z/TPF Message Analysis Tool

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Problem Statement

- How do you enable developers to find resource usage issues earlier in the development cycle to reduce time to market, reduce total development costs and take advantage of shift left savings?
- How do you understand where changes in resource usage (CPU, IO, memory, etc.) occur due to application changes made during development?
- How do you quickly diagnose application resource usage issues in development, test, and production environments?
- How do you prevent finding resource usage issues late in test cycles and having to push inefficient code into production only to have to absorb higher production resource usage?
- How do you educate new application developers about the code flow of real transactions in production?
- How do you identify code refactoring opportunities with the largest ROI?

Value Statement

Brian, the business executive, can leverage the z/TPF message analysis tool when enhancing existing or creating new applications to lower development costs and achieve faster time to market while producing higher quality code.

- Andrew, an application developer, can identify where excessive system resources are consumed by an application due to his code changes in less time and with a wider array of metrics than was possible using the TPF Toolkit 4.2 Performance Analyzer.
- Arthur, an application architect, can identify where real-world inefficiencies exist in applications from data collected for production traffic.
- Andrew, a new hire application developer, can use application flow data captured from production systems during onboarding to learn how an application works and become productive more quickly.

To-Be User Story

- Andrew modified an existing application.
- As we saw in the “Application Agility in Action on z/TPF” presentation, he used real-time runtime metrics collection to determine **if** there was a problematic difference in resources used by the modified application when compared to the base code.
- Suppose he found that the modified application is now using 30% more CPU than was anticipated by his acceptance criteria specified by the application architects.
- Now Andrew needs to determine **where** that additional CPU is being used.

Andrew

New Hire
Application Developer

To-Be User Story

- Andrew uses the z/TPF message analysis tool to discover where those resources are being used.
  - First, he captures a baseline run without his code.
  - Then he loads his code and runs his collection again.
  - He uses a dashboard to see a comparison of the resource usage.

Andrew

New Hire
Application Developer

To-Be User Story

- Andrew identifies that his application changes cause a module that he did NOT modify to use substantially more resources.
- He spent 1 hour to diagnose the issue early in development instead of the As-Is scenario of spending a week late during the testing phase.
- The development team refactors the design and modifies the code early in the project when change is easier to absorb.

Andrew

New Hire
Application Developer

To-Be User Story

- As Andrew does his unit testing, he continues to run real-time runtime metrics collection. **If** a resource usage issue is identified, he uses z/TPF message analysis tool and compares results to baselines to understand **where** the problematic resource usage exists.

Andrew

New Hire
Application Developer

To-Be User Story

- As Andrew completes his work, he creates a report from the z/TPF message analysis tool results to document that his application changes are within his acceptance criteria specified by the application architects.

Andrew

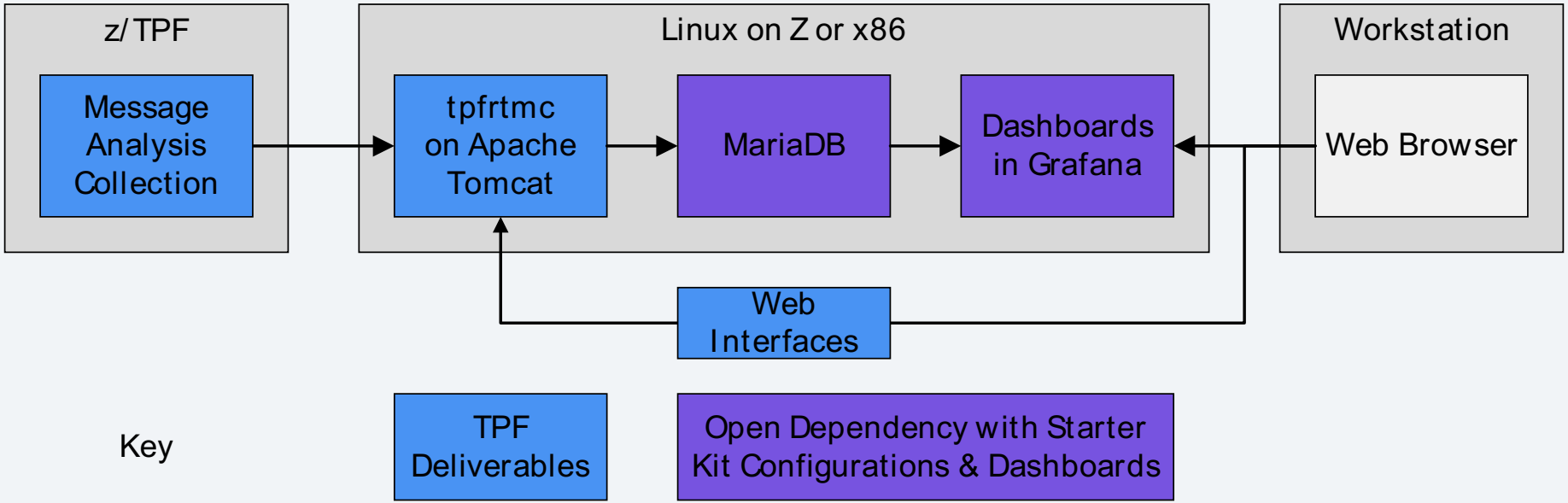
New Hire
Application Developer

Technical Details

- The z/TPF message analysis tool will be:
  - Built upon open-source solutions.
  - Leverage web-based dashboards to view CPU and other resource metrics.
  - Leverage web-based interfaces for registration, managing collections, etc.
  - Customizable and extendable.
  - Provided as a sample starter kit. All components will be easily deployed and administered by using Docker, Kubernetes, Red Hat OpenShift, etc.
  - Capable of performing collection in production environments.
  - Provided with z/TPF, no additional products to purchase.

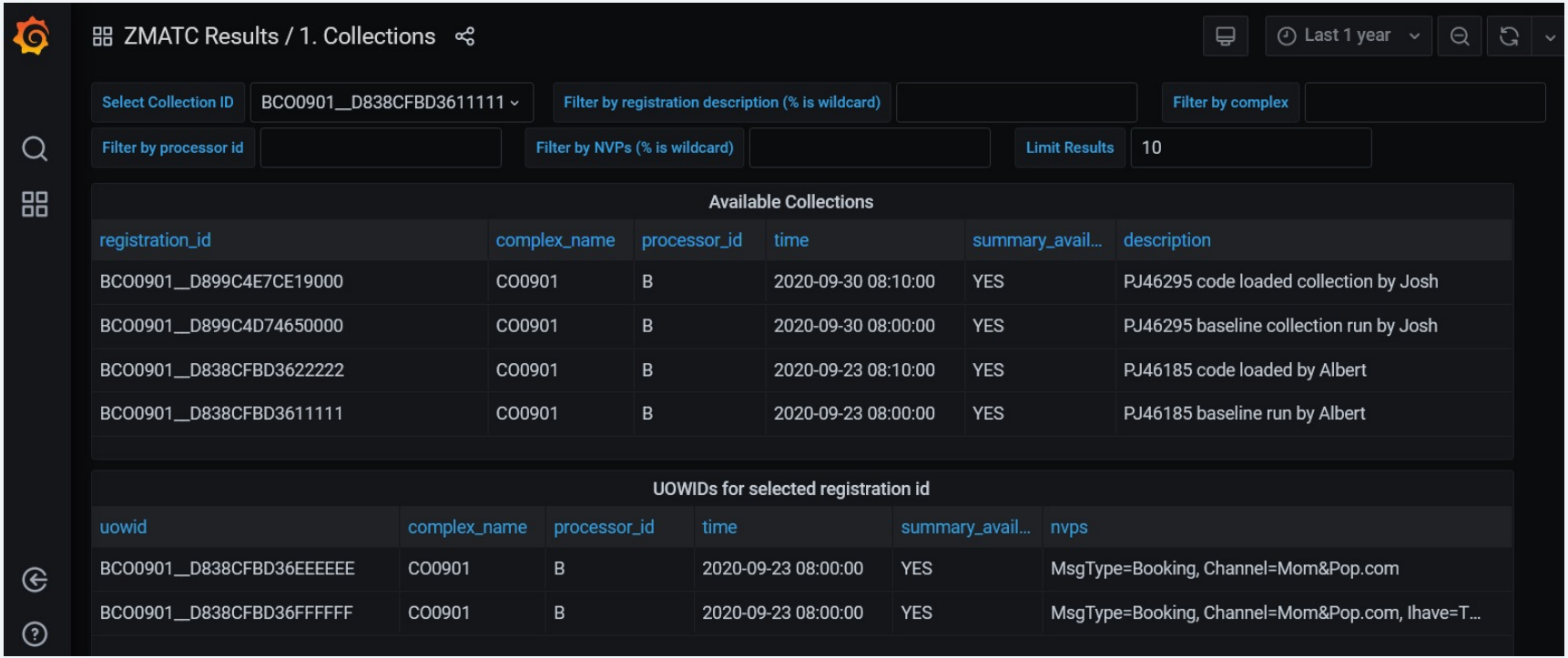
Technical Details

- The z/TPF message analysis tool will use the pipeline already built for real-time runtime metrics collection. As such, it's advisable to start making the investment to implement tpfrtmc in your environment. You can start with the z/TPF Insights Dashboard Starter Kit from the z/TPF Tools download page.



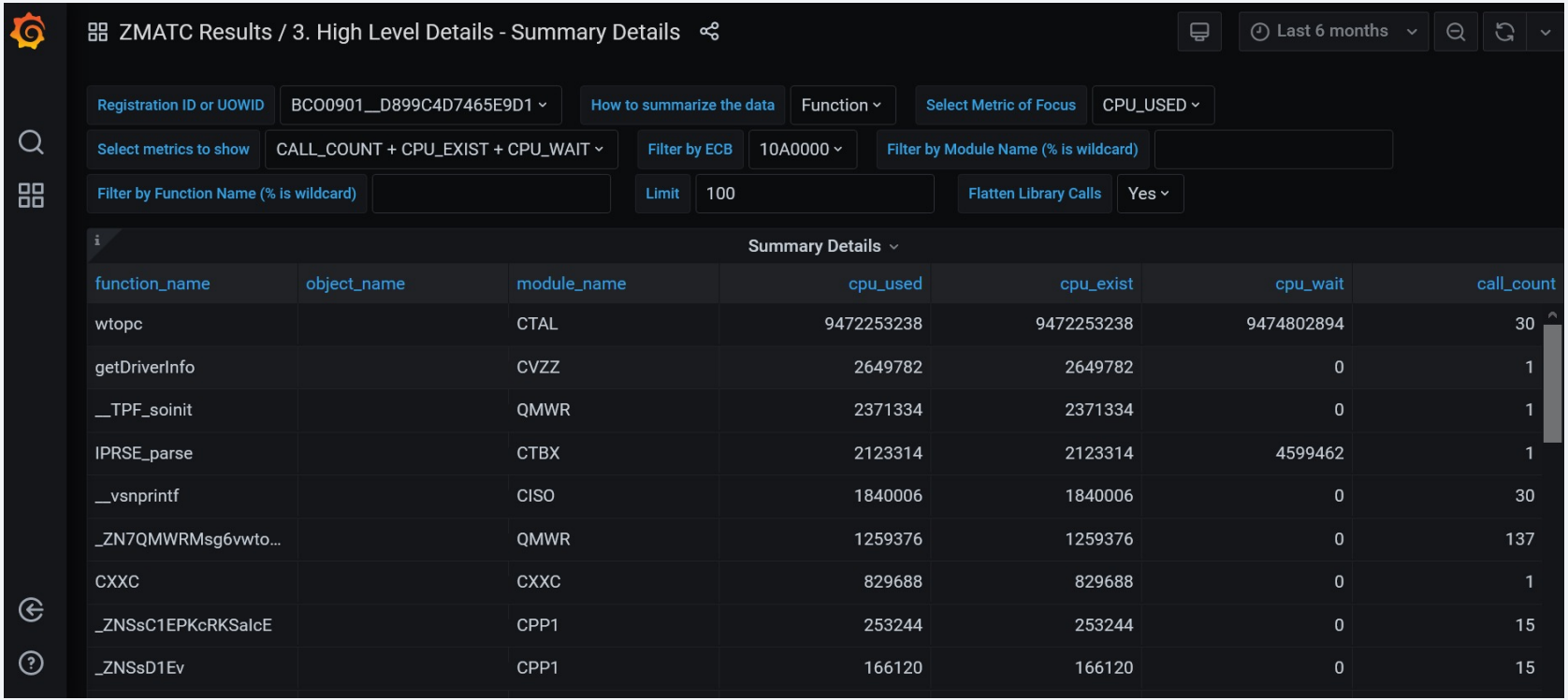
Prototype Screenshot – Collections Dashboard

- The Collections dashboard allows you to see the list of available collections.



Prototype Screenshot – Summary Details Dashboard

- The Summary Details dashboard shows summarized metrics for functions, etc.



function_name	object_name	module_name	cpu_used	cpu_exist	cpu_wait	call_count
wtopc		CTAL	9472253238	9472253238	9474802894	30
getDriverInfo		CVZZ	2649782	2649782	0	1
__TPF_soinit		QMWR	2371334	2371334	0	1
IPRSE_parse		CTBX	2123314	2123314	4599462	1
__vsnprintf		CISO	1840006	1840006	0	30
_ZN7QMWRMsg6vwto...		QMWR	1259376	1259376	0	137
CXXC		CXXC	829688	829688	0	1
_ZNSsC1EPKcRKSalcE		CPP1	253244	253244	0	15
_ZNSsD1Ev		CPP1	166120	166120	0	15

Conclusion

- The z/TPF message analysis tool will replace the TPF Toolkit 4.2 Performance Analyzer and provide many more features including running in production environments.
- The z/TPF message analysis tool will be built upon changes to trace log as discussed in the Trace log enhancements TPFUG presentation:
  - Capturing child ECBs.
  - Automatically activating all ECB trace levels for the captured ECBs.
  - Adding copy-on-write details.
  - Adding resource contention details
- The z/TPF message analysis tool will provide developers, architects, and your business shift left development cycle savings, better ROI refactoring analysis, resource usage diagnostic tooling and educational resources.

Thank you

- Let us know if your interested in being a sponsor user to help shape the features of the z/TPF message analysis tool. jwisniew@us.ibm.com & danielle.tavella@ibm.com
- In 2Q2021, we plan to do end user testing of the dashboard user interface with fake data to refine the user experience.
- If there is customer interest, we could make a beta available in 2H2021 (includes control program, real time, and offline changes).

Virtual TPFUG Q&A

Question	Answer
Is the Insights Dashboard Starter Kit available yet?	Yes, it is. Here is the link: https://www.ibm.com/support/pages/ztpf-real-time-insights-dashboard-starter-kit The starter kit can be used with real-time runtime metrics collection. But it can also be used stand alone with replays. It was most recently updated with support for the system wide JVM Monitor which will be discussed later today.
Regarding the Message Analysis tool, does tpfrtmc, MariaDB and Grafana all need to be collocated with z/TPF?	No, these components do not need to be collocated with z/TPF. We often doing tests x86 servers that are hosted in other parts of the country. The tpfrtmc offline utility and MariaDB operate best collocated.

Virtual TPFUG Q&A

Question	Answer
Does IBM offer special licenses for MariaDB & Grafana with message analysis tool?	MariaDB and Grafana are open-source products and so there is no fee for use.
What metrics are available on the dashboards?	The first release of the message analysis tool will provide CPU used time, CPU wait time, CPU defer/delay time, Existence time and SVC macro counts. We plan to support additional metrics in the future.
Visual diagrams are a key required feature.	Would like to do some user testing with the dashboards to see if they satisfy customer needs. If a visualization is an imperative, we can't do this in Grafana but could generate UML from the results and use an external viewer. We would like more customer input on this front.