Increasing Engineering Productivity in Microservices World

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About My Company

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About Me

Work

QuickBooks TurboTax Mint

Financial Data Platform

Play

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dynatrace

New Relic.

CloudBees
The Enterprise Jenkins Company

Sumit Nagal

Principal Engineer in Quality, Intuit

Agenda

- Microservices Overview
- Opportunity
- Journey Line
- Optimization
- Helping Engineering Productivity
- Best Practices and Lessons Learned
- Q & A

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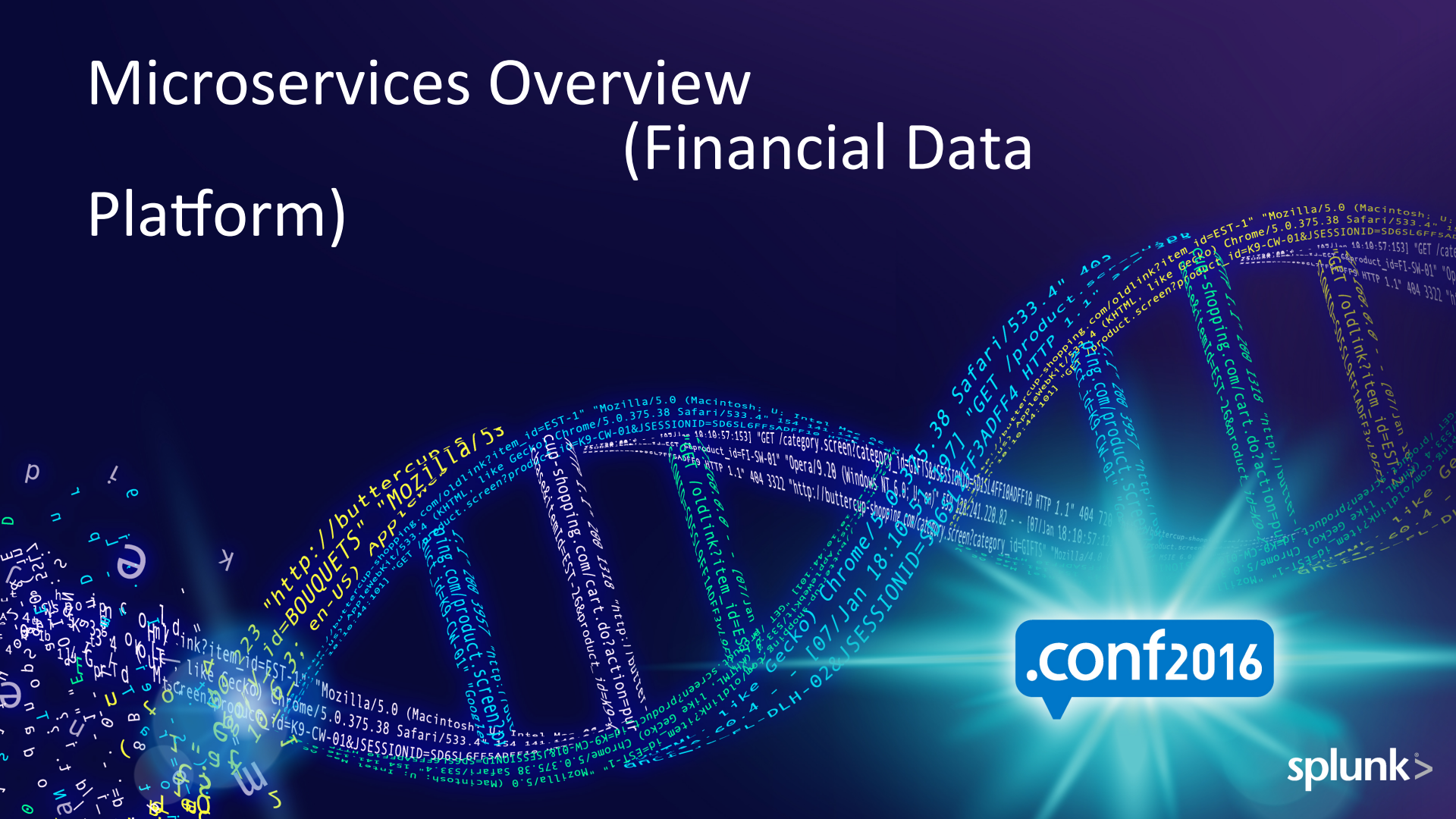
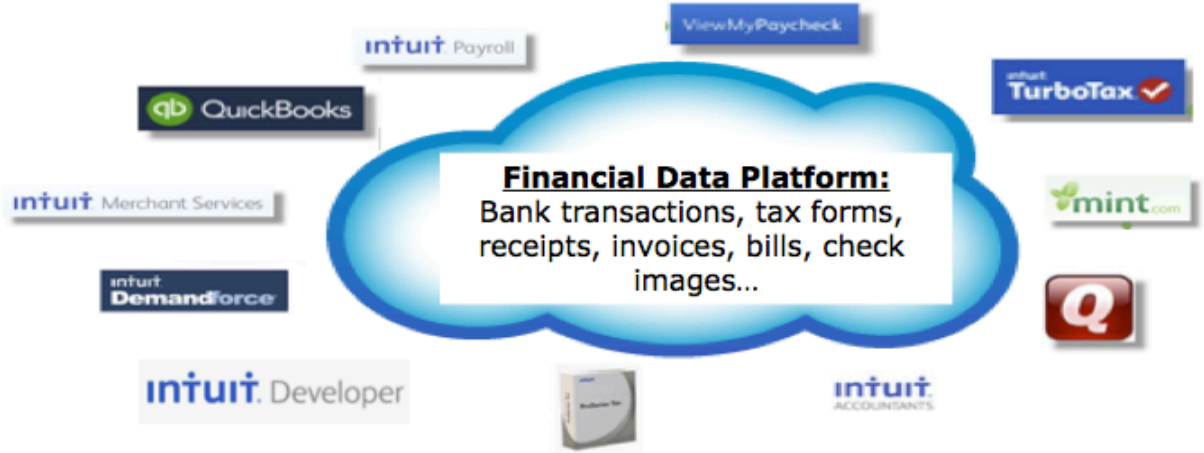
Microservices Overview (Financial Data Platform)



Financial Data Platform – Mission

Acquire and provide financial data that enables awesome user experience across the small business and consumer ecosystems



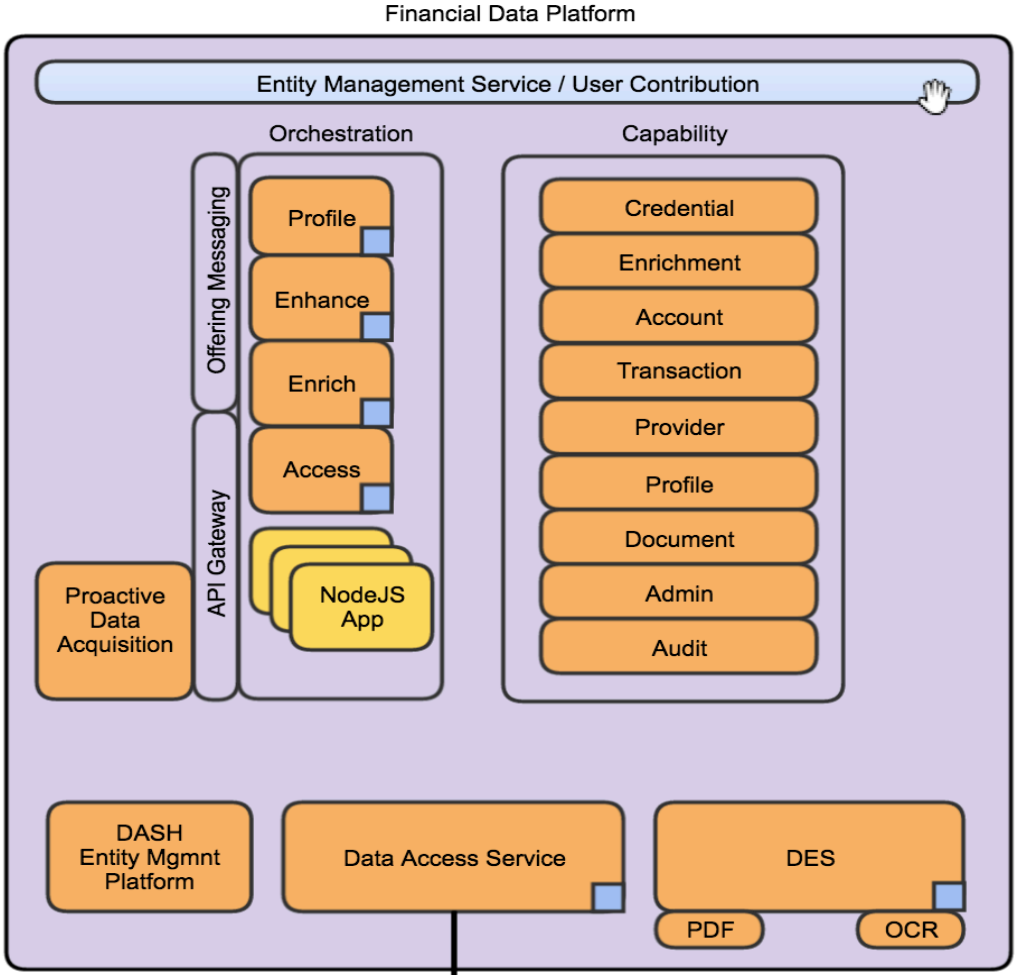
Powering key cross-Intuit initiatives:

Get data for taxes
Online banking
Intuit Commerce Network
Intuit Vault
Bill pay
Never enter data

Intuit Proprietary & Confidential

intuit

Overview



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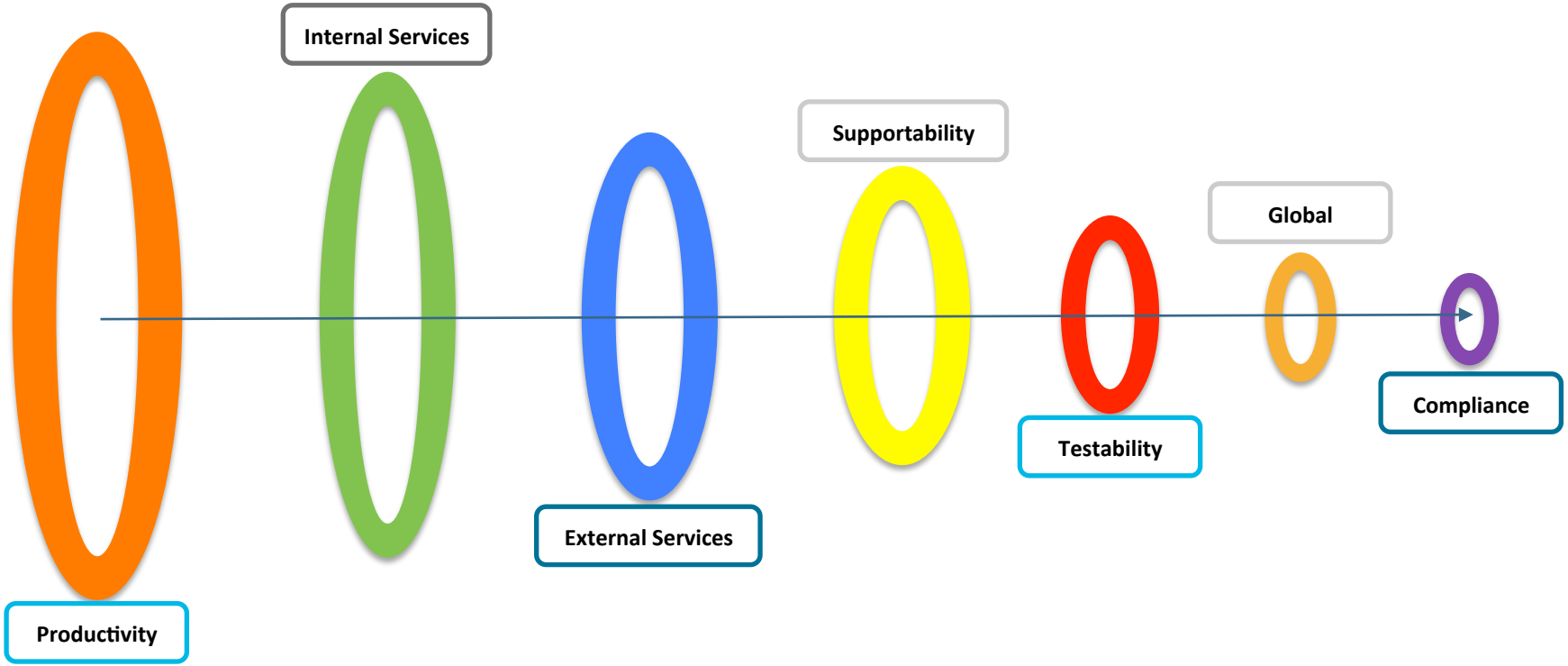
Opportunity

Challenges – Microservices



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Challenges - Engineering

Dev-Engineer

I need early integration environment.

I want to quickly identify and fix integration issues.

Ops-Engineer

I need visibility of the infrastructure.

I need the information on dependent services.

Quality-Engineer

I need to test every service in isolation.

I need visibility of my dependent service testing and its impact on my service.

Support-Engineer

How will I identify issue in service for customer flow?

How will I help customer and external services to identify service problem ?

Product Manager

What features are widely used by internal team ?

How to pivot services quickly based on external requirements ?

Management

How can I get visibility releases across services ?

What are potential bottlenecks for service release ?

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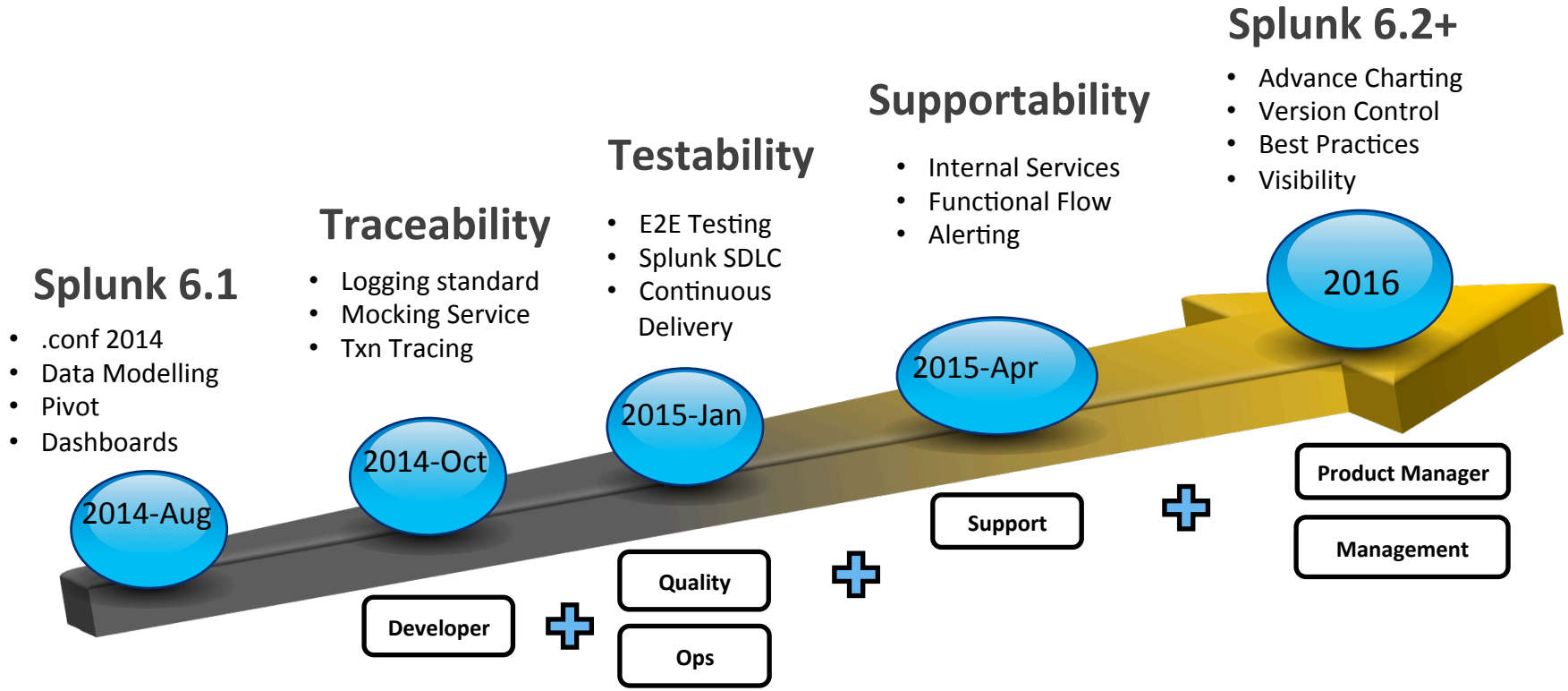
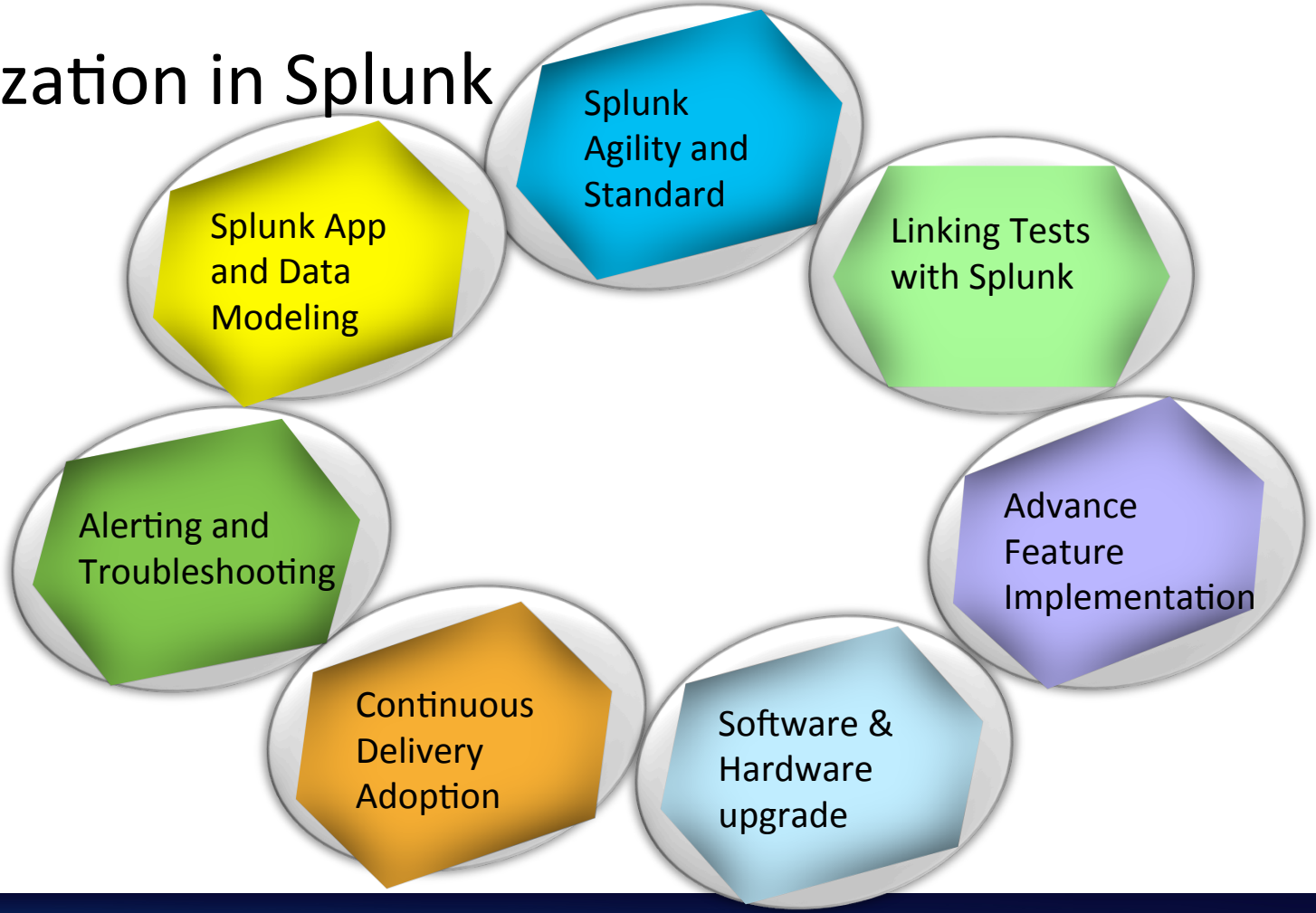
Journey Line

Journey Line

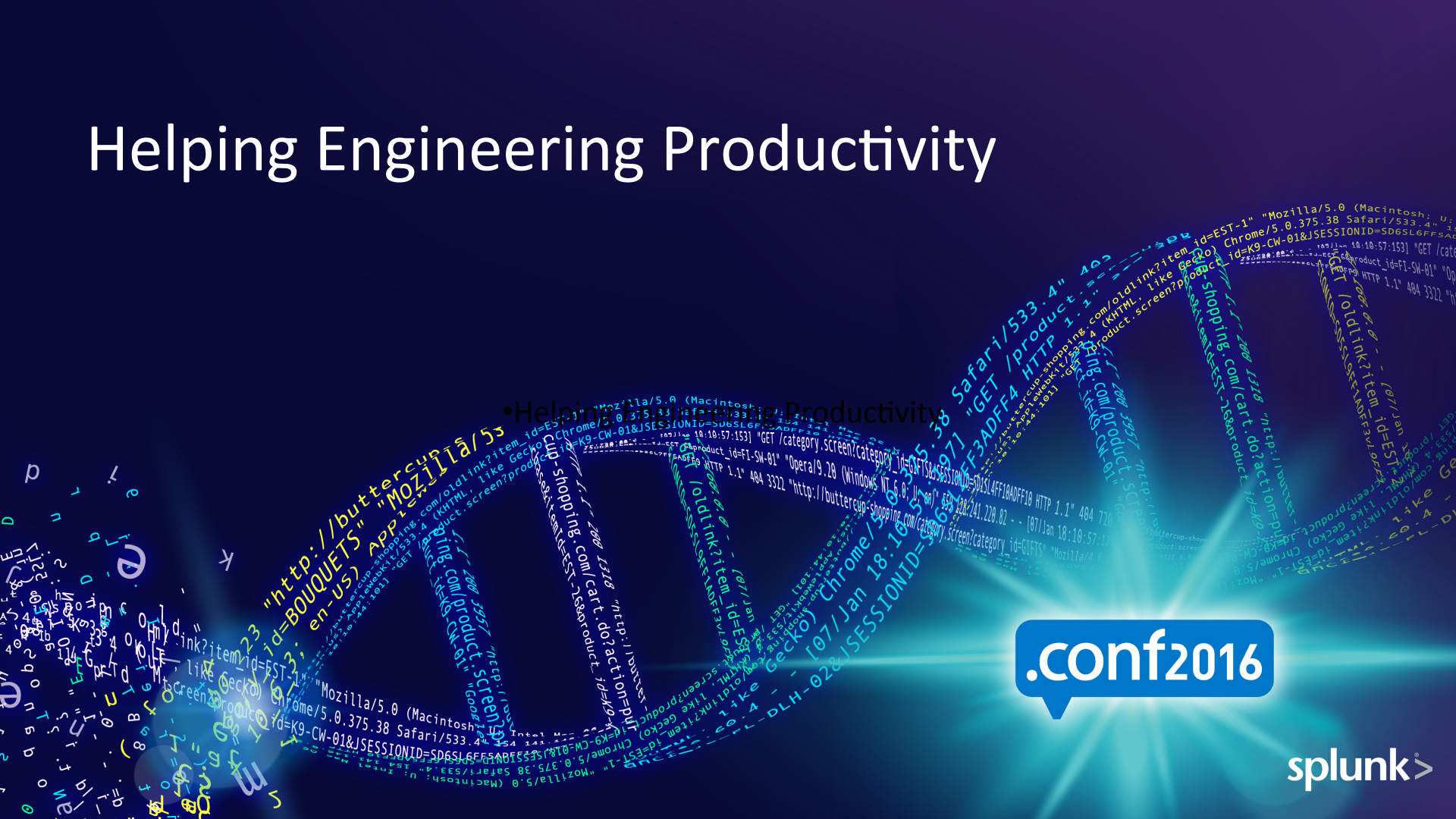


Optimization

Optimization in Splunk



Helping Engineering Productivity



Process Implementation-Increase Engineering Productivity

For Reference

- Continuous Delivery
- Standards (Logging/Testing/E2E/Certification)
- Traceability
- Adoption
- Agility

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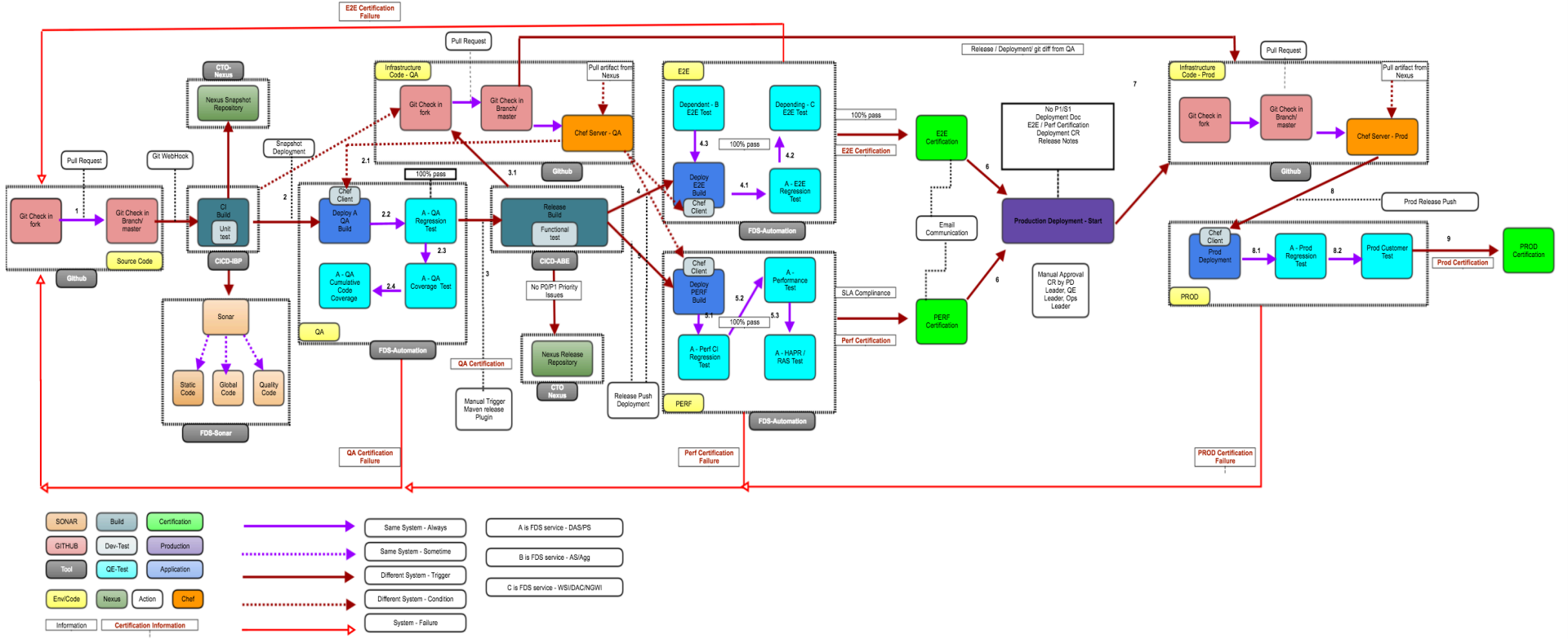
Continuous Delivery

For Reference



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Standards - Process Adoption

- Logging
  - –
- Testing
  - –
- Workflow
- Certification

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Standards - Logging

For Reference

Log Formatting Information

Edit

Created by Nagal, Sumit, last modified by Cao, Hong on Mar 31, 2015

Access | Document | Provider | DAC | DAS | DAP | PES | NGWI | Vault | WSI | CS

S.No.	Log Location	Existing	Suggestion
1	Time Format	20140902.104501.496/PDT	yyyy-MM-dd HH:mm:ss.SSS/zzz
2.	Logging Information coming from calling application (TTO Import)	• intuit_tid - tid=58666a1d-008b-4f23-af7f-9cfd946625c1 • Provider name - providerId=VerizonTest • Entity Type - entityTypes=[W2,1098] • Entity Count - entityCounts=[W2=1,1098=1] • Tax Year - taxYear=2014 • Auth ID - userAuthId=??? • App ID - appId=Intuit.platform.fdpasservice.astestclient • Asset - asset=??? • Intuit Asset - intuitOrigAssetId=81447775182873983 00	• intuit_tid - tid=58666a1d-008b-4f23-af7f-9cfd946625c1 • Provider name - legacyId=VerizonTest • Entity Type - entTypes="W2" • Entity Count - entCount="W2=1,1098=1" • Tax Year - taxYear=2014 • Auth ID - authId=??? • App ID - appId=Intuit.platform.fdpasservice.astestclient • Asset - assetId=??? • Intuit Asset - origAssetId=81447775182873983 00 • IP address - ipAddress=
3.	Logging information coming from Application (AS)	• Log Level - level=INFO • Method Type - reqMeth=POST • End Point - reqPath=/v1/access • Query Param - reqQParams={} • Content Type reqContType=application/json • Request Content Length - reqContLength=357 • Free Memory - freeMem=436mb • Total Memory - totalMem=4085mb • Response Content Type- respContentType=application/json • Response Content Size - respContLength=6778 • Host Response Content Type - hostRespContentType=application/x-ofx • Host Response Content Channel Type -hostRespChannelType=ofx2 • Status Message - statusDetail= • Status Code - respStatus=200 • Status Code from DAS - accSvcErrorCode=?? • Total Time - execTime=966	• Log Level - level=INFO • class information class=com.intuit.platform.fdp.access.xyz • Method Type - reqMeth=POST • End Point - reqPath=/v1/access • Query Param - reqQParams="" • Content Type reqContType=application/json • Request Content Size - reqContSize=357bytes • Free Memory - freeMem=436mb • Total Memory - totalMem=4085mb • Response Content Type -respContType=application/json • Response Content Size - respContSize=6778bytes • Host Response Content Type - hostRespContType=application/x-ofx • Host Response Content Channel Type -hostRespChanType=ofx2 • Status Message - statusMsg= • Status Code - statusCode=200 • Status Code from DAS - svcStatusCode=??

Log Entry at Calling Service

The following style should be used by a service to log all calls made to a remote service. For example, this log entry should be generat

- date
- time :
- logLevel
- myAppId : This is my (i.e., the service generating the log entry) app Id
- intuit_tid :
- remoteAppid : AppId of the service to which the call is being made
- remoteMethod :
- remotePath:
- remoteStatus: HTTP status code received from the remote service
- remoteErrorCode: error code received from the remote service
- remoteExecutionTime: time elapsed between the when the request was send, and when the response was received.

These fields should appear in the logs in the order specified above. In addition to these fields, a service may also log additional data as

In case the calling service is using a SDK to talk to the remote service, it is the SDK's responsibility to log in this format. If the SDK does not lo maintained.

- date
- time
- logLevel
- myAppId : This is my (i.e., the service generating the log entry) app Id
- intuit_tid :
- remoteAppid : AppId of the service to which the call is being made
- appClass : The class name where the log is being generated
- appMethod : The method name where the log is being generated
- remoteErrorCode: error code received from the remote service
- remoteExecutionTime: time elapsed between the when the request was send, and when the response was received.

Other Log Entries

The following style should be application to log everything else. For example, this can be used to log something interesting within a me

- Date
- Time
- LogLevel
- myAppId : This is my (i.e., the service generating the log entry) app Id
- intuit_tid :
- appClass : The class name where the log is being generated
- appMethod : The class name where the log is being generated

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Standards - Testing

For Reference

S.No.	Task	AS	PS	DAS	DAC	WSI	Vault	Doc	NGWI	CS	AGG	Available
1	Automation for every Environment	DONE	DONE	DONE	DONE	IN PROGRESS	DONE	DONE	DONE	DONE	IN PROGRESS	DONE
2	Automation for every host	DONE	DONE	DONE	DONE	IN PROGRESS	IN PROGRESS	IN PROGRESS		DONE	IN PROGRESS	IN PROGRESS
3	Unique identification for every Test	DONE	DONE	DONE	DONE	DONE	IN PROGRESS	IN PROGRESS	PENDING	DONE	IN PROGRESS	IN PROGRESS
4	Production tests	DONE	DONE	DONE	DONE		DONE	DONE	IN PROGRESS	DONE	IN PROGRESS	IN PROGRESS
5	No hardcoding	DONE	DONE	DONE	DONE	DONE	DONE	DONE	IN PROGRESS	DONE	IN PROGRESS	IN PROGRESS
6	Detaching Test from Source Code	PENDING	DONE	DONE	DONE	IN PROGRESS	DONE	PENDING	PENDING	DONE	IN PROGRESS	IN PROGRESS
7	Perf Automation Support	DONE	DONE	IN PROGRESS	IN PROGRESS		DONE	DONE	IN PROGRESS	DONE	IN PROGRESS	IN PROGRESS
8	Automation Test Stability - QA	IN PROGRESS	DONE	IN PROGRESS	IN PROGRESS	IN PROGRESS	DONE	IN PROGRESS		DONE	IN PROGRESS	IN PROGRESS
9	Automation Test Stability - E2E	DONE	DONE	DONE	DONE	IN PROGRESS	DONE	DONE		DONE	IN PROGRESS	IN PROGRESS
10	Automation Test Stability - Perf	IN PROGRESS	DONE	IN PROGRESS	IN PROGRESS		DONE	IN PROGRESS		DONE	IN PROGRESS	IN PROGRESS
11	Automation test Time (less then 10 minutes)	PENDING	DONE	DONE	DONE		IN PROGRESS	PENDING		IN PROGRESS	IN PROGRESS	IN PROGRESS
12	Smart/Smoke Tests	DONE	DONE	IN PROGRESS	IN PROGRESS		DONE	DONE	DONE	DONE	IN PROGRESS	IN PROGRESS

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Standards - Workflow

For Reference

S.No	Services	Release	JIRA Project	Dev Portal	Git	CI	Automation	Dependent Service	Depending Service	Security	Splunk
1	***NGWI***	X.X	NWI	NGWI	P4 : //ficds/DataAcquisitionService/webintegration/nextgencore/	NGWI_CI	NGWI	PS, PES , DES	AS, DAS, Agg		NGWIDataModel
2	**WSI**	X.X	FWSI	WSI	https://github.intuit.com/CTO-FDS-DurableConnectivity/wsi.git	WSI_IBP_CI	WSI	Doc, PS	FDI , DAS, Agg	WSI.pdf	WSIDataModel
3	**DAC**		FLGC	Direct API Connectivity	https://github.intuit.com/CTO-FDS-DurableConnectivity/dac.git	DAC_IBP_CI	DAC	PS,	AS, DAS, Agg, NGWI,	dac.pdf	DACServiceDataModel
4	**DAS**		OFXT	DAS	https://github.intuit.com/CTO-FDS-DurableConnectivity/das.git	DAS_IBP_CI	DAS	PS, DAC, NGWI, WSI, HDS, CRED	Agg, AS, FDI	das.pdf	DasServiceDataModel
5	**HDS**		FFBI	Hosted Data Services	https://github.intuit.com/CTO-FDS-DurableConnectivity/hds.git	HDS_IBP_CI	HDS	PS, PBI	AS, DAS, Agg,	hds.pdf	HDSDataModel
6	**PBI**		FFBI	Bulk Import	https://github.intuit.com/CTO-FDS-DurableConnectivity/pbi.git	PBI_IBP_CI	-	PS	AS, DAS, Agg, HDS	pbi.pdf	PBIDataModel
7	**CRED**		CRED	Credentials Service	https://github.intuit.com/CTO-FDP-Credential-Service/single-credential.git	CRED_IBP_CI	CRED	PS	AS, DAS, DAC, Widget		CredentialServiceDataModel
8	**Transaction**		FAT	Transaction Service	https://github.intuit.com/cto-dev-fdp-fdi/transaction.git	FDP-TXN	Txn	-	Enhance, Trinity		TransactionServiceDataModel
9	**Doc**		FDP	DOC		DOC_CI	Doc	DAP	AS, WSI, FDI , DAS		docservicedatamodel
10	**PES**		PDFX	PDF Extraction Service	https://github.intuit.com/PDFX/PesPdfExtractService.git	PES_IBP_CI	PES	PS	NGWI, AS, DAS		PEServiceDataModel
11	**AVS/FDI**		FAT	FDI		FDI-AVS	FDI-AVS	DAS, NGWI, Provider	-Widget		AVSDataModel
12	**Enhance/FDI**		FAT	FDI	https://github.intuit.com/cto-dev-fdp-fdi/enhance.git	FDI-Enhance	FDI	Transaction, Agg Classic	-Widget		FDIDataModel
13	**Vault**		FDP	Vault Service			-	Doc	-		-
14	**Profile/FDI**		FAT CRED for profile v2	FDI	https://github.intuit.com/fdp/fdp-profile-service.git	FDI-Profile	NA	PS, NGWI, DAS	-		FDIDataModel
15	**CAT**		CCCAT	Categorization	https://github.intuit.com/FDSCategorization/Categorization.git	CAT-IBP-CI	CAT_Local_CI-Regression	IUS	PERS , Agg		CATDashboard
16	**Agg**		FDSA	AGG	P4		Agg	NGWI, PS , DASH	AS, DAS, DAC, WSI, NGWI		Aggdatamodel
17	**Das Connector**		OFXT	NA			Agg	Agg	AS, DAS, DAC, WSI, NGWI		Aggdatamodel
18	**DASH**		DAS	DASH	Git Link Automation Link	DASH_CI AdminUI_CI	DASH_Automation AdminUI_Automation	-	PS		DASH Splunk
19	**Personalization**		PERSONALIZATION Under Categorization	Personalization	https://github.intuit.com/FDSCategorization/Personalization.git	Pers-IBP-CI	PERS_Local_CI-Regression		COAAnalyzer		
20	**COAAnalyzer**		COAAnalyzer Under Categorization	COAAnalyzer	https://github.intuit.com/FDSCategorization/COAAnalyzer.git	COA-IBP-CI	COAAnalyzer Regression	PERS QBOv3 API	-		COAAnalyzerDashboard
21	**AS**		FAS	Access Service			AS	PS, Doc,DAS, NGWI, HDS,			accessservicedatamodel
22	**Accounts**		-	Account Service	https://github.intuit.com/cto-dev-fdp-fdi/account.git	FDP-Account	FDP-Account	-	-		-
23	**CAF/FDI**		FWSI	FDI	https://github.intuit.com/cto-dev-fdp-fdi/customer-authorization-deauthorization.git	FDI-CAF	FDI	PS,	DAS, Doc, WSI,		FDIDataModel
24	**PS**		FDPS	PS	https://github.intuit.com/FDP-QE/ProviderService-IntegrationTests.git	PS_CI	PS		AS, DAS, DAC, Agg, WSI, NGWI, FDI , HDS, CRED, Doc, Vault, Bulk Import, PBI, PES		ProviderServiceDataModel

Standards - Certification

For Reference

BankStream

QA

	Component	Release	Deployment	Automation	Certification
1	QBO	31.0.X	INPROGRESS	INPROGRESS	INPROGRESS
2	PS	1.11.1.0	1-7-2016	COMPLETE	COMPLETE
3	DAS	1.7.0.0.x	01-13-2016	COMPLETE	COMPLETE
4	WSI	1.2.0.27	01-12-2016	COMPLETE	COMPLETE
5	FDI - CAF	0.0.5X	2-09-2016	COMPLETE	COMPLETE
6	AGG	4.7.20.3	1-15-2016	INPROGRESS	INPROGRESS
7	Doc	1.2.12.0	02-10-2016	COMPLETE	COMPLETE
8	BIM	4.7.21.113	1-14-2016	INPROGRESS	COMPLETE

E2E

	Component	Release	Deployment	Automation	Certification
1	QBO	31.0.X	INPROGRESS	INPROGRESS	NOT READY
2	PS	1.11.1.0	1-7-2016	COMPLETE	COMPLETE
3	DAS	1.6.0.5	11-19-2015	COMPLETE	COMPLETE
4	WSI	1.2.0.27	01-12-2016	INPROGRESS	INPROGRESS
5	FDI - CAF	0.0.4	2-09-2016	COMPLETE	COMPLETE
6	AGG/BIM	4.7.21.113	1-15-2016	INPROGRESS	COMPLETE
7	Doc	1.2.12.0	02-10-2016	COMPLETE	COMPLETE

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Traceability - Visibility to Identify Potential Issue

- Workflow Strategy (End-to-End)
- Single Service
- Single Test

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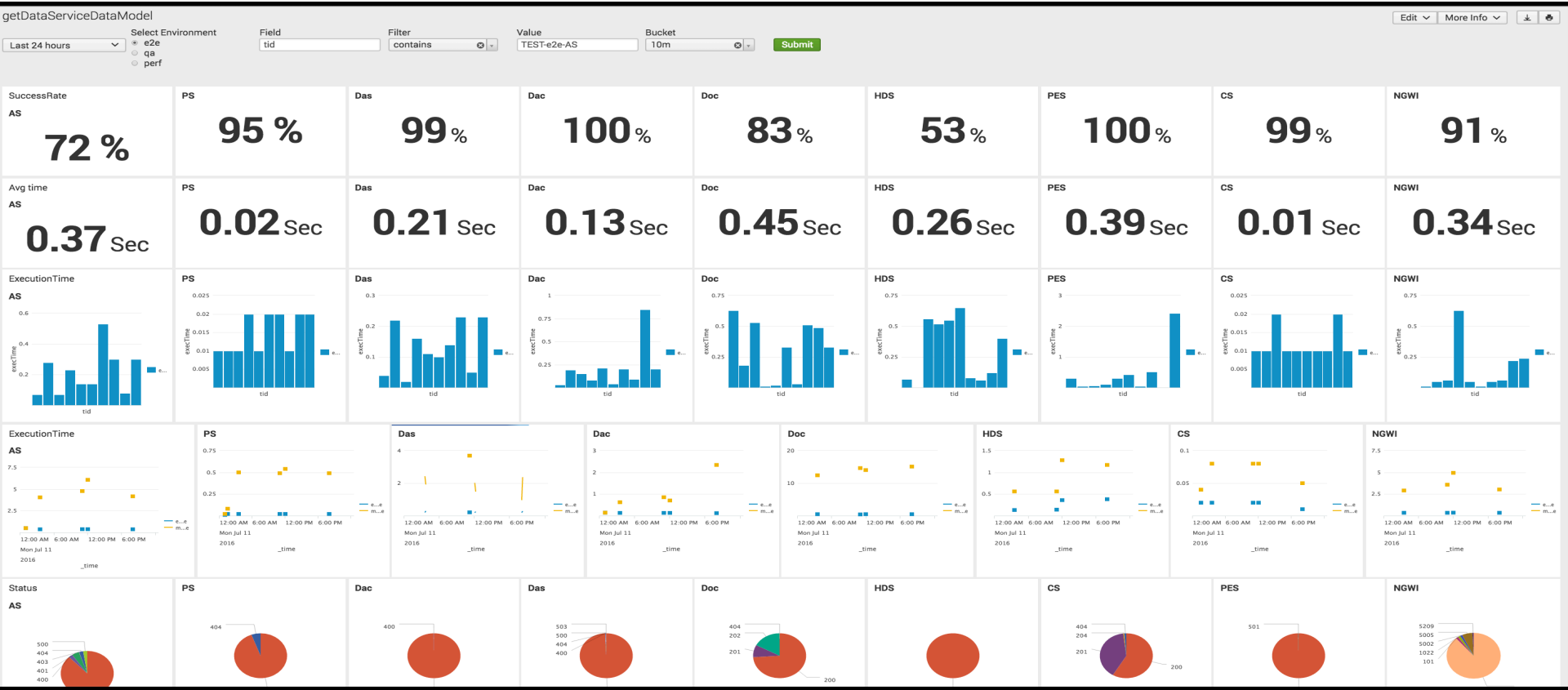
Traceability – Workflow – Tax

For Reference



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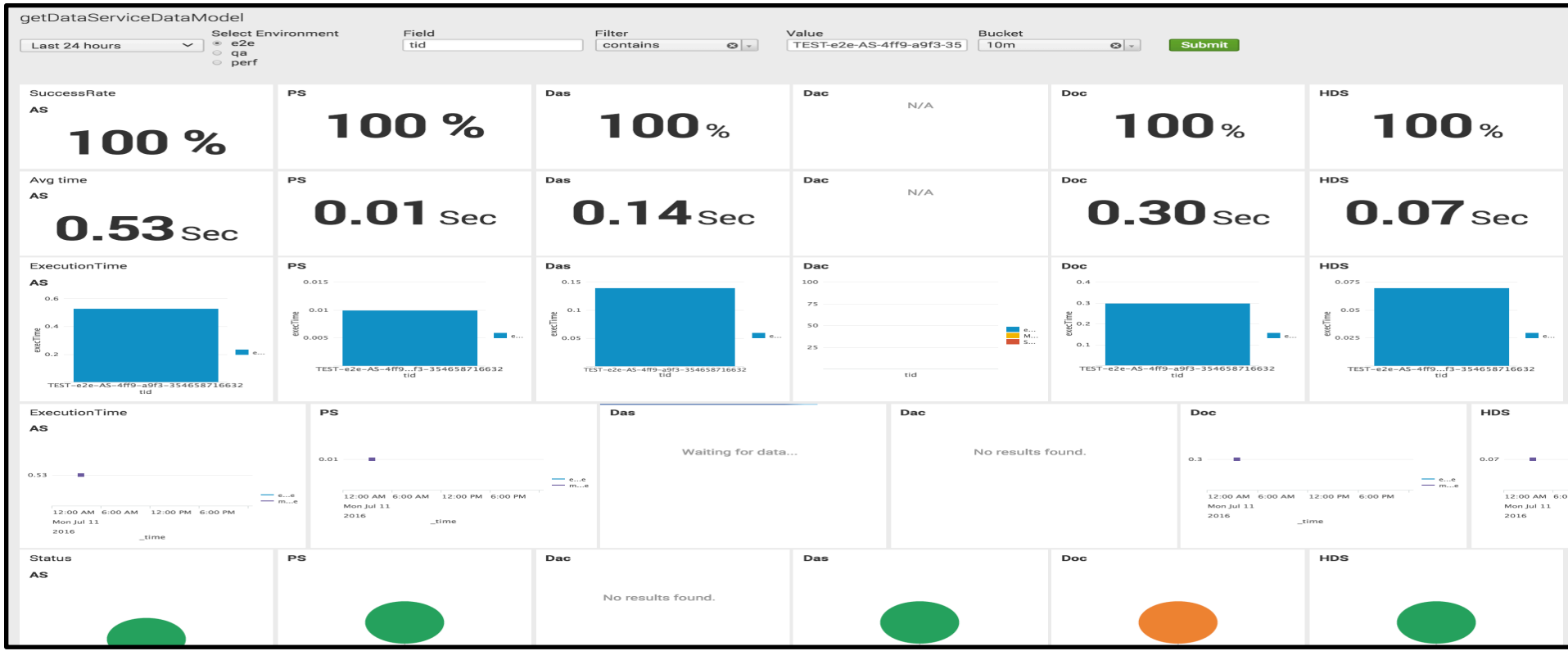
Traceability – Single Service - AS

For Reference



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Traceability – Single Test– AS

For Reference

Last 24 hours | Select Environment: e2e / qa / perf | Field: tid | Filter: contains | Value: TEST-e2e-AS-4ff9-a9f3-354658716632 | Bucket: 1h | Submit

Avg time

1 Sec

Avg Size

9 Kbs

Transactions

1

Success rate

100

Failure rate

0

execTime in Sec - top 10

tid	execTime
TEST-e2e-AS-4ff9-a9f3-354658716632	0.533000

Size in Kb - top 10

tid	respContLength
TEST-e2e-AS-4ff9-a9f3-354658716632	8.747070

BU App - Success Metrics

providerName	Intuit.platform.fdpasservice.astestclient
Dominion-Test	100.00%

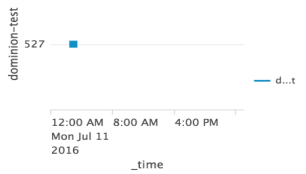
Status AS

providerName	200
Dominion-Test	1

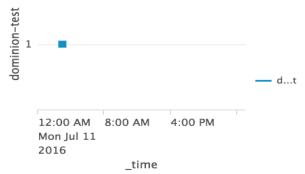
Failure AS

No results found.

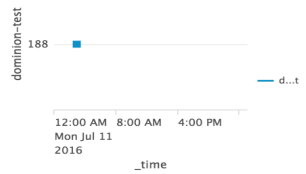
Access Service in ms



Provider Service in ms



DAS Service in ms



Alternat data service in ms

No results found.

Document service in ms

No results found.

Oauth Services in ms

No results found.

Provider by host

host	count(tid)
pe2eacqap400.ie.intuit.net	1

Provider ErrorCode

providerId	accSvcErrorCode	calledSvcErrorMessage
dominion-	0	

BU App - Information

AppId	BU
Intuit.platform.fdpasservice.astestclient	Intuit.platform.fdpasser

EntityType Information

entityTypes	taxYear	count
W2	2015	1

EntityCount Information

entityCounts	taxYear	count
W2=1	2015	1

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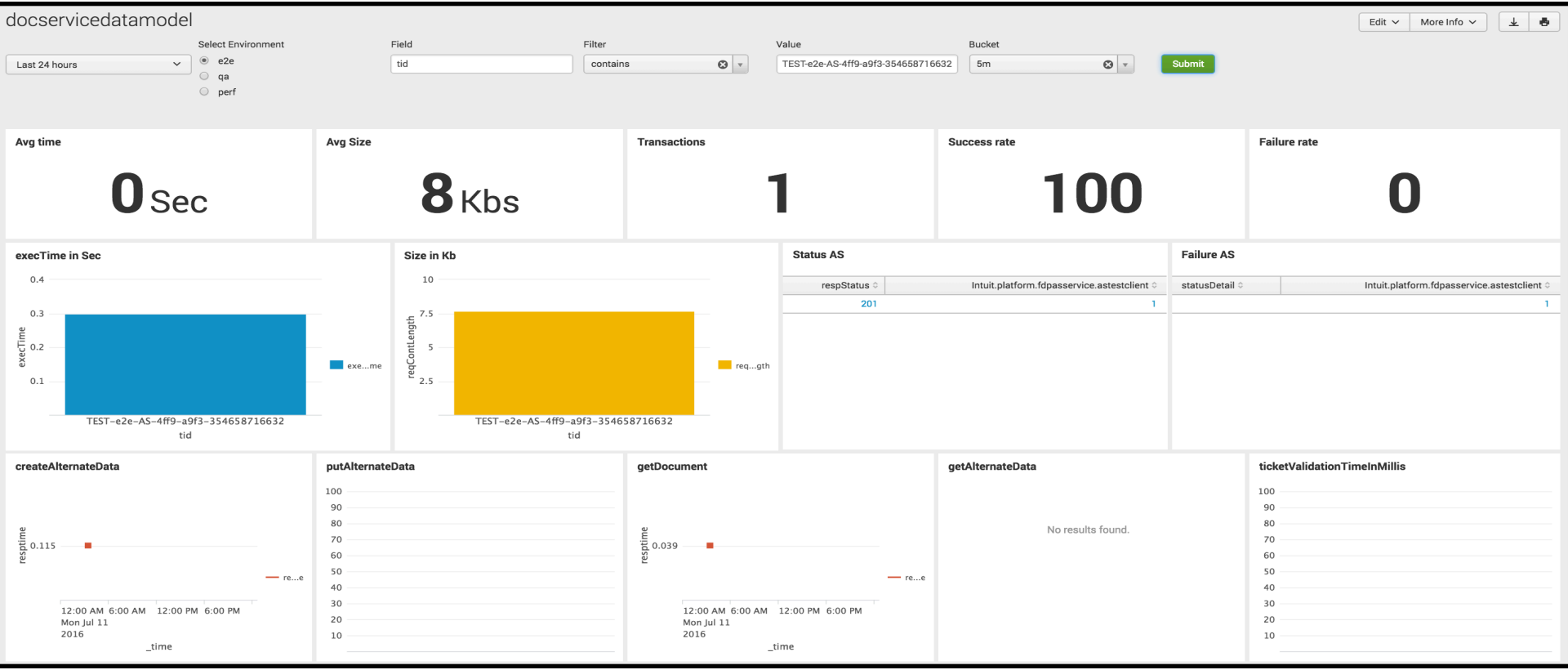
Traceability – Single Test– DAS

For Reference



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Adoption - Improving Engineering Productivity

- Workflow
- Internal Services
- External Services
- Single Service

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Adoption – Workflow - Tax

For Reference

Job ↓	Success #	%
FDP » AS » CD » AccessService_ClaimBased	5	100%
FDP » AS » CD » E2E-Test-Regression	1048	97%
FDP » AS » CD » E2E-Test-Sanity	33	100%
FDP » DAC » CD » QA-Bank-Regression	570	91%
FDP » DAC » CD » QA-Tax-Regression	1031	100%
FDP » DAS » CD » E2E-DAS-TAX-Regression	999	100%
FDP » DAS » CD » E2E-DAS-WSI-Regression	136	92%
FDP » DAS » CD » QA-Regression-Bank	570	91%
FDP » DAS » CD » QA-Regression-Tax	999	100%
FDP » Doc » CD » E2E-Test-Regression-Git	1146	98%
FDP » NGWI » CD » QA-Test-Sanity-109X	415	<100%
FDP » NGWI » CD » QA-Test-Sanity-DES	367	92%
FDP » NGWI » CD » QA-Test-Smoke	366	100%
FDP » NGWI » CD » QA-Test-Smoke-1095	18	12%
FDP » NGWI » CD » QA-Test-Smoke-Paychex	1	>0%
FDP » PS » CD » E2E-Test-Regression	17	100%
FDP » PS » CD » QA-Test-Regression	14	100%
Total	7735	94%

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Adoption – Workflow - Banking

For Reference

Job ↓	Success #	%
FDP » DAC » CD » E2E-Test-Sanity	1021	99%
FDP » DAC » CD » QA-Test-Sanity	0	0%
FDP » DAS » CD » E2E-Test-Sanity	1202	<100%
FDP » DAS » CD » E2E-Test-Smoke	1014	57%
FDP » DAS » CD » QA-Test-Sanity	1722	99%
FDP » DAS » CD » QA-Test-Smoke	0	0%
FDP » FDI » CD » E2E-Test-Regression	1	20%
FDP » FDI » CD » E2E-Test-Sanity	14	67%
FDP » FDI » CD » E2E-Test-Smoke	2	40%
FDP » FDI » CD » QA-Test-Regression	3	60%
FDP » FDI » CD » QA-Test-Sanity	18	86%
FDP » FDI » CD » QA-Test-Smoke	2	40%
FDP » HDS » CD » E2E-Test-Regression	13	62%
FDP » HDS » CD » E2E-Test-Sanity	13	62%
FDP » HDS » CD » QA-Test-Regression	13	62%
FDP » HDS » CD » QA-Test-Sanity	13	62%
FDP » HDS » CD » QA-Test-Smoke	0	0%
FDP » WSI » CD » E2E-Test-Regression	260	92%
FDP » WSI » CD » E2E-Test-Sanity	0	0%
FDP » WSI » CD » QA-Test-Regression	267	94%
Total	5578	86%

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Adoption – Tax – Internal Services

For Reference

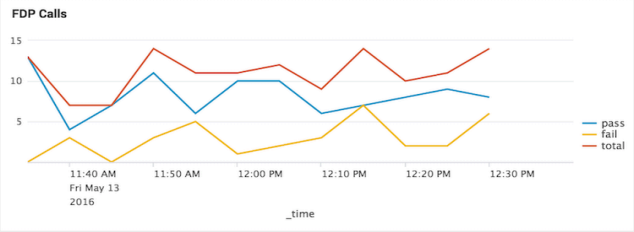
getData_CFP_DS_FDP_DataModel

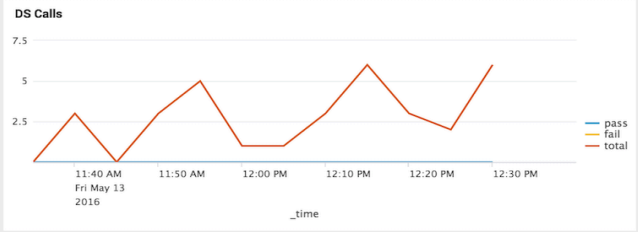
Edit | More Info

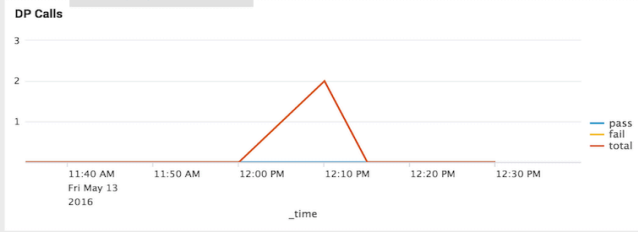
Field: tid | Filter: contains | Value: * | Bucket: 5m | Last 60 minutes | Submit

Total calls	Total Failures	FDP Error DS Success	FDP Error DS Success %	FDP Calls	FDP calls - Success	DS calls	DS Success	DP calls	DP Success
169	70	0	0.00%	133	99	33	0	3	0

2m ago







Distribution of fild - DS and FDP

fild	execTime	DSFAIL	DPFAIL	FDPFAIL	DSSUCCESS	DPSUCCESS	FDPSUCCESS	hosted	Retry	DP	DP_Percentage_Failure	DP_Percentage_Success	DS	DS_Percentage_Failure	DS_Percentage_Success	FDP	FDP_Percentage_Failure	FDP_Percentage_Success	Total
[redacted]	10.13	0	0	0	0	0	1	IntuitCC	0	0			0			1	0.00%	100.00%	1
	9.22	0	0	0	0	0	1	IntuitCC	0	0			0			1	0.00%	100.00%	1
	3.74	2	0	2	0	0	0		0	0			2	100.00%	0.00%	2	100.00%	0.00%	4
	8.65	0	0	0	0	0	1		0	0			0			1	0.00%	100.00%	1
	0.71	9	0	9	0	0	46	Self	0	0			9	100.00%	0.00%	55	16.36%	83.64%	64

« prev 1 2 3 4 5 6 7 next »

Distribution of App - DS and FDP

app	execTime	DSFAIL	DPFAIL	FDPFAIL	DSSUCCESS	DPSUCCESS	FDPSUCCESS	hosted	Retry	DP	DP_Percentage_Failure	DP_Percentage_Success	DS	DS_Percentage_Failure	DS_Percentage_Success	FDP	FDP_Percentage_Failure	FDP_Pe
Intuit.cc	1.59	1	0	1	0	0	5	Self	0	0			1	100.00%	0.00%	6	16.67%	83.33%
Intuit.ta	0.80	2	0	2	0	0	2	Self	0	0			2	100.00%	0.00%	4	50.00%	50.00%
Intuit.ta	1.56	30	3	31	0	0	92	IntuitCC Self	0	3	100.00%	0.00%	30	100.00%	0.00%	123	25.20%	74.80%

Distribution of Tax Form - DS and FDP

formtype	execTime	DSFAIL	DPFAIL	FDPFAIL	DSSUCCESS	DPSUCCESS	FDPSUCCESS	hosted	Retry	DP	DP_Percentage_Failure	DP_Percentage_Success	DS	DS_Percentage_Failure	DS_Percentage_Success	FDP	FDP_Percentage_Failure	FDP_Percentage_Success	Total
[redacted]	1.28	19	3	20	0	0	84	Self	0	3	100.00%	0.00%	19	100.00%	0.00%	104	19.23%	80.77%	126
	2.48	14	0	14	0	0	15	IntuitCC Self	0	0			14	100.00%	0.00%	29	48.28%	51.72%	43

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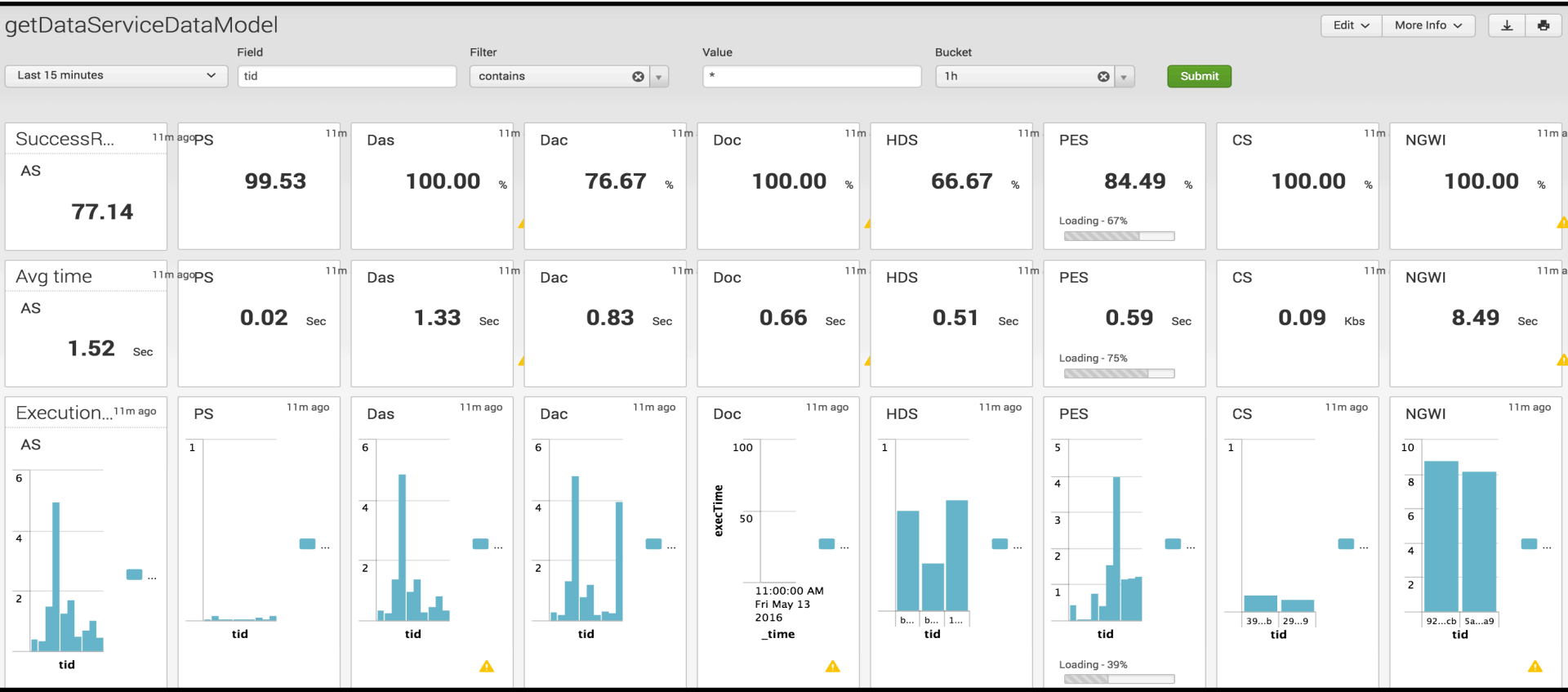
Adoption – Tax – FDP Services

For Reference



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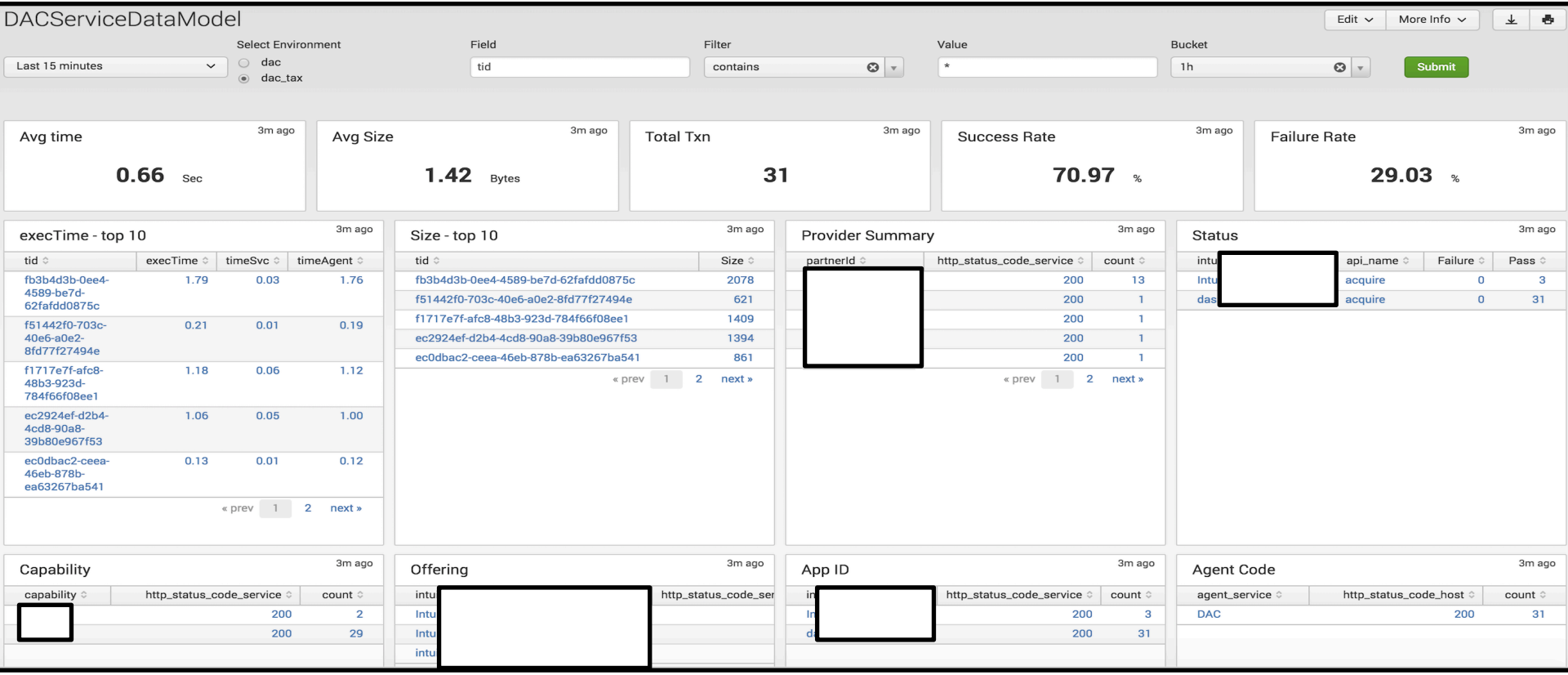
Adoption – Tax – External Service

For Reference



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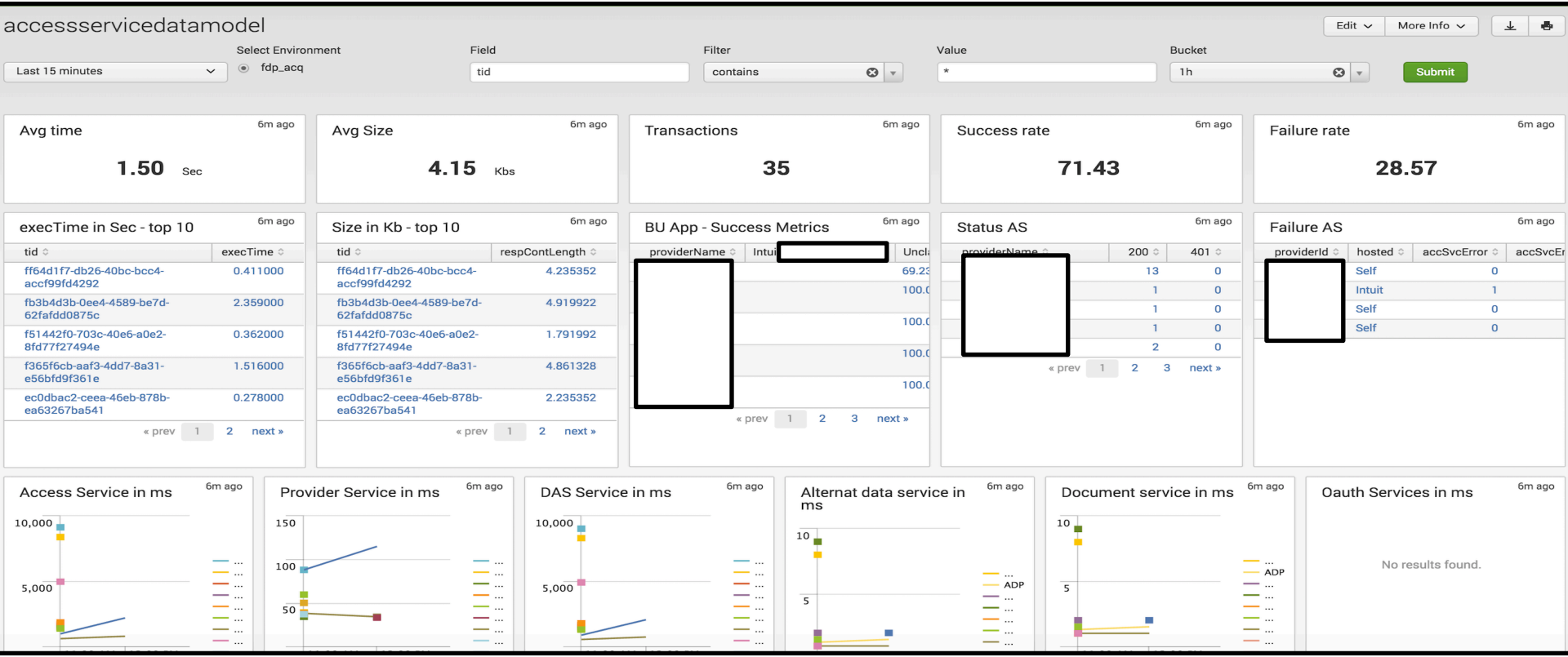
Adoption – Tax – Single Service -AS

For Reference



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Agility - Increasing Productivity with Splunk

- Right indexing across environment – holistic view
- Pivot creation - standard
- Dashboard creation - standard
- Extracted Fields - standard
- Transaction ID - standard
- Version control – maintaining and managing of Splunk assets
- Promotion – Simplify monitoring and alerting in production
- Traversing – Across microservices
- tstats utilization in place of pivot – performance boost
- Summaries – Acceleration technology with summary indexing

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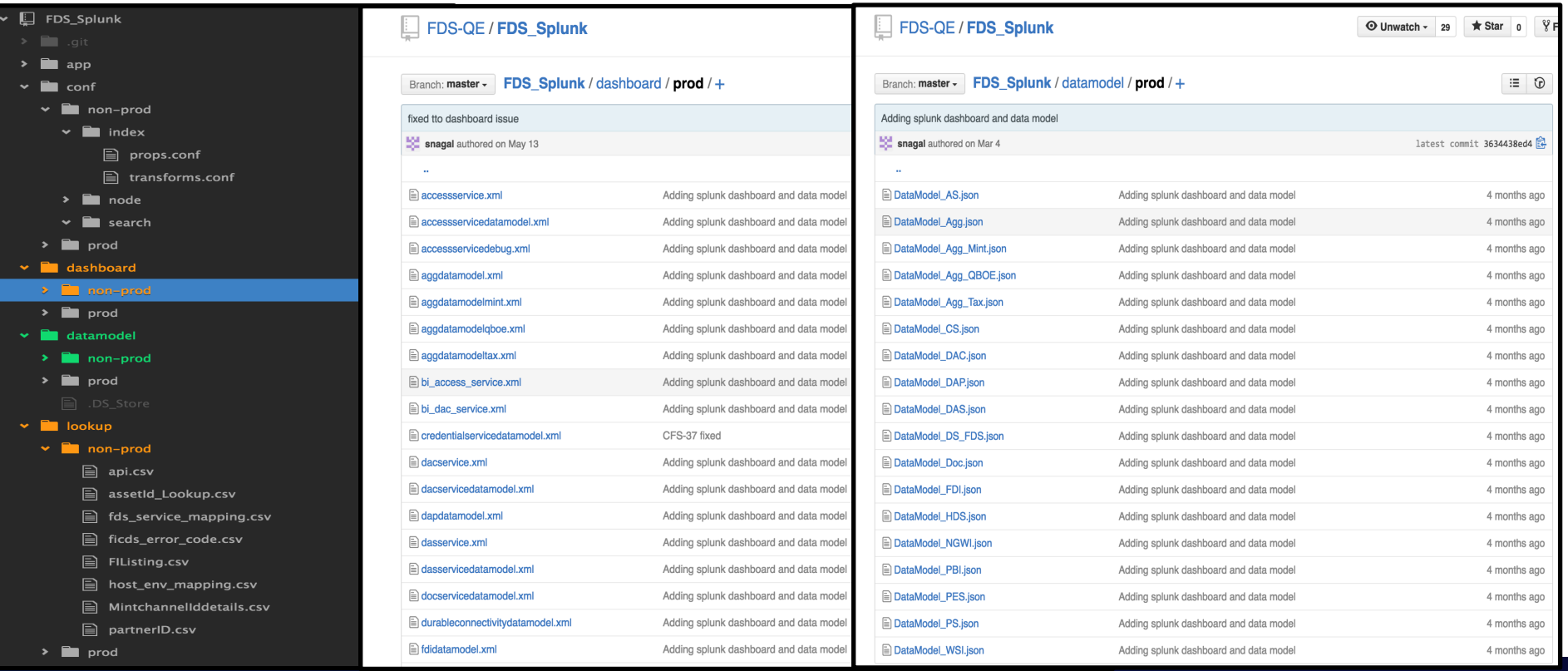
Agility – Increasing Productivity with Splunk

For Reference



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Best Practices / Lessons Learned/ What's Next

Best Practices

- Microservices are different than monolith – handle with care
- Logging standard – must be in microservices
- End-to-end testing – strategy define
- Data modelling – per service
- Continuous delivery - adoption
- Splunk SDLC - alerting / supportability / accountability

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Lessons Learned

- Performance issues
- Number of queries per user
- Dashboard debugging with data model
- Data model migration
- Modification in data model (enhance/ updation)
- Process accountability
- Data model – supportability special char “|”
- Json parsing with data model is challenging
- Calculation field support is missing in data model
- Disk space

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What's Next

- Atlassian Jira integration
- PagerDuty
- Splunk REST API
- Atlassian HipChat
- CloudBees Jenkins
- Splunk annotation in testing
- Interaction and linking in multiple dashboards
- Holistic data model and dashboard - any service

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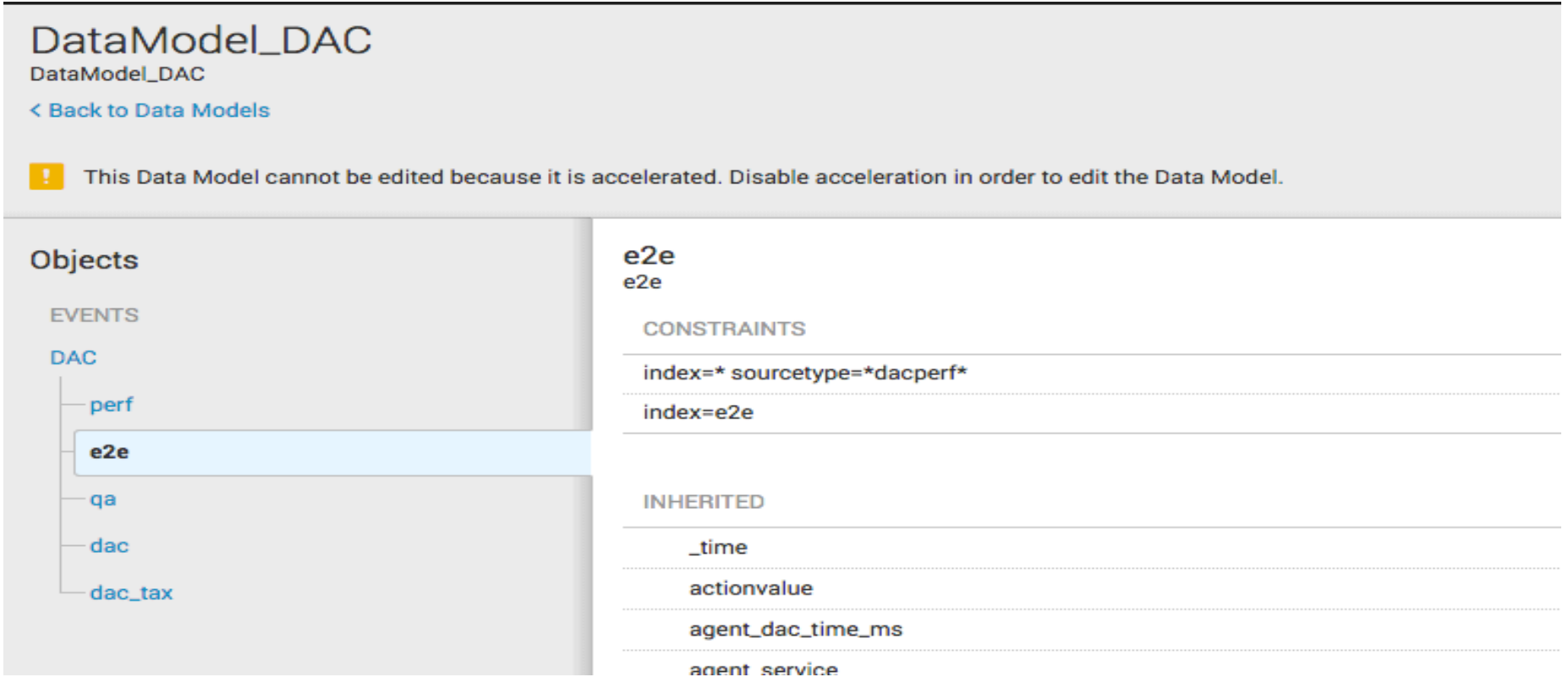
Q & A

THANK YOU

Appendix

Splunk – Data Model

For Reference



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Splunk – Data Model - Fields

For Reference

EXTRACTED

acti		String
age	_ms	Number
age		String
age		Number
api		String
api_		String
autl		Number
byt	d	Number
byt		Number
cap		String
dac		Number
dat		String
Dm	_exceptions	String
doc	3_count	String
doc	9_count	Number
doc	count	String
ein		String
env		String
erro		Number
erro	t	Number
erro	vice	Number
erro		String
erro	:	String
erro	ice	String
Har	us	String
hos	ersion	Number
hos	version	Number
hos		String
http	de_host	Number
http	de_providersvc	Number
http	de_service	Number
inde		String
intu		Number
intu		Number
intu	ntservice	String
intu	d	Number
intu	l	Number

CALCULATED

ExceptionVal	Number
ErrorValue	Number
TPS	Number
tid	String
GenricException	String
ExceptionInfo	String
CausedException	String
CausedExceptionMessage	String
Application	String
AssetId	String
BU	String

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Splunk – Data Model – Eval /Regex/lookup

For Reference

CALCULATED			
ExceptionVal	Number	Eval Expression	Edit
ErrorValue	Number	Eval Expression	Edit
TPS	Number	Eval Expression	Edit
Application	String	Lookup	Edit
AssetId	String		
BU	String		
tid	String	Regular Expression	Edit
GenricException	String	Regular Expression	Edit
ExceptionInfo	String		
CausedException	String	Regular Expression	Edit
CausedExceptionMessage	String		

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Life cycle for Log change in Splunk

For Reference

- New change in Logs
- Modify Data Model
- Auto Extract
- Custom Extract
- Modification in Main Search
- Modification in Panel
- Download Data Model
- Download Dashboard
- Data Model - Move to Prod
- Modification in Prod Dashboard

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