A03: How z/OS Connect changes IMS performance and problem management.

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Overview

- Introduction – who we are?
- z/OS Connect: system ‘s perspective
- Performance and problem management scenario
  - Test system configuration
  - IMS perspective of z/OS Connect
  - Distributed perspective of IMS
  - Combined perspective
- Challenges, shortfalls, and conclusions

Fundi

- Perth-based company
- z/OS-centric
- Developers of
  - IBM IMS Performance Analyzer for z/OS
  - IBM CICS Performance Analyzer for z/OS
  - IBM IMS Problem Investigator for z/OS
  - About half a dozen other IBM tools
- 35 years developing mainframe software
- Me? Product Manager for Transaction Analysis Workbench

Why we care about z/OS Connect?

- Key technology: we believe in it
- Challenging use story for new product features:
  - Have we done a good enough job at making mainframe data accessible to off-host analysis?
  - Can taking a cross subsystem approach help manage z/OS Connect from the mainframe side?
  - Does providing instrumentation data for the various sources on z/OS help developers and operations people on other platforms?

Why you should care about z/OS Connect?

- Short answer: cloud and mobile
- Provides a unified interface into systems of records on z/OS
- Enables REST/JSON
- Facilitates integration with newer frameworks such as Node.JS
- Implemented on top of WebSphere Liberty Profile
- **z/OS Connect is important to maintaining the viability of IMS as a platform**

Quick overview

IMS Gateway Navigator | Project Explorer

- IMS Gateway Servers
  - zOS Connect on FTS1
    - IMS Connection profiles
      - LIAM
      - MOBICON
      - RAFCON
    - IMS interaction properties profiles
      - IDDA Datastore
    - Services
      - BADTRAN
      - CEXTPGM
      - phonebook
      - XXXX

IMS Transaction Navigator

- IMS Gateway Servers
  - zOS Connect on FTS1

IMS Explorer Task Launcher

IBM

Overview | DBD and PSB Tasks | Getting Started Tasks | SQL and pureQuery Tasks |

Task Overview

Getting Started Tasks
Get started with IMS Explorer (import resources, connect to z/OS, populate the IMS catalog).

DBD and PSB Tasks
Work with your DBD and PSB resources.

SQL and pureQuery Tasks
Work with SQL and pureQuery to query IMS data from the z/OS system.

Unit Test Tasks
Define IMS transactions and create test cases to test and debug these transactions.

IMS Mobile Tasks
Create, deploy and test IMS Gateway Services.

Learn more

IMS Informatior
View the IMS Exp

What is IMS Exp
Demonstrates ho

IMS Explorer we
Learn more abou

Changes to IMS
See a cumulative
, and known issu

Properties | Servers | Error Log | Problems

IMS Transaction Server at FTS1

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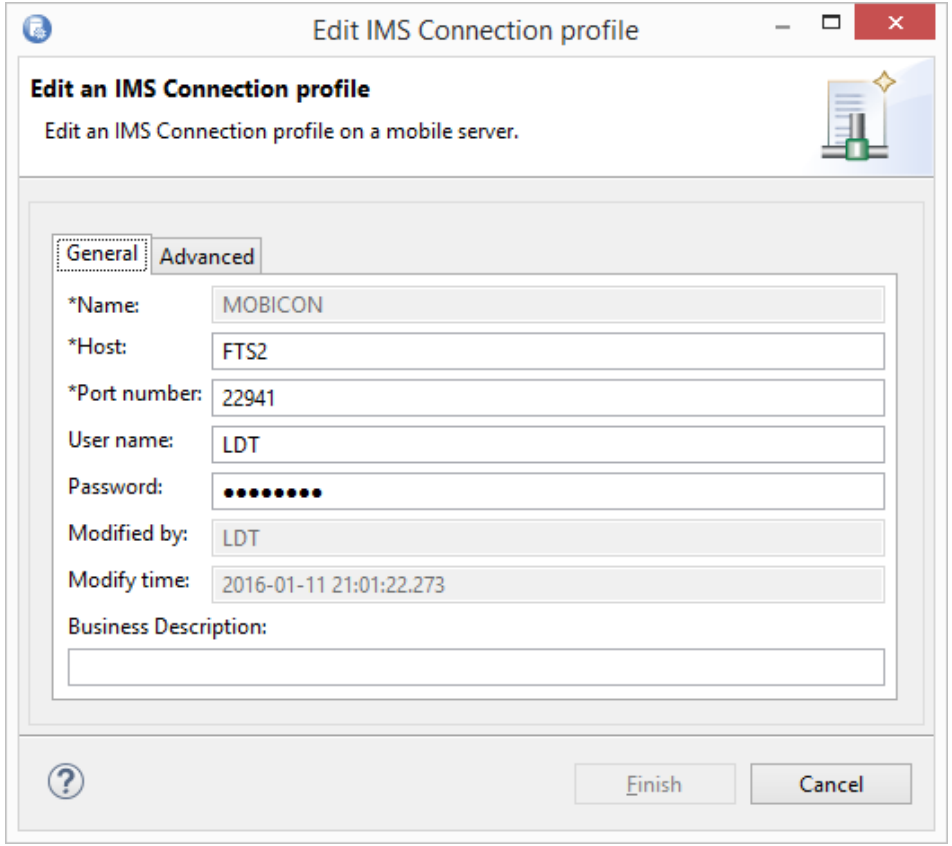

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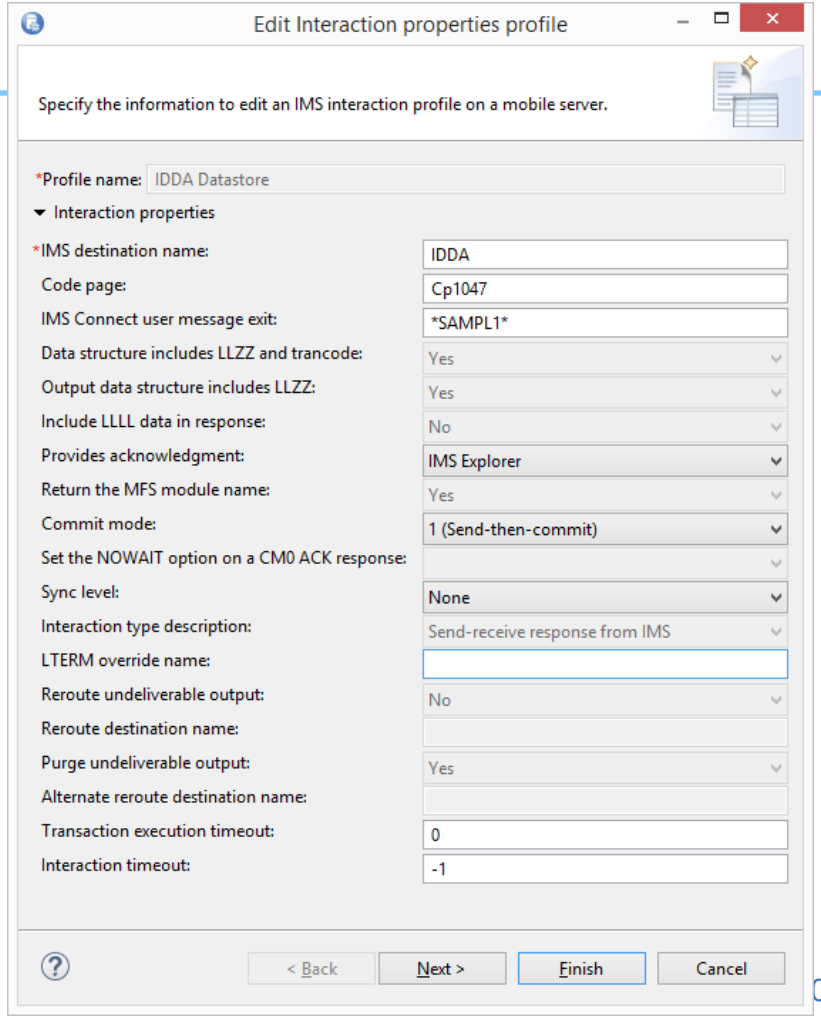

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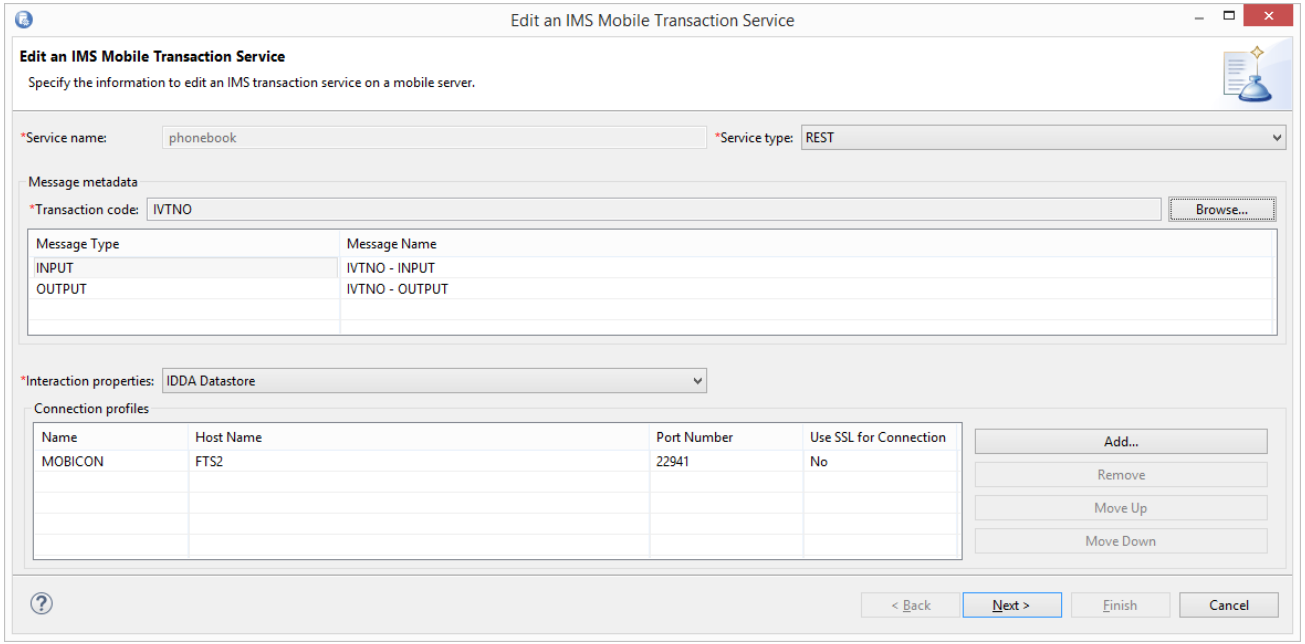
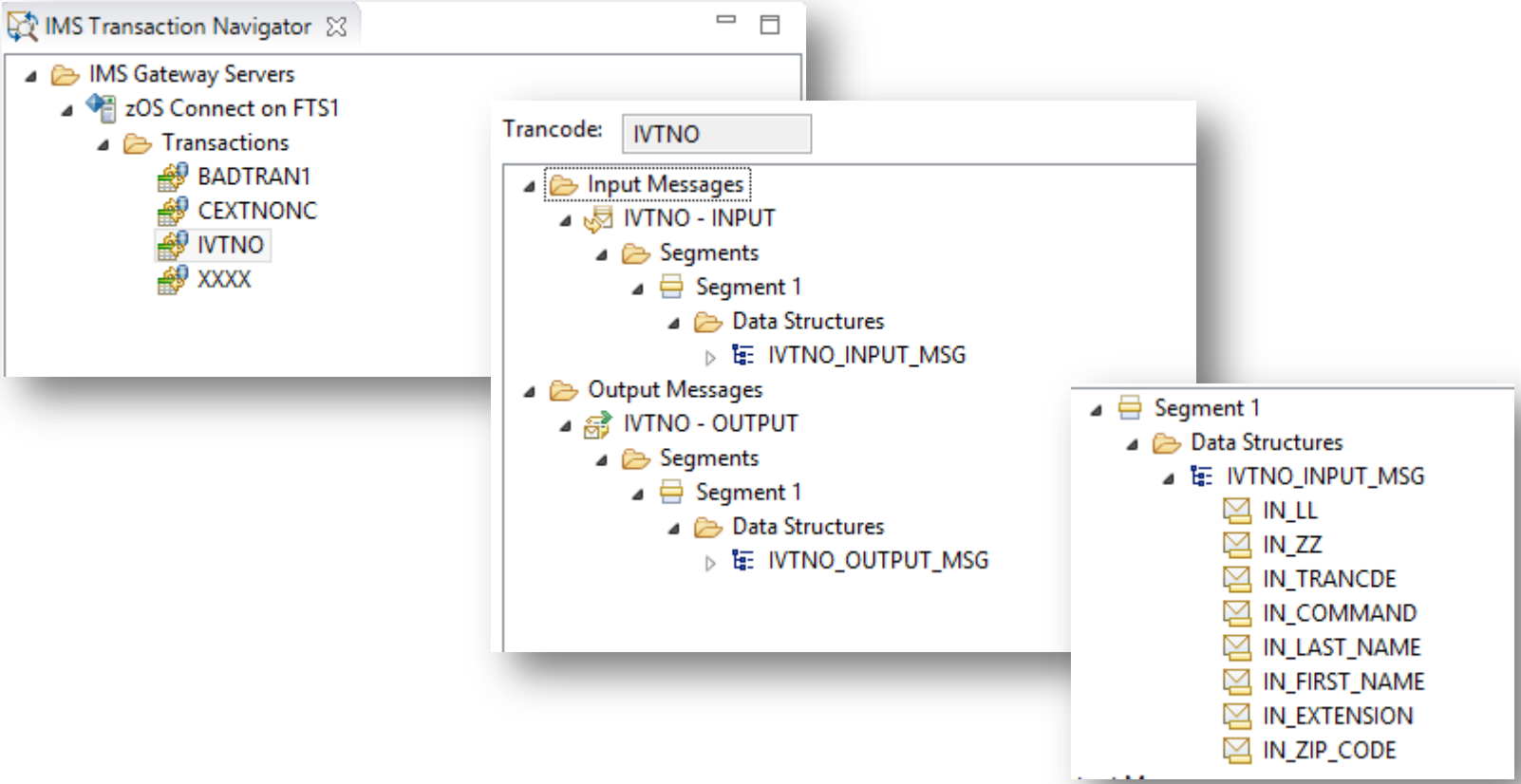


Quick overview



Operational challenges of z/OS Connect

- Simplifying transaction execution paradoxically requires increased operational complexity
- There may be no single individual with a complete understanding of the transaction paths and dependencies
- New consumers of IMS performance information
- New input into how IMS performance is partitioned and managed
- *Application* abstraction for cloud/mobile must be met with *operational* integration
- A catalyst for changing how you manage IMS performance

Operational artefacts of z/OS Connect

REST/JSON

z/OS Connect

- SMF
- zFS

IMS

IMS Connect

- No intrinsic logging*
- Some tracing

IMS

- IMS log

*We used IMS Connect Extensions

Functional dimensions of these artefacts

	zFS	SMF	IMS Log	IMS Connect
Performance		X	X	X
Security	X	X	X	X*
Audit	X	X	X	
Debug	X	X	X	X

*By default there is no security in IMS Connect for z/OS Connect (not true for EE)

Functional

	zFS	SMF	IMS Log	IMS Connect	Distributed
Performance		X	X	X	X
Security	X*	X	X	X	X
Audit	X	X	X		X
Debug	X	X	X	X	X

*The key audit of security may be off z/OS entirely

Overview of the test environment

Architectural tiers

- Simulate a typical architecture
- Emphasis was on the systems-perspective
- Wanted to automate collection and ingestion of *all* the log sources into an analytics platform

Questions we wanted to answer

- What does a z/OS Connect transaction look like from an IMS perspective? What identifiers and signatures does it present?
- What is the differential utility of each of the various log sources?
- How do problems percolate through the logs?
- What are some of the challenges of incorporating zFS logs in the analysis and is it worthwhile?
- Is it possible to build an end-to-end picture of transactional performance by merging the various log sources? What are some of the challenges in doing so?

Products we used

- IBM Transaction Analysis Workbench for z/OS:
  - On host analysis of SMF, IMS, and IMS Connect Extensions logs
  - ETL for offhost analytics
- IBM IMS Connect Extensions for z/OS: collector for IMS Connect activity; additional security and management
- IBM IMS Configuration Manager for z/OS: set up and control of the environment
- Home-grown zFS/nix log forwarder (POC)
- Elastic stack (formally ELK): provide historical repository and analysis front-end (Kibana)

Limitations

- SMF: only looked at 120.11, but there are other subtypes relating to the JVM that we want to look at
- Looking at built in logging and tracing.
- Single transaction type - artificial.
- Front-end asynchronously calls the transactions
- Low volumes
- “Narrow” architecture
- z/OS Connect “1.0”

How traditional tooling sees the transactions

```
  File  Mode  Filter  Time  Labels  Options  Help
BROWSE    SMF:IFASMF.FTS1.SMF.MAN1                    Record 00000037 More: < >
Command ===> ____________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2016-02-16 09.44.02.176316
/  ____ ____________________________________  Tuesday 2016-02-16 Time (LOCAL)
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.44.02.180000
__ 239  Package accounting                              DBA4 09.44.03.546866
__ 003  Thread accounting                               DBA4 09.44.03.546924
__ 6E13 CICS Transaction TranCode=WMSC Task=11310             09.42.34.063949
__ 6E13 CICS Transaction TranCode=WMSC Task=11311             09.42.44.068815
__ 6E13 CICS Transaction TranCode=WMSC Task=11312             09.42.54.072250
__ 6E13 CICS Transaction TranCode=WMSC Task=11313             09.43.04.077538
__ 6E13 CICS Transaction TranCode=WMSC Task=11314             09.43.14.078460
__ 6E13 CICS Transaction TranCode=WMSC Task=11315             09.43.24.079367
__ 6E13 CICS Transaction TranCode=WMSC Task=11316             09.43.34.081549
__ 6E13 CICS Transaction TranCode=WMSC Task=11317             09.43.44.086834
__ 6E13 CICS Transaction TranCode=WMSC Task=11318             09.43.54.088880
__ 6E13 CICS Transaction TranCode=WMSC Task=11319             09.44.04.089463
__ 2A06 DASD Data Set I/O statistics TranCode=ZSTATSD         09.44.05.760000
__ 2A06 DASD Data Set I/O statistics TranCode=ZSTATSD         09.44.05.770000
__ 2A06 DASD Data Set I/O statistics TranCode=ZSTATSD         09.44.05.770000
__ 77   TCP/IP Statistics                                     09.44.05.770000
__ 2A   DFSMS Statistics and Configuration                    09.44.07.290000
__ 2A06 DASD Data Set I/O statistics TranCode=SYSADM          09.44.07.290000
__ 2A   DFSMS Statistics and Configuration                    09.44.07.300000
```

```
BROWSE    SMF:IFASMF.FTS1.SMF.MAN1                          Record 00000037 More: < >
Command ===> ____________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2016-02-16 09.44.02.176316
/  ____ Filtering ________________________   Tuesday 2016-02-16 Time (LOCAL)
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.44.02.180000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.48.19.190000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.49.37.040000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.53.42.930000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.54.30.410000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.55.35.360000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.06.23.320000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.07.11.170000

…
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.20.55.820000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.21.06.510000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.35.40.770000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.41.32.350000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.46.51.900000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.47.03.940000
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   10.47.05.700000
************************** DURATION reached (01.13.04) **************************
```

```
BROWSE     SMF:IFASMF.FTS1.SMF.MAN1                Record 00001635 Line 00000000
Command ===> ____________________________________________________ Scroll ===> CSR
Form    ===>          +     Use Form in Filter                   Format ===> STD
******************************** Top of data ********************************
+0005  Code... 780B  URI=/zosConnect/services/phonebook
+000A  STCK... D04E99CA504F0000      LSN.... 0000000000000663
       Date... 2016-02-16 Tuesday    Time... 09.48.19.190000.000

+0000  Length..... 04A4        Flag....... 5E          Type....... +120
+0006  Time....... 0035DCBF    Date....... 0116047F    SMF ID..... 'FTS1'
+0012  Subsystem.... 'WAS '    Subtype.... +11

+0048  Server..... Server
+0048  Version.... +1          System..... 'FTS1    '  Sysplex.... 'FTS1PLEX'
+005C  Job id..... 'STC24197'  Job name... 'ZOSCON06'
+006C  ASSBSTKN... 0000060000000E61

+0098  User....... User
+0098  Version.... +1          Type....... +102        Length..... +324
+00A4  Version.... +3
+00A8  Arrival.... 09.48.19.176230
+00B0  End........ 09.48.19.190069                     Response... 0.013838
+00B8  Target URI... '/zosConnect/services/phonebook'  Length in.... +184
+0144  Length out... +73
+00FC  Service.... 'phonebook'                         Method..... 'POST    '
+0148  User id.... ‘xxx'
+0188  Request id... 00000000000000560000000000000000000000000000
+01A0  Service grouping... '          '
******************************** End of data ********************************
```

Edit an IMS Mobile Transaction Service

Edit an IMS Mobile Transaction Service

Specify the information to edit an IMS transaction service on a mobile server.

*Service name: phonebook

*Service type: REST

Message metadata

*Transaction code: IVTNO

Browse...

Message Type	Message Name
INPUT	IVTNO - INPUT
OUTPUT	IVTNO - OUTPUT

*Interaction properties: IDDA Datastore

Connection profiles

Name	Host Name	Port Number	Use SSL for Co...
MOBICON	FTS2	22941	No

Add...

Remove

Move Up

Move Down

< Back | Next > | Finish | Cancel

```
  File  Mode  Filter  Time  Labels  Options  Help
BROWSE    IDDA.SLDSP.IMSLOG.G0026V00 +                          Records excluded
Command ===> ____________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2016-02-16 09.44.02.176316
/  ---- Tracking ------------------------   Tuesday 2016-02-16 Time (LOCAL)
__ 780B URI=/zosConnect/services/phonebook Service=phonebook   09.44.02.180000
__ 5607 Start of UOR Program=DFSIVP1 Region=0002               09.44.02.178815
__ 003C Prepare READ Socket                                    09.48.19.182211
__ 0049 READ Socket                                            09.48.19.182300
__ 00A4 Event Collection IRM Trace                             09.48.19.182323
__ 003D Message Exit called for READ                           09.48.19.182329
__ 00A3 Event Collection OTMA Trace                            09.48.19.182371
__ 003E Message Exit returned from READ TranCode=IVTNO         09.48.19.182379
__ 00A3 Event Collection OTMA Trace                            09.48.19.182480
__ 0041 Message sent to OTMA Type=Transaction                  09.48.19.182493
__ 01   Input Message TranCode=IVTNO Source=Connect            09.48.19.182828
__ 35   Input Message Enqueue TranCode=IVTNO                   09.48.19.182945
__ 31   DLI GU TranCode=IVTNO Region=0002                      09.48.19.183012
__ 5616 Start of protected UOW Region=0002                     09.48.19.183537
__ 5050 Database ISRT Database=IVPDB1 Region=0002              09.48.19.184113
__ 5050 Database ISRT Database=IVPDB1 Region=0002              09.48.19.184129
__ 5050 Database ISRT Database=IVPDB1 Region=0002              09.48.19.184133
__ 5050 Database ISRT Database=IVPDB1 Region=0002              09.48.19.184246
__ 5052 Database insert into KSDS Database=IVPDB1I Region=0002 09.48.19.184276
__ 5050 Database ISRT Database=IVPDB1I Region=0002             09.48.19.184312
__ 03   Output Message Response LTerm=22941 Source=Connect     09.48.19.184445
```

```
 ROWSE    IDDA.SLDSP.IMSLOG.G0026V00 +                Record 00000080 More: < >
Command ===> ____________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2016-02-16 09.44.02.176316
/  ---- Tracking ------------------------   Tuesday 2016-02-16 Time (Relative)
__ 0049 READ Socket                                            09.48.19.182300
__ 00A4 Event Collection IRM Trace                                   +0.000022
__ 003D Message Exit called for READ                                 +0.000028
__ 00A3 Event Collection OTMA Trace                                  +0.000071
__ 003E Message Exit returned from READ TranCode=IVTNO               +0.000078
__ 00A3 Event Collection OTMA Trace                                  +0.000180
__ 0041 Message sent to OTMA Type=Transaction                        +0.000192
__ 01   Input Message TranCode=IVTNO Source=Connect                  +0.000528
__ 35   Input Message Enqueue TranCode=IVTNO                         +0.000644
__ 31   DLI GU TranCode=IVTNO Region=0002                            +0.000712
…
__ 5050 Database ISRT Database=IVPDB1I Region=0002                   +0.002012
…
__ 5610 Syncpoint Start of Phase 1 Region=0002                       +0.002219
__ 00A3 Event Collection OTMA Trace                                  +0.002321
__ 0042 Message received from OTMA Type=Data                         +0.002328
__ 00A3 Event Collection OTMA Trace                                  +0.004396
__ 0042 Message received from OTMA Type=Commit confirm               +0.004405
__ 00A3 Event Collection OTMA Trace                                  +0.004449
__ 003D Message Exit called for XMIT                                 +0.004456
```

```
  BROWSE     IDDA.SLDSP.IMSLOG.G0026V00 +          Record 00000081 Line 00000000
Command ===> ____________________________________________ Scroll ===> CSR
Form    ===>          +     Use Form in Filter            Format ===> STD
******************************** Top of data ********************************
+0004  Code... 00A4  Event Collection IRM Trace
+024D  STCK... D04E99CA4E6F35A6      LSN.... 0000000000000DD3
       Date... 2016-02-16 Tuesday    Time... 09.48.19.182323.353

+0000  CERE_A4_LL......... 025D
+0002  CERE_A4_ZZ......... 0000                        CERE_A4_RECID...... A0
+0005  CERE_A4_EVTID...... A4  CERE_A4_PFXLL...... 0014
+0008  CERE_A4_EFLAG...... 00  CERE_A4_VER#....... 24
+000A  CERE_A4_TASKID..... ID of task recording event
+000A  CERE_A4_COL#....... 01  CERE_A4_TKS#....... 06
+000C  CERE_A4_EVKEY...... D04D91CECE242F06
+0014  CERE_A4_BASE_LL.... 000E
+0016  CERE_A4_APAR....... 0001                        CERE_A4_CONT....... 01
+0019  CERE_A4_CODE....... 04  CERE_A4_OEVTID..... 3D
+001C  CERE_A4_#SEG....... 0000
+001E  CERE_A4_4LL........ 0000022D

+0024  IRMMask.... IRM IMS Request Message section
+0024  IRM_Len.... 001C        IRM_ARCH... 01          IRM_F0..... 00
+0028  IRM_ID..... '*HWSJAV*'  IRM_NAK_RSNCDE..... 0000
+0034  IRM_F5..... C0          IRM_TIMER........... FF  IRM_SQCT... 00
+0037  IRM_ES..... 00          IRM_CLIENTID....... 'HWSBCKOT'
```

```
File  Menu  Format  Help
.------------------------------------- Field Zoom -------------------------------------.
|  File  Menu  Help                                                                     |
|  ---------------------------------------------------------------------------------------
|  BROWSE    IDDA.SLDSP.IMSLOG.G0026V00 +                          Line 00000000       |
|  Command ===> ____________________________________________ Scroll ===> CSR_           |
|  ****************************** Top of data ******************************           |
|  +014F  OMUSR_FLAG2........ 40   Flag 2                                               |
|                                                                                       |
|   Off   OMUSR_TRSTUSR...... 80   Trusted User, no signon                              |
|   On    OMUSR_F2_CIDREQ.... 40   IC4J request generated CLIENTID for dup               |
|   Off   OMUSR_F2_CIDGEN.... 20   ICON returned generated CLIENTID to IC4J             |
|   Off   OMUSR_HWSPLSET..... 10   ICON protocol level exists in OMUSR_PROLEV           |
|   Off   OMUSR_MSCMSG....... 08   This is an MSC message                                |
|   Off   OMUSR_APPFWRD...... 04   Application data uses the LLLL format                 |
|   Off   OMUSR_PWDBIN....... 02   Passticket field is binary Password                  |
|   Off   OMUSR_PWDTEXT...... 01   Passticket field is text Password                    |
|  ****************************** End of data ******************************           |
|                                                                                       |
|                                                                                       |
.---------------------------------------------------------------------------------------.
+0163  OMUSR_PROLEV....... 00  OMUSR_FLAG4........ 00  OMUSR_RES4L1....... 00
+0166  OMUSR_RES5......... 00000000
+016A  OMUSR_PARTNER...... 000000                      OMUSR_RESP1........ 00
+016E  OMUSR_REROUT_NM.... '        '
+0176  OMUSR_EWLMCORR..... EWLM Correlator; OMHDRCFL=OMHDREWC when present
```

```
Field Zoom
File  Menu  Help
BROWSE    IDDA.SLDSP.IMSLOG.G0026V00 +                        Line 00000000
Command ===> ____________________________________________ Scroll ===> CSR
****************************** Top of data ******************************
+0212  CERE_A4_APL_DATA...

       OTMA Application data

       +0000  003B0000 C9E5E3D5 D6404040 4040C1C4   *....IVTNO     AD*
       +0010  C4404040 4040C9D5 C6D9C160 F8F9F540   *D     INFRA-895 *
       +0020  C9D5C6D9 C160F8F9 F540C9D5 C6D9C160   *INFRA-895 INFRA-*
       +0030  F8F9F540 F9F5F1F2 F14040              *895 95121       *
****************************** End of data ******************************
```

```
 ROWSE    IDDA.SLDSP.IMSLOG.G0026V00 +                Record 00000080 More: < >
Command ===> ____________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2016-02-16 09.44.02.176316
/  ---- Tracking ------------------------   Tuesday 2016-02-16 Time (Relative)
__ 0049 READ Socket                                            09.48.19.182300
__ 00A4 Event Collection IRM Trace                                   +0.000022
__ 003D Message Exit called for READ                                 +0.000028
__ 00A3 Event Collection OTMA Trace                                  +0.000071
__ 003E Message Exit returned from READ TranCode=IVTNO               +0.000078
__ 00A3 Event Collection OTMA Trace                                  +0.000180
__ 0041 Message sent to OTMA Type=Transaction                        +0.000192
__ 01   Input Message TranCode=IVTNO Source=Connect                  +0.000528
__ 35   Input Message Enqueue TranCode=IVTNO                         +0.000644
__ 31   DLI GU TranCode=IVTNO Region=0002                            +0.000712
…
__ 5050 Database ISRT Database=IVPDB1I Region=0002                   +0.002012
…
__ 5610 Syncpoint Start of Phase 1 Region=0002                       +0.002219
__ 00A3 Event Collection OTMA Trace                                  +0.002321
__ 0042 Message received from OTMA Type=Data                         +0.002328
__ 00A3 Event Collection OTMA Trace                                  +0.004396
__ 0042 Message received from OTMA Type=Commit confirm               +0.004405
__ 00A3 Event Collection OTMA Trace                                  +0.004449
__ 003D Message Exit called for XMIT                                 +0.004456
```

```
BROWSE     SMF:IFASMF.FTS1.SMF.MAN1 +            Record 00000063 Line 00000029
Command ===> ____________________________________________ Scroll ===> CSR
Form    ===>          +     Use Form in Filter            Format ===> STD

+0090  DFSYPRE.... MVS APPC System Segment for OTMA; Item ID = 87
+0090  LUY_LENGTH......... 027A                      LUY_ZZ..... 0000
+0092  LUY_MSG_PREFIX_TYPE........ 87
+0095  LUY_CONVERSATION_TYPE...... ' '
+0096  LUY_SYNC_LEVEL..... 'N'                      LUY_MSG_TYPE....... 80
+0098  LUY_MSG_FLAG....... 85  LUY_RACF_OPT....... 'F'
+009A  LUY_CLIENT_FLAGS... 00  LUY_MSG_FLAG2...... 00
+009C  LUY_LTERM.......... '22941   '
+00A4  LUY_TRANCODE....... 'IVTNO   '
+00AC  LUY_TOKEN.......... D04E98D534DCBC84
+00B4  LUY_FLAGS          00000000
```

```
Field Zoom
File  Menu  Help
BROWSE     IDDA.SLDSP.IMSLOG.G0033V00 +                Line 00000000
Command ===> ____________________________________ Scroll ===> CSR
****************************** Top of data ******************************
+009E  OMHDRLTM... 'ZOSCON  '

       Override LTERM name
****************************** End of data ******************************
```

```
+0118  LUY_SUPER_MN....... 00000000
```

```
+03EE  MSGMSUID... 0000000000000000                    MSGMSGID... 0000
+03F8  MSGMSPAD... 0000000000000000
+0400  MSGMSCTS... Date and Time - Standard UTC
+0400  MSGMSCDT... 00000000    MSGMSCTM... 000000000000
+040A  MSGMSCZN... 0000
+040C  MSGIMSR.... 13          MSGIMSL.... 10
+040E  MSGTODTK... Token for 2nd - n records
+040E  MSGQTYPE... 00          MSGIMSID... 0000000000000000
+0417  MSGTOKEN... 00000000000000
+041E  MSGLKTKN... 00000000000000000000000000000000
+042E  MSGTFLG.... User Exit doubleword Trace
+042E  MSGTFL1.... 00          MSGTRFL2... 00          MSGTRFL3... 00
+0431  MSGLRFL2... 00          MSGLRFL3... 00          MSGPRFL2... 00
+0434  MSGPRFL3... 00
+0436  MSGERRSN... 00000000    MSGHIMSR... 13          MSGHIMSL... 10
+043C  MSGTMFL1... 00          MSGOMNAM... 0000000000000000
+0446  MSGLLCNT... +0

+0458  QLOGMSGD... Message Text
+0458  MSGXDLEN... 003B        MSGXFLG1... 03          MSGXFLG2... 00
+045C  MSGXSTXT... Message Text
       +0000  C9E5E3D5 D6404040 4040C1C4 C4404040   *IVTNO     ADD   *
       +0010  4040E3C3 D360F1F0 F8404040 E3C3D360   *  TCL-108   TCL-*
       +0020  F1F0F840 4040E3C3 D360F1F0 F8404040   *108   TCL-108   *
       +0030  F9F5F1F2 F14040                       *95121           *
********************************** End of data ********************************
```

Edit Interaction properties profile

Specify the information to edit an IMS interaction profile on a mobile server.

*Profile name: IDDA Datastore

Interaction properties

*IMS destination name:	IDDA
Code page:	Cp1047
IMS Connect user message exit:	*SAMPL1*
Data structure includes LLZZ and trancode:	Yes
Output data structure includes LLZZ:	Yes
Include LLLL data in response:	No
Provides acknowledgment:	IMS Explorer
Return the MFS module name:	Yes
Commit mode:	1 (Send-then-commit)
Set the NOWAIT option on a CM0 ACK response:	
Sync level:	None
Interaction type description:	Send-receive response from IMS
LTERM override name:	ZOSCON
Reroute undeliverable output:	No
Reroute destination name:	
Purge undeliverable output:	Yes

< Back | Next > | Finish | Cancel

Summary of identifiers

- z/OS Connect to IMS no different than to any other subsystem:
  - Server instance?
  - Must understand the service definition to know it is IMS related
- In IMS Connect, workload can clearly be identified as ‘WAS’ workload but cannot be distinguished (intrinsically) from TM Resource Adapter clients
- In IMS, we can only identify that the transaction originated in **IMS Connect** have the port (as LTERM); other fields in OTMA section

What you can do

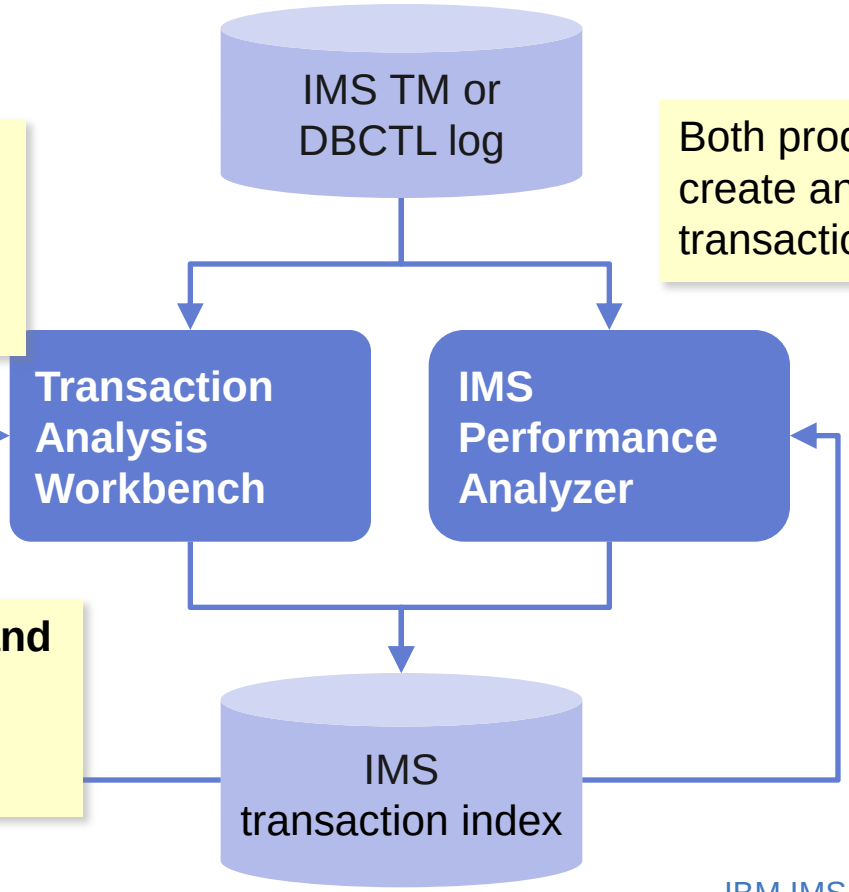
- Compose your topology to identify the workload:
  - Dedicated IMS Connect
  - Dedicated port numbers
  - Dedicated datastores (logical only)
- Use the LTERM override name as an identifier by application developers
- Reject: Exit name

Log analytics

Log analytics solutions

- Solutions have developed off z/OS which share common characteristics:
  - Unified interface for all business artefacts: logs, traces, etc
  - Framework to collect and centralize logs
  - Dashboards to combine and relate the various data sources
- z/OS Connect is the canary in the mineshaft regarding the importance of these platforms

IMS transaction index



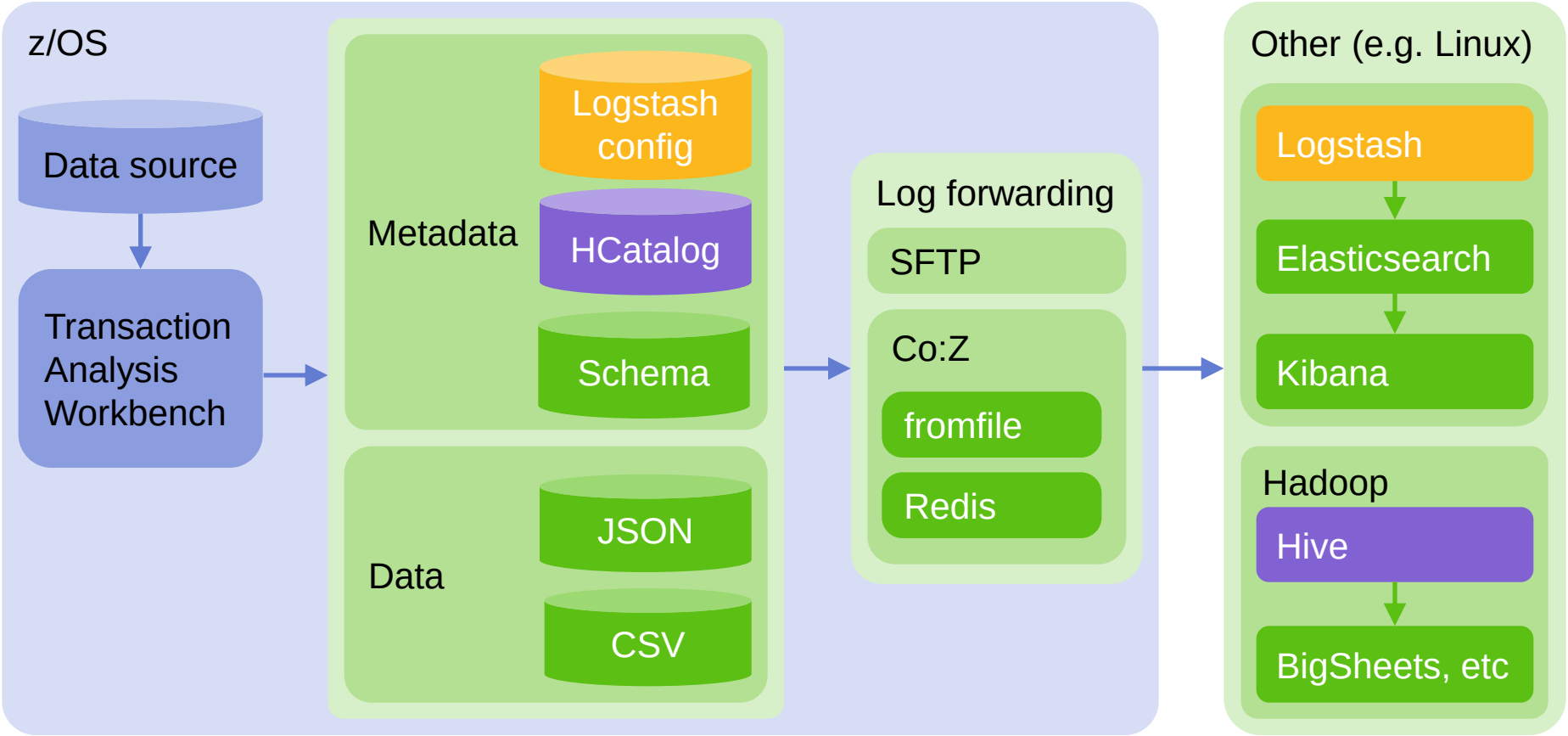
IMSINDEX command of the report and extract utility

Both products can create an IMS transaction index

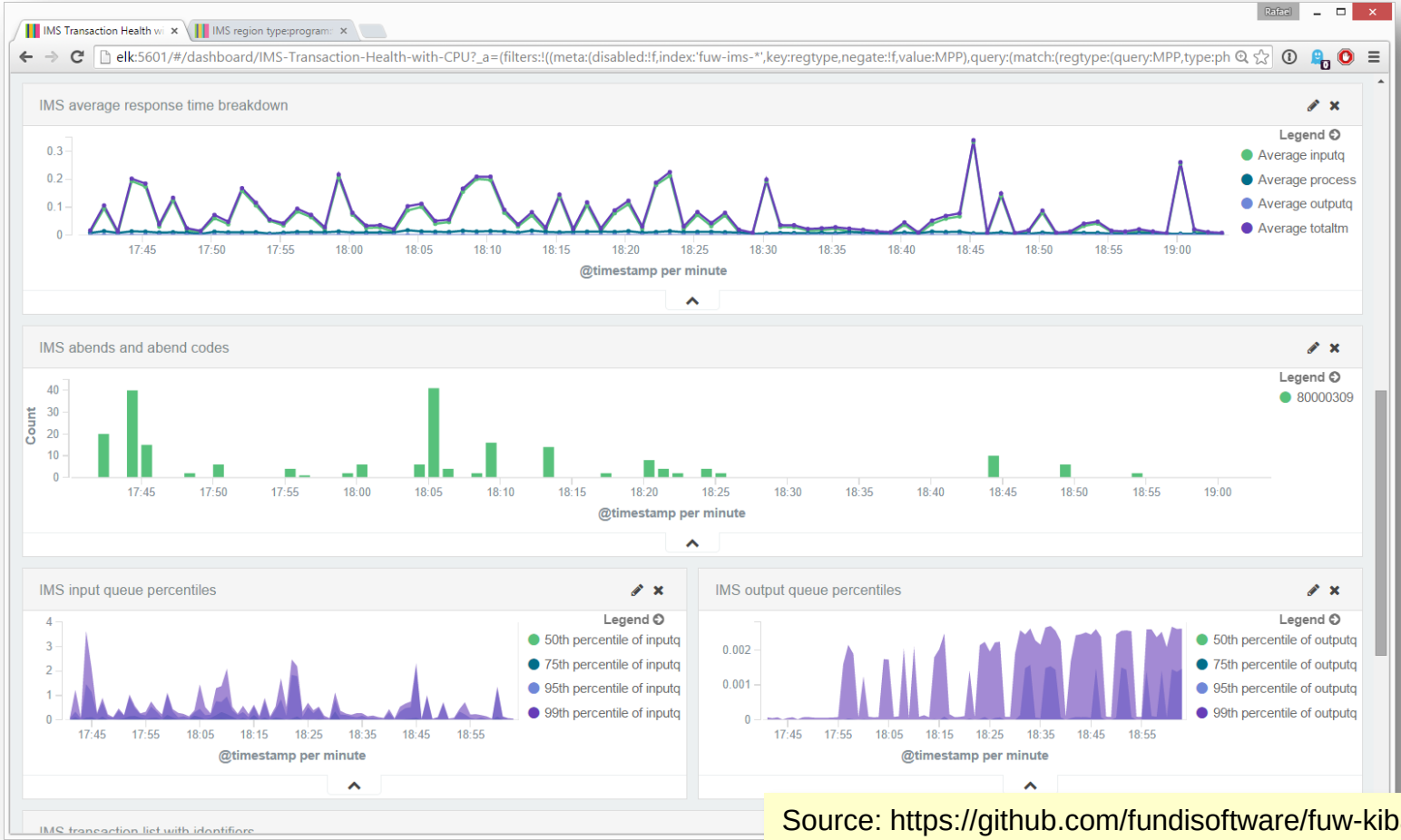
- **Reduce file size and processing costs**
- **Reporting and analysis**

An IMS transaction index created by one product can be used by either product

Log transformation in detail

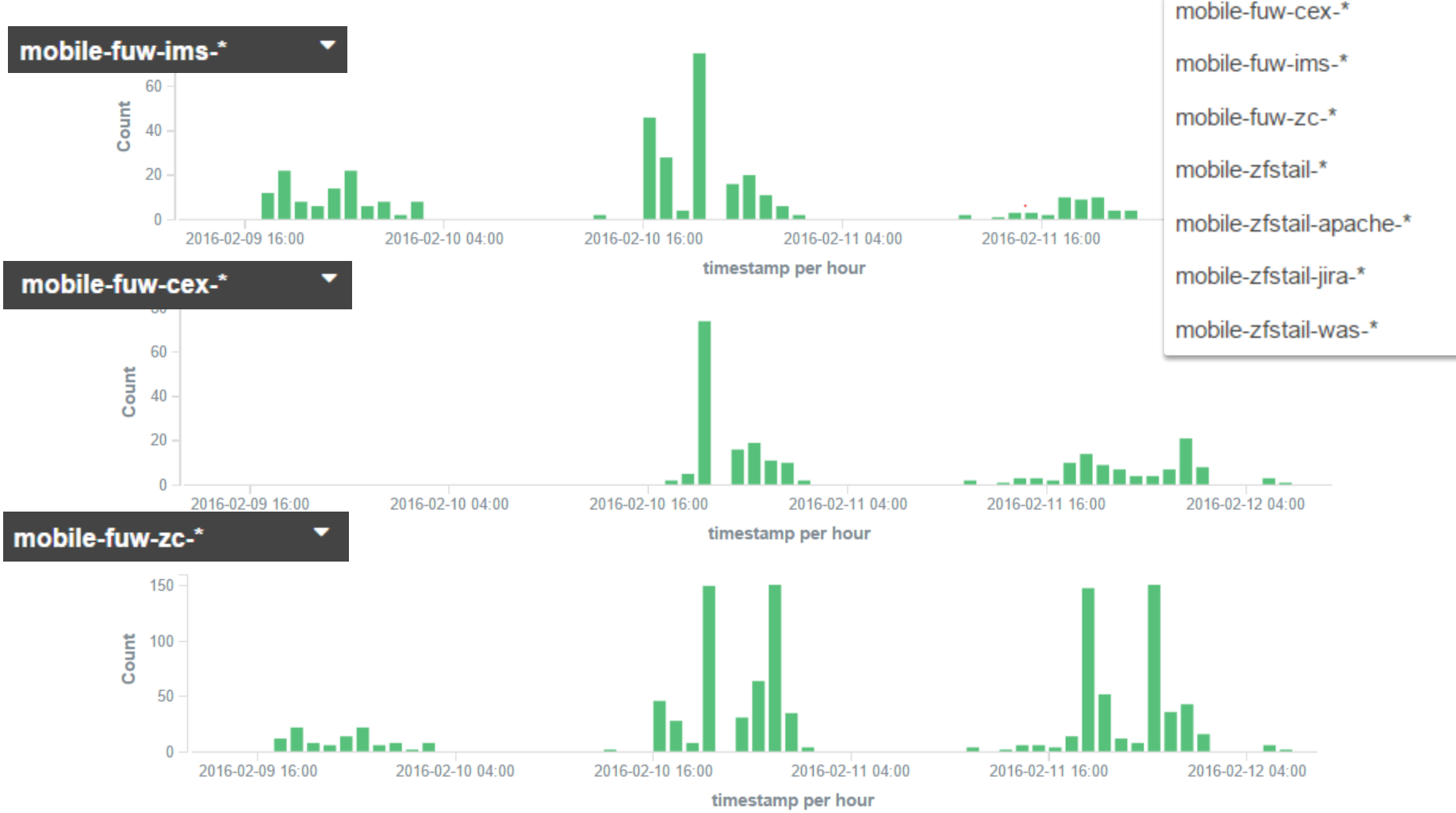


Elastic stack (ELK)

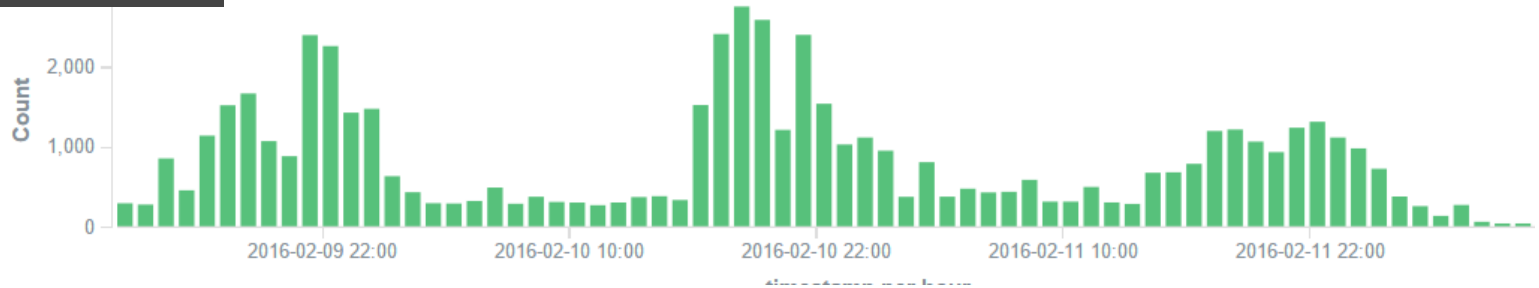


Bring problems to the foreground. Know exactly where you transactions are spending the most time

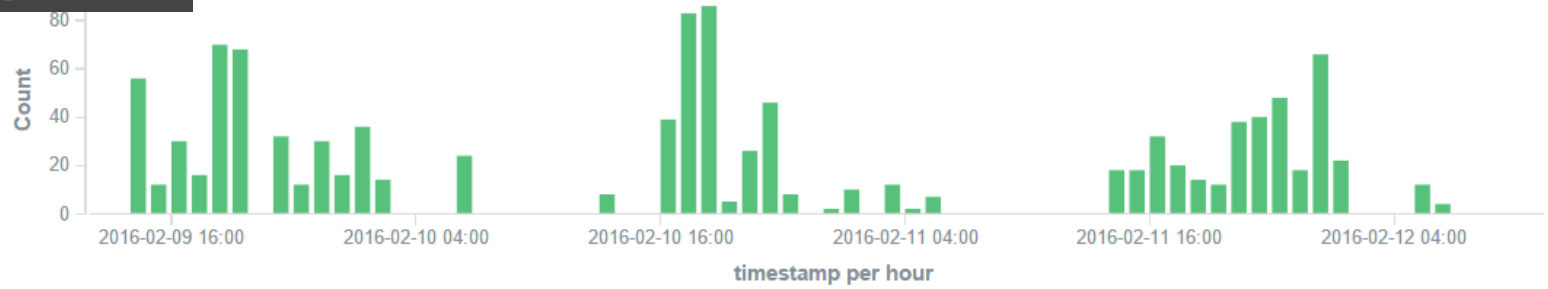
Source: https://github.com/fundisoftware/fuw-kibana-dashboards

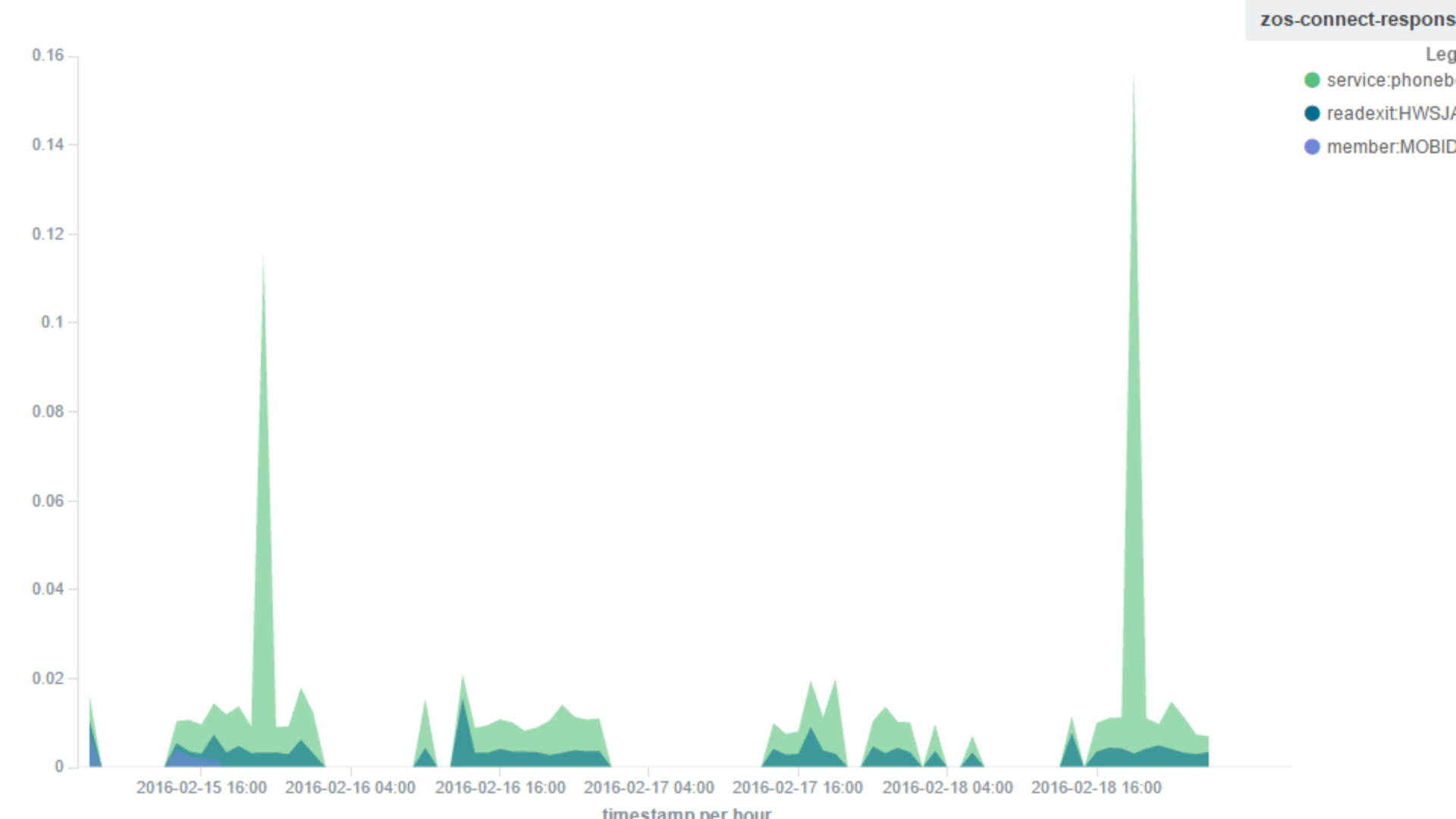

mobile-fuw-ims-*
Count
60
40
20
0
2016-02-09 16:00
2016-02-10 04:00
2016-02-10 16:00
2016-02-11 04:00
2016-02-11 16:00
timestamp per hour
mobile-fuw-cex-*
Count
60
40
20
0
2016-02-09 16:00
2016-02-10 04:00
2016-02-10 16:00
2016-02-11 04:00
2016-02-11 16:00
2016-02-12 04:00
timestamp per hour
mobile-fuw-zc-*
Count
150
100
50
0
2016-02-09 16:00
2016-02-10 04:00
2016-02-10 16:00
2016-02-11 04:00
2016-02-11 16:00
2016-02-12 04:00
timestamp per hour
mobile-fuw-cex-*
mobile-fuw-ims-*
mobile-fuw-zc-*
mobile-zfstail-*
mobile-zfstail-apache-*
mobile-zfstail-jira-*
mobile-zfstail-was-*

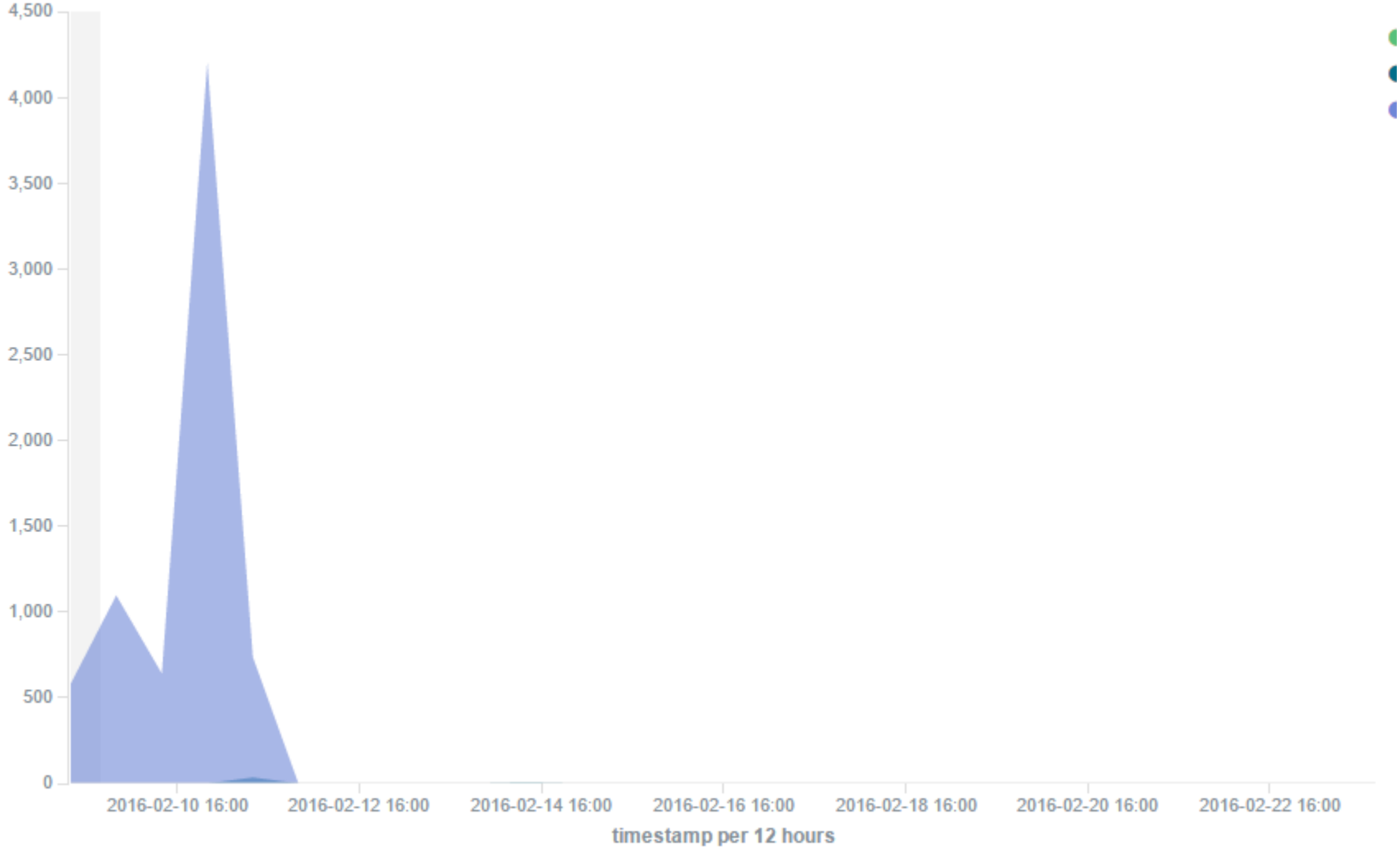
mobile-zfstail-apache-*



mobile-zfstail-jira-*




zos-connect-respons
Leg
service:phoneb
readexit:HWSJA
member:MOBID
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
2016-02-15 16:00
2016-02-16 04:00
2016-02-16 16:00
2016-02-17 04:00
2016-02-17 16:00
2016-02-18 04:00
2016-02-18 16:00
timestamp per hour


4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2016-02-10 16:00
2016-02-12 16:00
2016-02-14 16:00
2016-02-16 16:00
2016-02-18 16:00
2016-02-20 16:00
2016-02-22 16:00
timestamp per 12 hours

Challenges we encountered

- Identifying the appropriate timestamps for correlating events on a timeline
- Different units used in different log files
- Not all exceptions percolate nicely through the various tiers
- Deep knowledge of IMS was still required in some cases
- Counting documents does not always count the same events (access log versus SMF log for example)
- More thought needs to go into representation of flag fields

Conclusions

Conclusions

- zOS Connect presents new performance management challenges:
  - SMF logs
  - zFS logs
  - Tagging workloads through IMS
- Increases reliance on IMS Connect and IMS Connect instrumentations
- Signifies a deeper shift in how applications are developed
- Creates an opportunity to modernize your performance management infrastructure:
  - Leverage open platforms
  - Fit with broader organizational performance and security management goals

Thank You


Sharpen your competitive edge
2016 IMS Technical Symposium
March 7 – 10, 2016
Wiesbaden, Germany
www.ims-symposium.com

Tools and technologies used

Addendum

Transaction Analysis Workbench

- **One platform** for managing performance and problems with z/OS transactions
  - Comprehensive performance analysis, with a pedigree in benchmark CICS and IMS performance tools, adding IBM MQ, z/OS Connect, WAS, and DB2
  - Tracing and profiling of transactions, even across subsystems
- **Minimal overhead**
  - Uses the logs and traces generated by z/OS and the various subsystems during normal transaction processing

Transaction Analysis Workbench

- Simplifies collection and analysis
  - **Automatically selects the required log data** from each subsystem
  - Instantly **combine and slice information sources** in real time
  - Automate problem determination steps and **disseminate knowledge through workflows**
- Exposes logs and other z/OS traces to **off-host analysis**
  - Extract, transform, and load (ETL) for most transactional artefacts
  - Input for mobile workload pricing calculation

Coverage

across z/OS subsystems

IMS	CICS	DB2	MQ	WAS	z/OS

Consolidation

of different logs in a single user interface

IBM Transaction Analysis Workbench for z/OS

Session manager	Automated file selection	Interactive log browsing	Batch processing and reporting	Transformation (Elasticsearch/ Hadoop)

Collaboration

between experts and other users

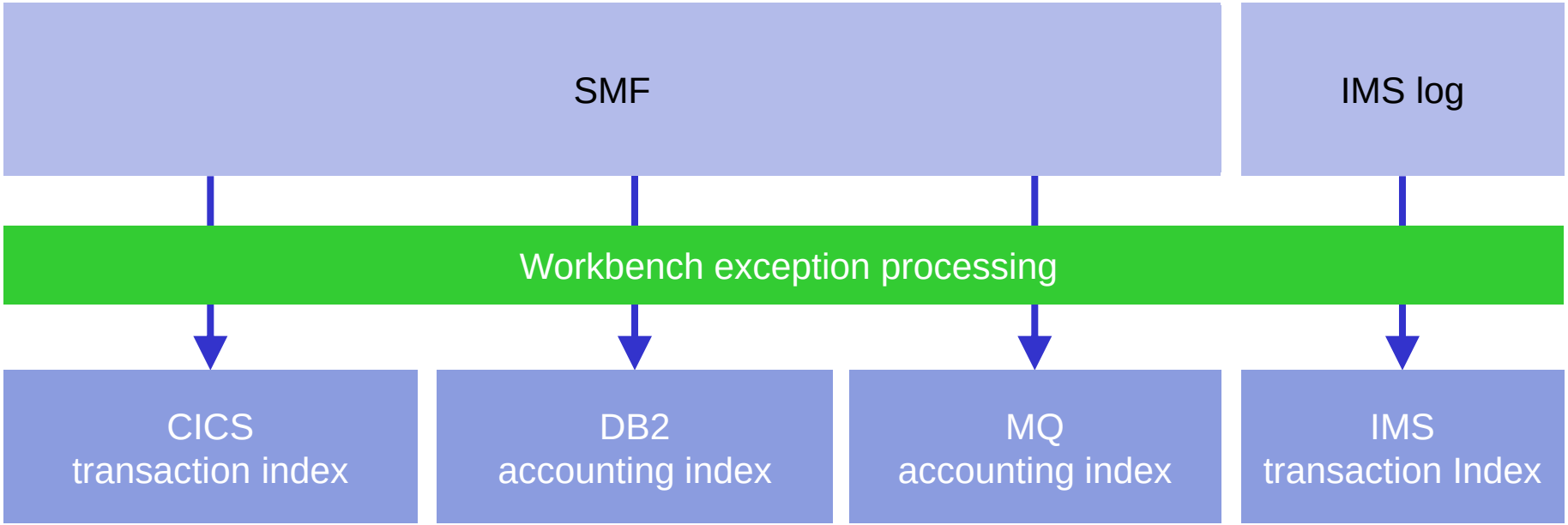
First responders	System programmers	Subsystem admins	Application developers	Other subject-matter experts

Log type support

IMS	CICS	DB2	MQ, WAS	z/OS
IMS log and trace	CMF performance class (SMF 110)	DB2 log	MQ log extract	SMF
IMS monitor	CICS trace (DFHAUXT or GTF)	DB2 accounting	MQ statistics (SMF 115-1, -2)	OPERLOG
CQS log stream	VSAM forward recovery and autojournaling log streams	DB2 performance trace (IFCIDs)	MQ accounting (SMF 116)	**z/OS Connect (SMF 120-11)**
IMS Connect event data (collected by IMS Connect Extensions)		Near Term History (collected by OMEGAMON XE for DB2)	WAS request activity performance statistics (SMF 120-9)	
OMEGAMON ATF				
IRLM long lock detection (SMF 79-15)				

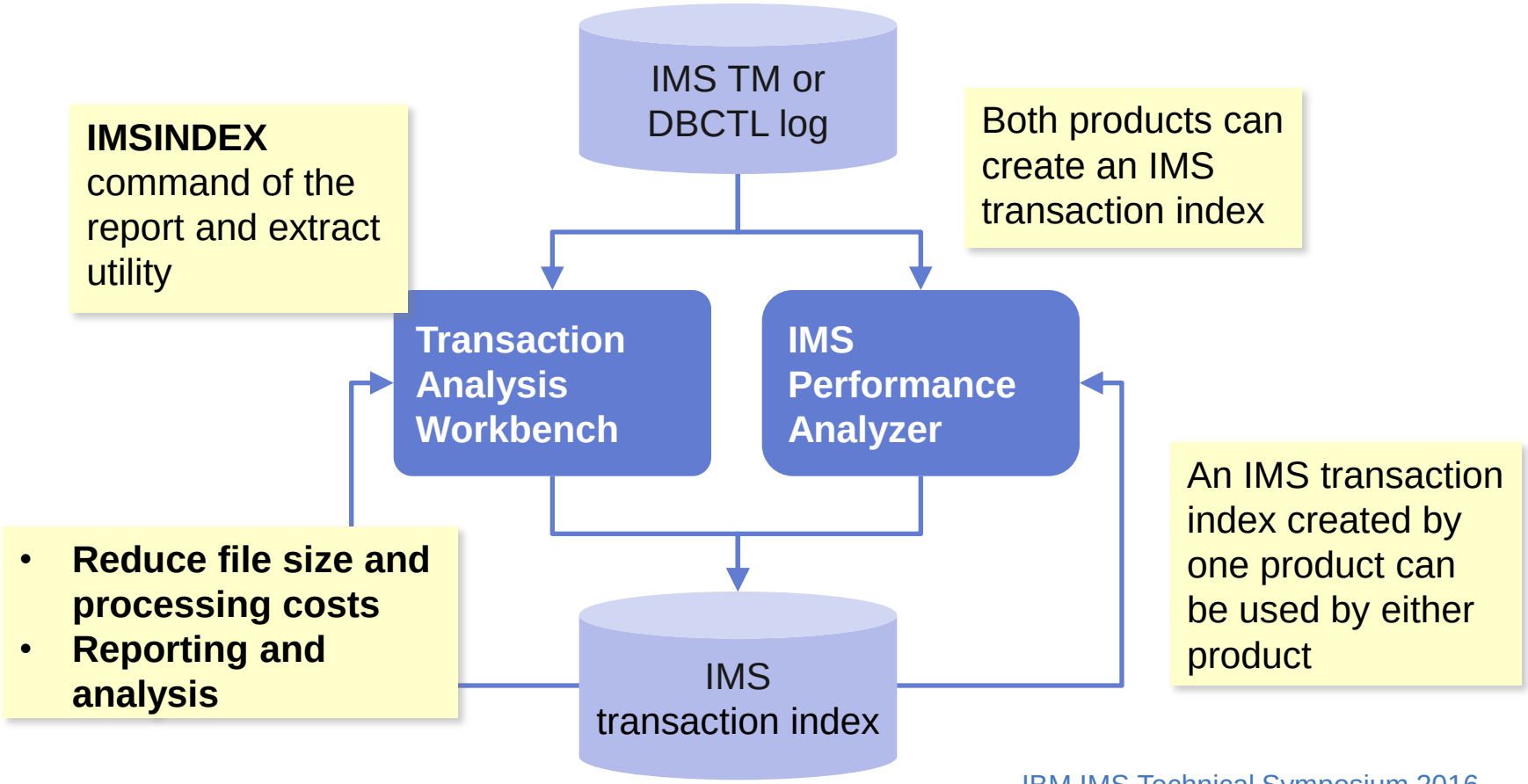
All supported log types can be treated and processed in a consistent way: format, interpret, relate, select, reduce, ETL

Indexes

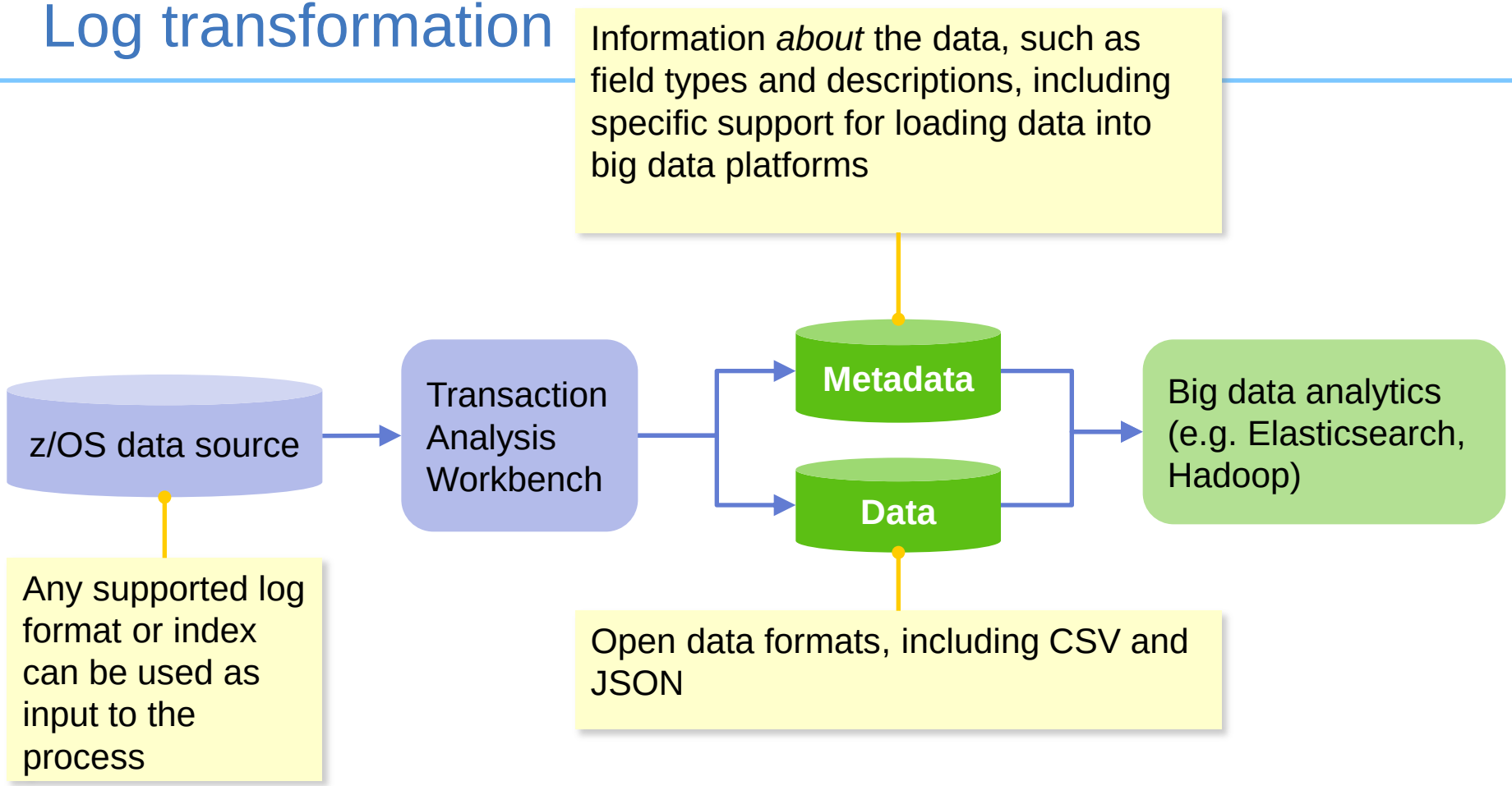


- Collates transaction-related records by subsystem
- Can be filtered to include exception transactions only
- Extracts just the records that are of interest for performance and problem determination
- For IMS, consolidates multiple record types into a single record

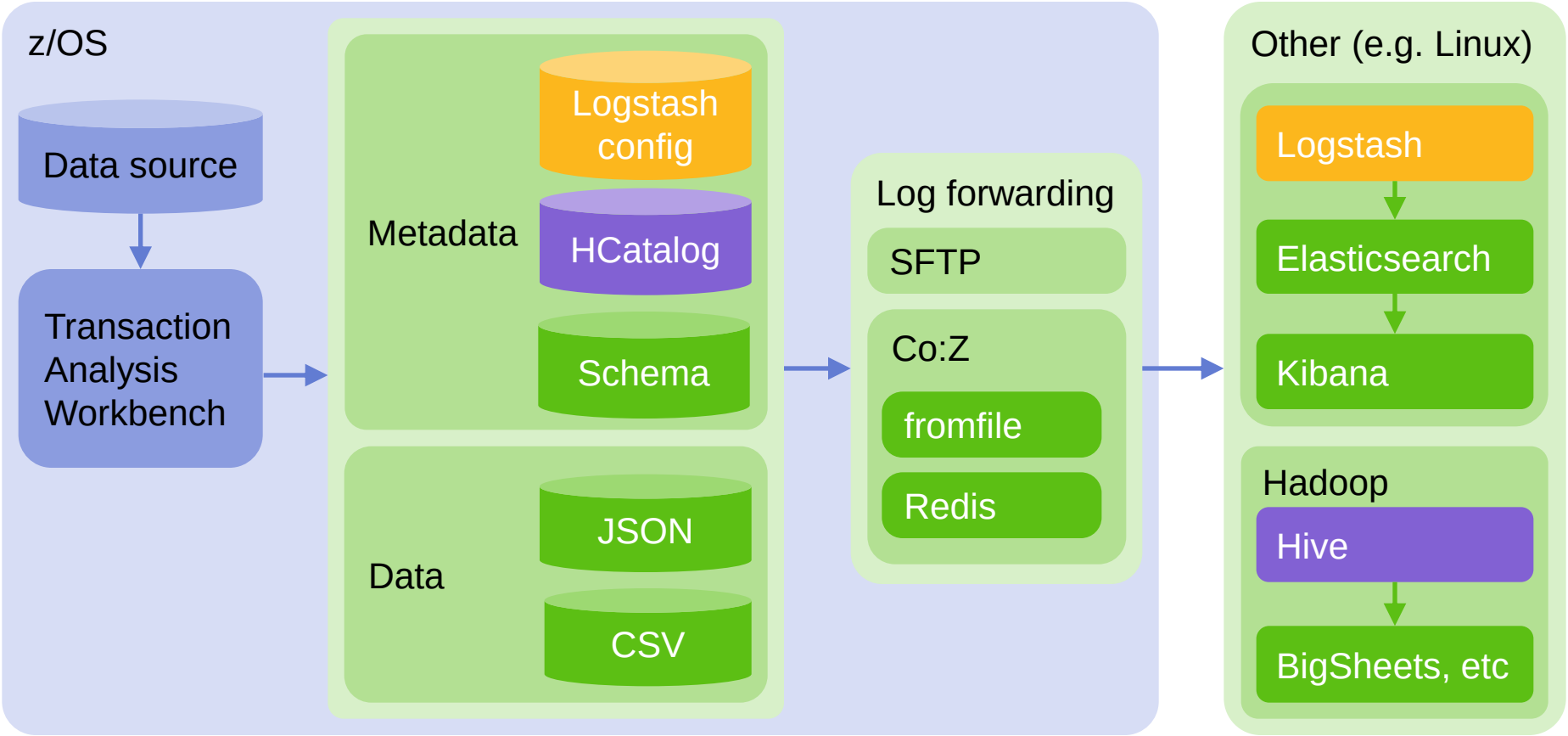
IMS transaction index



Log transformation



Log transformation in detail



```
                                Big Data menu
Command ===>

Enter SUB to create and edit JCL.

Meta data for . . 1  1. Hadoop   2. Logstash

Record types:
/  CICS CMF performance class                        (SMF 110)
/  DB2 accounting                                    (SMF 101)
/  DB2 system statistics IFCID 001                   (SMF 100)
/  Address space accounting class 1                  (SMF 30)
/  WebSphere MQ accounting class 1                   (SMF 116)
/  WebSphere Application Server inbound requests     (SMF 120.9)
/  IMS Transaction Index                             (IMS log)

Input files:
  SMF  . . . . . . . SMF.DATA.SET
  IMS log  . . . . . IMS.DATA.SET

Output sequential data sets or z/OS UNIX files:
  Home directory . .
  CSV  . . . . . . . %RTYP-data.csv
  HCatalog . . . . .
    Table  . . . . .
    Location . . . .

Log forwarding  3  1. None   2. SFTP   3. Co:Z
  Target . . . . . .
  Batch script . . .
  Remote directory .

  _  Delete files after successful transfer
```

Generate JCL to import log data to analysis platform

Generates HCatalog file for Hadoop, config for Logstash

Sets appropriate data types: timestamps, float, string, etc.

Select data to export: covers CICS, IMS, DB2, MQ, WAS

JCL selects relevant fields in the data

These are just the most common record types. Use any supported data source/field

Parameterization of key variables makes reuse simple

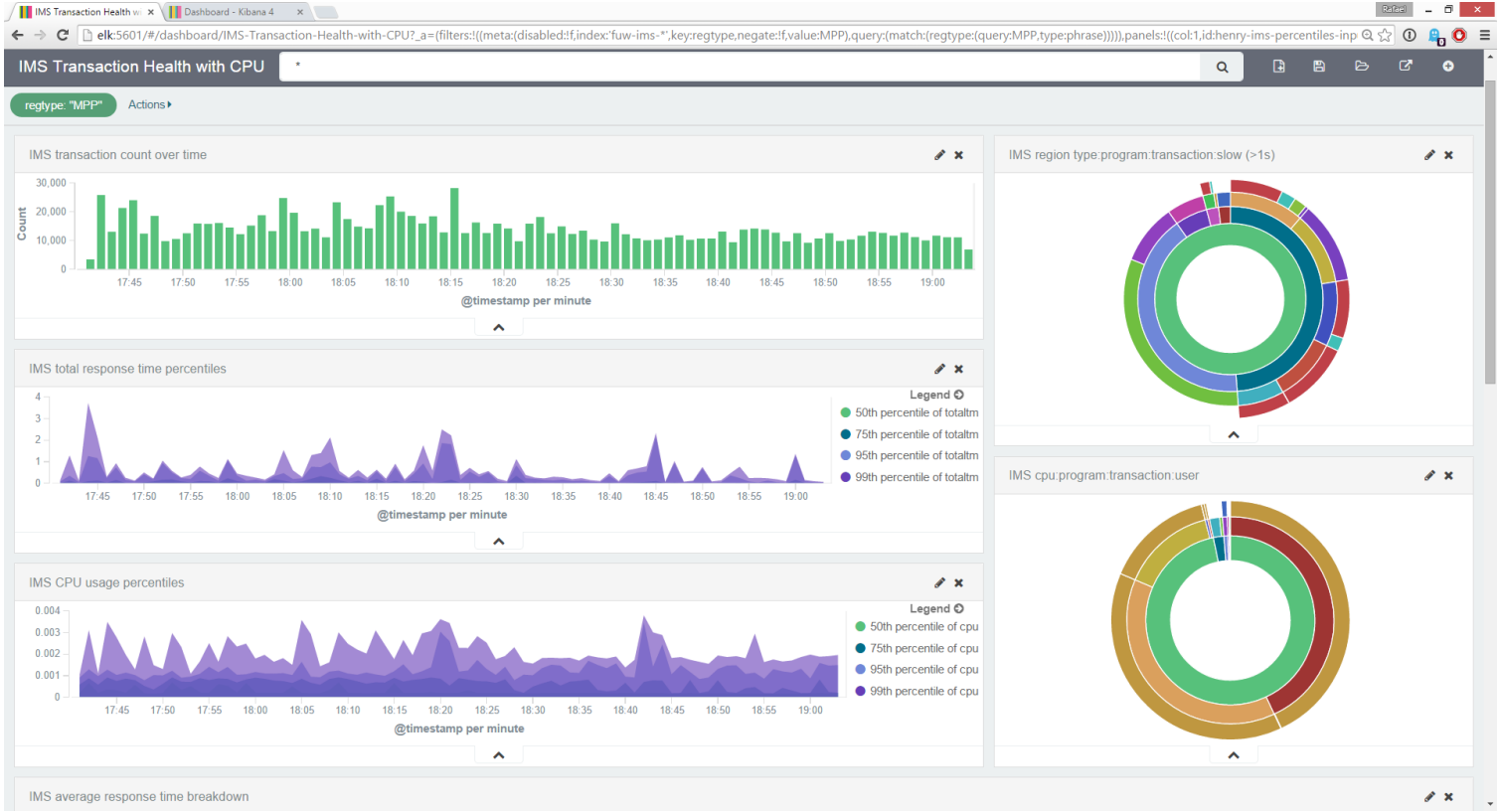
The JCL is ready for use and can be easily adapted for scheduling (for example, as part of archiving job)

Transfer via SFTP, or use Co:Z to transfer and load onto remote system

IMS Connect Extensions

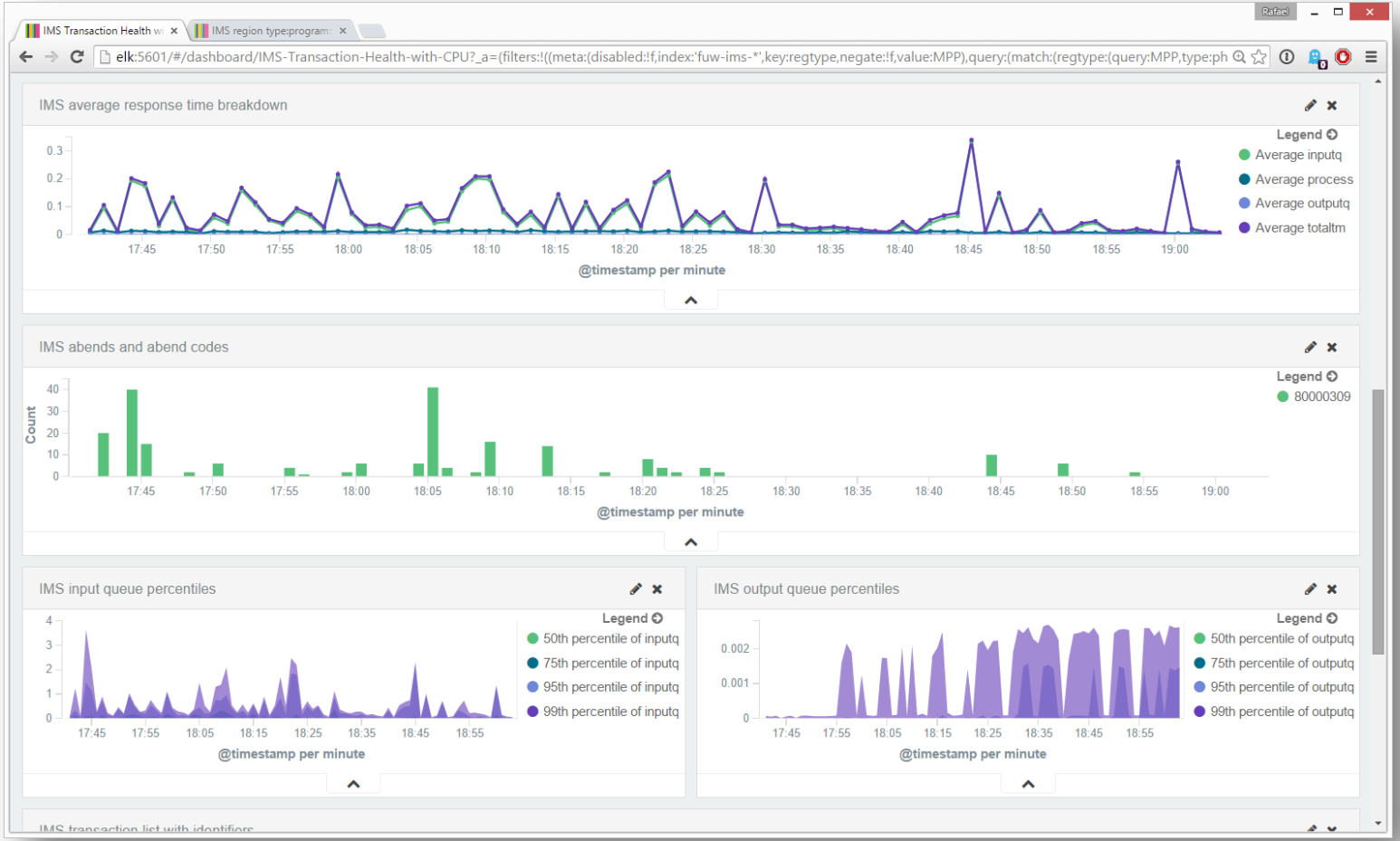
- Extensions for the IMS Connect feature of IMS
- Event collection and instrumentation
- Routing and fault management
- Automation
- Additional security

Elasticsearch, Logstash, **Kibana** (ELK stack)



We use Logstash to feed data into Elasticsearch and view in Kibana (all open source)

Combine visualizations into dashboards



Bring problems to the foreground. Know exactly where you transactions are spending the most time