Yellow	12	75	5	1	1	100	0	0	0	-	-
/DemoDriver/response.jsp	Green	-	-	-	-	-	0	0	0	0	-	-

Drill down from “/Approve_Order”



Select “Errors” under Troubleshoot

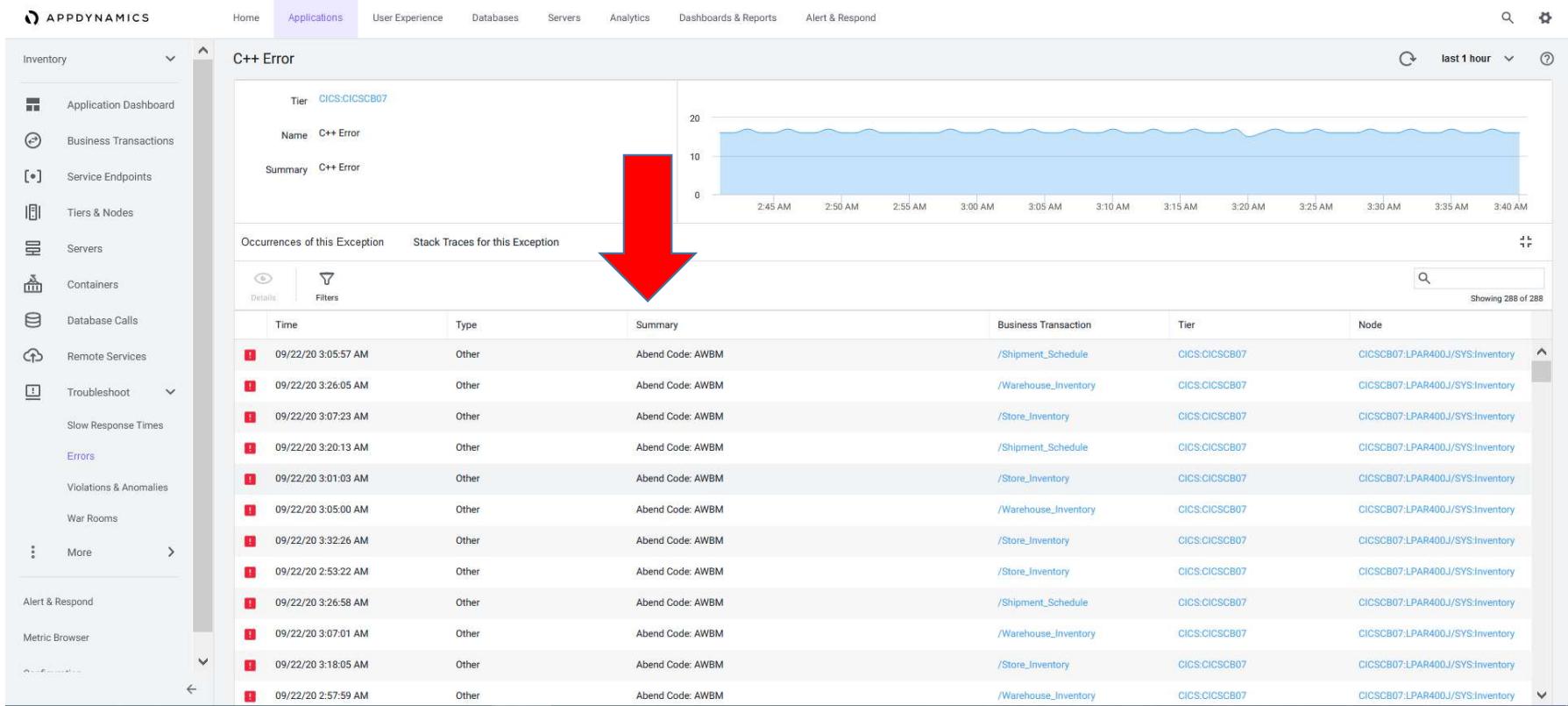


Click on “Exceptions”

The screenshot shows the AppDynamics Application dashboard. The left sidebar has a 'Errors' section with a red arrow pointing to it. The main navigation bar has an 'Exceptions' tab highlighted with a red box and a yellow arrow pointing to it. The dashboard displays two line charts: 'Exceptions' (2.4K exceptions, 41 exceptions/min) and 'HTTP Error Codes' (1.6K codes, 27 codes/min). The main content area shows a table of exception details:

Name	Summary	Exceptions / min	Exception count	Tier
C++ Error	C++ Error	16	978	CICS:CICSCB07
HttpHostConnectException : ConnectException	org.apache.http.conn.HttpHostConnectException caused by java.net.ConnectException	1	43	WebApplicationServer
Internal Server Error : 500	HTTP error code : 500	27	1,594	WebApplicationServer
Web Server Errors	Web Server Errors	13	797	HTTPServer
HttpResponseException	org.apache.http.client.HttpResponseException	40	2,391	WebApplicationServer

Drill down “C++ Error”, It displays the abend code



Troubleshoot → Slow Response Times

The screenshot shows the AppDynamics interface for troubleshooting slow response times. A large red arrow points from the left margin towards the sidebar, highlighting the 'Troubleshoot' section.

Dashboard Overview:

- Slow Transactions:** Shows a line chart of response times over time, with a significant spike at 3:00 AM. The chart includes a legend for response status: Normal (green), Slow (yellow), Very Slow (orange), Stall (pink), Error (grey), and Errors (red).
- Slow Transaction Snapshots:** A table listing 24 transaction snapshots. Each row includes a yellow triangle icon, a timestamp, execution time (Exe Time), URL, business transaction name, tier, and node information. The URL for the first transaction is highlighted with a red box: `/DemoDriver/Db2DriverWebHandler`.

Left Sidebar (highlighted by a red arrow):

- Inventory
- Application Dashboard
- Business Transactions
- Service Endpoints
- Tiers & Nodes
- Servers
- Containers
- Database Calls
- Remote Services
- Troubleshoot** (highlighted)

 - Slow Response Times
 - Errors
 - Violations & Anomalies
 - War Rooms

- More

Alert & Respond

Metric Browser

Slowest DB & Remote Service Calls

-> displays the line of code in trouble

The screenshot shows the AppDynamics interface for monitoring application performance. The top navigation bar includes links for Home, Applications (which is selected), User Experience, Databases, Servers, Dashboards & Reports, Alert & Respond, and a search bar. A red arrow points from the 'Applications' tab down to the 'Slow Response Times' section. Another red arrow points from the 'Slow Response Times' title to the 'Slowest DB & Remote Service Calls' tab, which is currently active. The main content area displays a table of slow calls, with a specific SQL statement highlighted in a box.

Call Type	Call	Avg. Time per Call (ms)	Number of Calls	Max Time (ms)	Snapshots
From	HTTP://WLAG.SVL.IBM.COM:53998/CATALOGMANAGER/ITEM/10	127,253.6	21	127,333	View Snapshots
All Calls	HTTP://WLAG.SVL.IBM.COM:53998/CATALOGMANAGER/ITEM/20	121,759.6	23	127,318	View Snapshots
DB	HTTP://9.30.238.55:40575/CICS/CWBA/CHU\$WB1D	6,033.5	18	8,990	View Snapshots
HTTP	HTTP://9.30.238.55:40577/CICS/CWBA/CHU\$WB1G	4,641.5	22	7,996	View Snapshots
JDBC	UPDATE ACCOUNT SET BALANCE=? WHERE ID=?		31	24	134 View Snapshots
	SELECT ACCOUNT.BALANCE FROM ACCOUNT,USER WHERE USER.ID=? AND ACCOUNT.USER=USER...		132	1	132 No Snapshots

Call Details:

```
SELECT ACCOUNT.BALANCE FROM ACCOUNT,USER WHERE USER.ID=? AND ACCOUNT.USER=USER.ID
```

❖ Note: The visibility of SQL statement is instrumented by AppD Java Agent for JDBC calls

Summary

Recap what you explored

- ❑ Exercise 1: Login
- ❑ Exercise 2: Application Flow Map
- ❑ Exercise 3: Business Transaction
- ❑ Exercise 4: Troubleshoot – slow response time, errors, DB calls
- ❑ Exercise 5: Transaction Score, Transaction Snapshot, etc.
- ❑ Exercise 6: Walk through a CICS-Db2 application scenario
- ❑ Exercise 7: Navigating to the error code & slowest DB calls

Summary

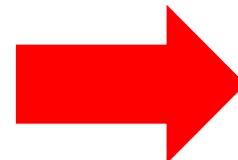
- Explored how IBM Z APM Connect extends end-to-end the AppDynamics Application Flow Map and dashboards with mainframe visibility
- Walked through AppDynamics Business Transactions Map for transaction tracking
- Explored how to use AppDynamics various features to drill down and pinpoint the troubled application line of code



Congratulations! You have completed the Z APM Connect Lab!

Thank you!

Please complete the
Session Survey!



Lab Title Demo

Start:
End:
Enviro

Lab Guide 

Launch Lab 

Survey 

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Please Recycle

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