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In addition, any information about our roadmap outlines our general product direction and is subject to change at any time without notice. It is for informational purposes only and shall not be incorporated into any contract or other commitment. We undertake no obligation either to develop the features or functionalities described, in beta or in preview (used interchangeably), or to include any such feature or functionality in a future release.

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# Using Splunk<sup>®</sup> Infrastructure Monitoring for Database Infrastructure

Focus on Oracle<sup>®</sup> DB Observability OBS1645C

#### Joe deBlaquiere

Principal Product Manager | Splunk





### Joe deBlaquiere

Product Manager | Splunk Observability



# Agenda

- Database Observability Objectives / Challenges
  - Why Database Observability
  - Database Perspective and Personas
  - Database Telemetry Sources
- Key Value of Splunk Database Observability
  - Splunk O11y Telemetry Data Collection (for Oracle)
  - Database Observability Entities
  - Splunk Infra Mon Views
  - Splunk Infra Mon Alerting
  - Splunk APM Correlated Views
- How to get started



# **Database Observability Drivers**

Why are databases so important?



# Data is core to business



# Drives internal process

Database availability critical to internal process, systems



# Powers customer experience

Microservice applications continuously interact



# **Database Observability Perspectives**



#### IT Ops

#### IT Admin

.

- Responsible for infrastructure availability
- Views across multiple instances
- Accountable for incident response - infrastructure
- DBA
  - Responsible for architecture and performance
  - Accountable for incident escalation

#### DevOps

- SRE
  - responsibility for application availability (and apps depend on dbs)
  - Accountable for incident response - application
- DevOps Developer
  - responsible for application features, experience and performance
  - Escalation point





< >

# **Database Telemetry**

How do we know if our database is happy?

- 1. Internal View: **JUST ASK** databases are designed to answer questions
  - a. Internal Performance Views (V\$SYSSTAT, V\$SYSMETRIC, V\$SESSTAT, V\$SESMETRIC)
  - b. Query Log Info transaction log data and statistics
  - c. Other local practice, environment specific, ... (many things available, just ask)
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  - a. Coarse metrics: CPU, Memory, I/O

#### 9.76 V\$SQLSTATS

V\$SQLSTATS displays basic performance statistics for SQL cursors and contains one row per SQL statement (that is, one row per unique value of SQL\_ID). The column definitions for columns in V\$SQLSTATS are identical to those in the V\$SQLAREA views. However, the V\$SQLSTATS view differs from V\$SQL and V\$SQLAREA in that it is faster, more scalable, and has a greater data retention (the statistics may still appear in this view, even after the cursor has been aged out of the shared pool). Note that V\$SQLSTATS contains a subset of columns that appear in V\$SQLAREA.

| Column                    | Datatype        | Description   |
|---------------------------|-----------------|---|
| SQL_TEXT                  | VARCHAR2 (1000) | First thousand characters of the SQL text for the current cursor  |
| SQL_FULLTEXT              | CLOB            | Full text for the SQL statement exposed as a $_{\rm CLOB}$ column. THe full text of a SQL statement can be retrieved using this column instead of joining with the <code>VSQLTEXT</code> view.  |
| SQL_ID                    | VARCHAR2 (13)   | SQL identifier of the parent cursor in the library cache  |
| LAST_ACTIVE_TIME          | DATE            | Last time the statistics of a contributing cursor were updated  |
| LAST_ACTIVE_CHILD_ADDRESS | RAW(4   8)      | Address of the contributing cursor that last updated these statistics   |
| PLAN_HASH_VALUE           | NUMBER          | Numeric representation of the current SQL plan for this cursor. Comparing one ${\tt PLAN\_HASH\_VALUE}$ to another easily identifies whether or not two plans are the same (rather than comparing the two plans line by line).  |
| PARSE_CALLS               | NUMBER          | Number of parse calls for all cursors with this SQL text and plan   |
| DISK_READS                | NUMBER          | Number of disk reads for all cursors with this SQL text and plan  |
| DIRECT_WRITES             | NUMBER          | Number of direct writes for all cursors with this SQL text and plan   |
| DIRECT_READS              | NUMBER          | Number of direct reads for all cursors with this SQL text and plan  |
| BUFFER_GETS               | NUMBER          | Number of buffer gets for all cursors with this SQL text and plan   |
| ROWS_PROCESSED            | NUMBER          | Total number of rows the parsed SQL statement returns   |
| SERIALIZABLE_ABORTS       | NUMBER          | Number of times the transaction failed to serialize, producing ${\tt ORA-08177}$ errors, per cursor   |
| FETCHES                   | NUMBER          | Number of fetches associated with the SQL statement   |
| EXECUTIONS                | NUMBER          | Number of executions that took place on this object since it was brought into the library cache   |
| end_of_fetch_count        | NUMBER          | Number of times this cursor was fully executed since the cursor was brought into the library cache. The value of this statistic is not incremented when the cursor is partially executed, either because it failed during the execution or because only the first the rows produced by this cursor are fetched before the cursor is closed or re-executed. By definition, the value of the END_OF_FETCH_COUNT column should be less or equal to the value of the EXECUTIONS column. |
| LOADS                     | NUMBER          | Number of times the object was either loaded or reloaded  |
| VERSION_COUNT             | NUMBER          | number of cursors present in the cache with this SQL text and plan  |
| INVALIDATIONS             | NUMBER          | Number of times this child cursor has been invalidated  |
| PX_SERVERS_EXECUTIONS     | NUMBER          | Total number of executions performed by parallel execution servers (0 when the statement has never been executed in parallel)   |
| CPU_TIME                  | NUMBER          | CPU time (in microseconds) used by this cursor for parsing, executing, and fetching   |
| ELAPSED_TIME              | NUMBER          | Elapsed time (in microseconds) used by this cursor for parsing, executing, and fetching. If the   |



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|-----|---------------------------|---------------|---|
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|     |                           |               | cription  |
|     |                           |               | : thousand characters of the SQL text for the current cursor  |
|     |                           |               | text for the SQL statement exposed as a CLOB column. THe full text of a SQL statement be retrieved using this column instead of joining with the <code>V\$SQLTEXT</code> view.  |
|     | SQL_ID                    | VARCHAR2 (13) | SQL identifier of the parent cursor in the library cache  |
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But.. ask?



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|--|----------------------------|-----------------------------------|---|--|
| :… what q<br></th <th>uestions SH</th> <th>OULD I</th> <th>SQLSTATS are identical to those in th<br/>is faster, more scalable, and has a gr<br/>hared pool). Note that V\$SQLSTATS<br/>cription<br/>: thousand characters of the SQL text for<br/>text for the SQL statement exposed as a c<br/>b er etrieved using this column instead of</th> <th>e V\$SQL and V\$SQLAREA views. However,<br/>eater data retention (the statistics may still<br/>contains a subset of columns that appear in<br/>the current cursor<br/>CLOB column. The full text of a SQL statement<br/>joining with the V\$SQLTEXT view.</th> | uestions SH                | OULD I                            | SQLSTATS are identical to those in th<br>is faster, more scalable, and has a gr<br>hared pool). Note that V\$SQLSTATS<br>cription<br>: thousand characters of the SQL text for<br>text for the SQL statement exposed as a c<br>b er etrieved using this column instead of | e V\$SQL and V\$SQLAREA views. However,<br>eater data retention (the statistics may still<br>contains a subset of columns that appear in<br>the current cursor<br>CLOB column. The full text of a SQL statement<br>joining with the V\$SQLTEXT view.     |
|  | SQL_ID                     | VARCHAR2 (13)                     | SQL identifier of the parent cursor in the libra  | ry cache   |
|  | But how o<br>local practic | can my Sl<br>ce?                  | MEs define  | text and plan<br>Lext and plan<br>Lext and plan  |
|  | DIRECT_READS               | NUMBER                            | Number of direct reads for all cursors with thi   | s SQL text and plan  |
|  | BUFFER_GETS                | NUMBER                            | Number of buffer gets for all cursors with this   | SQL text and plan  |
|  | ROWS_PROCESSED             | NUMBER                            | Total number of rows the parsed SQL stateme   | ent returns  |
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|  | FETCHES                    | NUMBER                            | Number of fetches associated with the SQL st  | atement  |
|  | EXECUTIONS                 | NUMBER                            | Number of executions that took place on this  | object since it was brought into the library cache   |
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|  | LOADS                      | NUMBER                            | Number of times the object was either loaded  | l or reloaded  |
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|  | INVALIDATIONS              | NUMBER                            | Number of times this child cursor has been in   | validated  |
|  | PX_SERVERS_EXECUTIONS      | NUMBER                            | Total number of executions performed by par<br>never been executed in parallel)   | allel execution servers (0 when the statement has  |
|  | CPU_TIME                   | NUMBER                            | CPU time (in microseconds) used by this curs  | or for parsing, executing, and fetching  |
|  | ELAPSED_TIME               | NUMBER                            | Elapsed time (in microseconds) used by this of<br>cursor uses parallel execution then ELAPSED   | ursor for parsing, executing, and fetching. If the TIME is the cumulative time for the query   |

But

ask



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# **Splunk Observability DB Telemetry**

Consistent Models for Complete, Correlated and Extensible Collection

#### OpenTelemetry Receiver

| splunk>            | ← New Chart   | Q, + D  |
|--------------------|---|---|
| â                  | Oracle Database: Oracle DB Session  |   |
| Ô                  | Overrides: Session *× Instance optional Host Ip-172-31-36-225.us-west-1.compute.internal ×  |   |
| ភ                  | Filter Tinstances/ocalhost19161 × The host.ids-0ds25a569deb030e93 × optional Time -1d Chart Resolution  | 1 🖉 🗸   |
| E,                 | Copy of # Logical and Physical Reads 30m 🖉 📾 📾 🖘 🗐 4 🏨 🖬 💬 🖽 Coree Saree  | Аз 🗇 🗘  |
| Ę                  | Chart description   |   |
|                    |   |   |
| (!)                | 40  |   |
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| ¢                  | 20  |   |
| ф<br>83            |   |   |
| ₽<br>₽             | 20<br>0<br>1450 1650 1850 2050 2250 13 Apr 0250 0450 0650 0850  | 10:00 12:00                                     |
| ↓<br>83<br>⊘<br>53 | 20<br>14.00 16.00 18.00 20.00 13.0er 02.00 04.00 06.00 08.00<br>POt Editor Churt Options Ass Data Table Events  | 10:00 12:00                                     |
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- OOTB resource metrics
- focus on contention (e.g. locks, queues)
- Top Queries Log
- Context-correlation for Host/Container

#### Open Telemetry Tracing



- Transaction RED (rate, error, duration)
- Query Time
- Client Connection

# Extensibility via custom queries

context = "slow\_queries"

metricsdesc = { p95\_time\_usecs= "Gauge metric with percentile 95 of elapsed time.", p99\_time\_usecs= "Gauge metric with percentile 99 of elapsed time." } request = "select percentile\_disc(0.95) within group (order by elapsed\_time) as p95\_time\_usecs, percentile\_disc(0.99) within group (order by elapsed\_time) as p99\_time\_usecs from v\$sql where last\_active\_time >= sysdate - 5/(24\*60)"

[[metric]]

context = "big\_queries"

untricedesc = { p95\_rows= "Gauge metric with percentile 95 of returned rows.", p99\_rows= "Gauge metric with percentile 99 of returned rows." } request = "select percentile\_disc(0.95) within group (order by rownum) as p95\_rows, percentile\_disc(0.99) within group (order by rownum) as p99\_rows from v\$sql where last\_active\_time >= sysdate - 5/(24\*60)"

[[metric]]

context = "size\_user\_segments\_top100"
metricsdesc = {table\_bytes="Gauge metric with the size of the tables in user
segments."}
labels = ["segment\_name"]
request = "select \* from (select segment\_name,sum(bytes) as table\_bytes from

user\_segments where segment\_type='TABLE' group by segment\_name) order by table\_bytes

- Local practice
- Config/App Specifics (e.g. extensions)
- Drives charts, alerts



# **Database Observability Entities / KPIs**

| Instance | <ul> <li>Resource Utilization (SGA)</li> <li>Execution Rate</li> <li>Wait Time</li> <li>Tablespaces</li> <li>Session/Query Status</li> </ul> |
|----------|--|
| Sessions | <ul> <li>Resource Utilization (PGA)</li> <li>Connection Rate</li> <li>Session I/O</li> <li>Parses</li> <li>Execution Rate</li> </ul>         |
| Queries  | <ul> <li>Resource Utilization (Query)</li> <li>Execution Rate</li> <li>Execution Time</li> <li>Waits / Locks</li> <li>Parses</li> </ul>      |





# Splunk<sup>®</sup> Infrastructure Monitoring Views

Aggregate Views (Forest):

- Optimized for IT Ops Users
- View across population quickly identify outliers

| splunk> | Infrastructure   | Q + D   |
|---------|--|---|
| â       | -1d • Add Filter   | Clear All 0 Alerts 0 Active Detectors   |
| 0°.0    | K All Infrastructure Service Oracle DB Sessions *                                | ¢   |
| A       | Oracle DB Sessions Color by PGA Mem  | ory Usage (bytes) 🔻 Group by none 💌 Find Outliers off 👻 🏥 📰                     |
| Ξ,      |  |   |
|         |  |   |
| •       |  |   |
| (1)     |  |   |
| 0       |  |   |
| 부       | ip-172-31-36-225.us-west-  |   |
|         | 1.compute.internal   localhost:9161   92<br>Region us-west-1                     |   |
| Ð       | PGA memory 11M   |   |
| ٦       | usaigu   |   |
| 4       | Dashboard: Gracle DB Sessions  # Sessions 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | POAmemory Hardpartes Softpartes Physical reads Logical reads Instance host-name |
|         | <b>2</b> 0 99 ·  | localhost lp-172-3  |
|         | 20   | 598,376 0 0 0 0 localhost ip-172-3  |
|         | 0 <u>97</u> .  | localhost ip-172-3  |
|         | Weid 13 Apr 2022 1422 00 Background User Active User Inactive 94 0               | 2,031,512 0 0 0 0 localhost ip-172-3  |
|         | 93 0   | 991,592 0 0 0 0 localhost ip-172-3  |
|         | CPU Usage (%) 30m 0 ··· PGA Memory Usage (bytes) 30m 0 ··· 92 0                  | 11.73084M 0 0 0 0 localhost ip-172-3  |
|         | 91 0   | 598,376 0 0 0 0 localhost ip-172-3  |
|         | 1.50 TOMIB 90 0  | 794,984 0 0 0 0 localhost ip-172-3  |
|         | 9 -  | localhost ip-172-3  |
|         | 5MiB 89 0  | 598,376 0 0 0 0 localhost ip-172-3  |
|         | 88 0   | 598,376 0 0 0 0 localhost ip-172-3  |
|         | 0 18:00 13 Apr 06:00 12:00 18:00 13 Apr 06:00 12:00                              | E08.376 D 0 0 Inselfered In 173.3<br>Wed 13 Apr 2022 14:22:20                   |
|         | # Soft and Hard Parses 🕬 O \cdots Session Activity (1 hour)                      | 20) 0   |
|         | 6 ↓session_id Executes   | Parses Commits Rollbacks Exchange D Enqueue De hostname instance                |
| >>      | 99 145   | 218 0 0 0 0 ip-172-3 localhost  |
|         |  | 0 0 0 0 0 lo-179-9 localhost  |

Single Entity Views (Tree):

- Provide Detail and Context
- Single Instance View

| splunk>            | Infrastructure   |  |  |   |                       | Q, + D  |
|--------------------|--|--|--|---|-----------------------|---|
| â                  | Today, 12:00am - 3:00am - Add Filter                             |  |  |   | Clear Al              | 0 Alerts 0 Active Detectors   |
| or <sup>q</sup> ,o | < All Infrastructure Service Oracle DB Ses                       | sions 💌 > Session Name [ip-172-31-36-2       | 25.us-west-1.compute.internal   localhost:9161 | 108 -                                       |                       | \$  |
| <b>.</b>           | Oracle DB Sessions<br>Session: Ip-172-31-36-225.us-west-1.comput | e.internal   localhost.9161   108            |  | :   | ABOUT THIS SESSION    | 1   |
| ₽.                 | # Logical and Physical Reads 🗅 …                                 | Execution Rate 3m                            | # Soft and Hard Parses 3m 🗅 …                  | PGA Memory Usage (bytes) 3m 🇅 …             | aws_account_id        | 906383545488  |
| o                  |  | 1k   | 1  | 14MIB                                       | aws_architecture      | x86_64  |
| (!)                | 100  | 500  | 20<br>0  | 10MIB<br>SMIB                               | aws_arn               | arn:aws:ec2:us-west-<br>1:906383545488:instance/i-<br>0d25a5d9deb030a93 |
| 4                  |  | 0  | 13 Apr 01:00 02:00                             | 12 4 22 0100 0200                           | aws_availability_zone | us-west-1c  |
|                    | 13 Apr 0100 0200   | 13 Apr 01.00 02.00                           |  | aws_hypervisor                              | xen                   |   |
| Ø                  | CPU Usage (%) 3m 🌼 …   | # Commit/Rollback 3m 0                       | Activity (1 hour) 2m                           | ۵   | aws_image_id          | ami-00008506813cea27a   |
|                    | 6  | 1  | ↓session_id Executes Parses Comm               | nits Rollbacks Exchange D Enqueue D         | aws_instance_id       | i-0d25a5d9deb030a93   |
| 67                 | 4  | 0.500  | 108 26,269 19,528 0                            | 0 0 0                                       | aws_instance_type     | t3a.medium  |
|                    | 2  |  |  |   | aws_launch_time       | Fri Mar 11 05:29:17 UTC 2022  |
|                    | 0  | 0<br>13 Apr 01:00 02:00                      | Wed 13 Apr 20                                  | 022 03:02:00                                | aws_private_dns_name  | ip-172-31-36-225.us-west-<br>1.compute.internal                         |
|                    | Resource Utilization 1m  | o  | Resource Utilization (24h) 2m                  | á   | aws_region            | us-west-1   |
|                    | ↓session_id CPU PGA memory Hard                                  | parses Soft parses Physical re Logical read- | ↓session_id CPU (avg) PGA memo Hard p          | parses Soft parses Physical re Logical read | aws_reservation_id    | r-049625e3d506c0bc8   |
|                    | 108 0.8300000 63.7523M 8   | 4 0 0  | 108 0.6902334 6,111,884 347                    | 887 439 7,901                               | aws_root_device_type  | ebs   |
|                    |  |  |  |   | aws_state             | {Code: 16,Name: running}  |
|                    |  |  |  |   | ✓ AWS Custom Tage     | s   |
|                    | Wed 13 Apr 2   | 022 03:01:00                                 | Wed 13 Apr 21                                  | 022 03:02:00                                | aws_tag_Name          | BITS_Oracle   |



### **Instance View**

- Transactions
  - Executions
  - Wait Times
- Tablespace Size/Utilization
- Global (SGA) Utilization
  - Processes
  - Sessions
  - Locks
  - Rollback Segments
  - ...
- Context Metadata





### **Session View**



- Session Transaction
   Rates
  - Executions
  - Parses
- Process (PGA) Utilization
  - CPU
  - Reads
  - Commits
  - Rollbacks
- Context Metadata



# **Query View**

Top N (configurable):

- Long-Running Queries
- Frequently Executed Queries

Query Stats:

- CPU
- Read
- Write
- Memory

Noisy Neighbors ?

**Optimization Opportunities ?** 

| shboards<br>acle Database | e / Oracle Qu  | Jeries          |              |             |                 |             |                |                |                |            |               |             |                   | Q                         | . +       |    |
|---------------------------|----------------|-----------------|--------------|-------------|-----------------|-------------|----------------|----------------|----------------|------------|---------------|-------------|-------------------|---------------------------|-----------|----|
| acle Database             | e ••• O        | RACLE DB IN     | STANCES      | ORACLI      | E DB INSTANCE   | ORACL       | E DB SESSIONS  | ORACLE DB S    | ESSION         | ORACLE     | QUERIES       | ORACLE QU   | JERY              |                           |           |    |
|                           |                |                 |              |             | Override        | s: Filter   | optional       | Time -1        | 5m             |            | Chart Resolu  | ution       | Event Overl       | ay Save                   | Reset     |    |
| # Monitored               | Queries 5n     | n               |              | Ĺ           | ж   #L          | .ong Runnin | g Queries 5m   |                | ¢              |            | # Most Exec   | uted Querie | es 5m             | _                         | ¢,        | 1  |
|                           |                | 26              | 5            |             |                 |             | 2              | 0              |                |            |               |             | 14                | ł.                        |           |    |
|                           | Tue 2          | 26 Apr 2022 15: | :50:00       |             |                 |             | Tue 26 Apr 2   | 022 15:50:00   |                |            |               | Tu          | e 26 Apr 2022 15: | 50:00                     |           |    |
| 15 Minute Qu              | uery Stats (M  | lost Executed   | ) 10s        |             |                 |             | ¢              | 15 Minute Qu   | uery Stats (Lo | ongest Ru  | nning) 10s    |             |                   |                           | ¢         | 1  |
| sql_id                    | ↓ Peak CPU     | Total Bytes     | Total Bytes  | Peak Shara  | sql_fulltext    | instance    | host.name      | sql_id         | ↓ Peak CPU     | Total Byte | s Total Bytes | Peak Shar   | a sql_fulltext    | instance                  | host.name | э  |
| ayr79g4                   | 2.716700       | -               | -            | -           | select ss       | localhos    | ip-172-3       | f2tstbvc       | 18.59700       | 0          | 0             | 0           | -                 | localhos                  | ip-172-3  | 3. |
| cm5vu2                    | 1.150400       | 0               | 0            | 0           | select /*       | localhos    | ip-172-3       | 820qdz         | 18.30590       | 0          | 0             | 0           | -                 | localhos                  | ip-172-3  | 3. |
| 0k8522r                   | 0.7425000      | 0               | 0            | 0           | select pr       | localhos    | ip-172-3       | 355qh2         | 12.76020       | 0          | 0             | 0           | select p          | localhos                  | ip-172-3  | 3. |
| 459f3z9                   | 0.7375000      | 0               | 0            | 0           | select va       | localhos    | ip-172-3       | cutf9f4        | 12.72510       | 0          | 0             | 0           | select p          | localhos                  | ip-172-3  | 3  |
| 0ws7ahf                   | 0.5968000      | 0               | 0            | 0           | -               | localhos    | ip-172-3       | bfwc1rb        | 2.631400       | 0          | 0             | 0           | SELECT            | localhos                  | ip-172-3  | 3  |
| 06dk28                    | 0.4829000      | 0               | 0            | 0           | SELECT          | localhos    | ip-172-3       | 5zmyy6         | 1.867600       | 0          | 0             | 0           | -                 | localhos                  | ip-172-3  | 3  |
| 5ur69at                   | 0.2346000      | 0               | 0            | 0           | select d        | localhos    | ip-172-3       | 459f3z9        | 0.7375000      | 0          | 0             | 0           | select va         | localhos                  | ip-172-3  | 3  |
| gmj071g                   | 0.1909000      | 0               | 0            | 0           | SELECT          | localhos    | ip-172-3       | 06dk28         | 0.4755000      | 0          | 0             | 0           | SELECT            | localhos                  | ip-172-3  | 3  |
| dbkwwt                    | 0.1418000      | 0               | 7,012,352    | 0           | SELECT          | localhos    | ip-172-3       | 15j627a        | 0              | 0          | 0             | 0           | -                 | localhos                  | ip-172-3  | 3  |
| бхурбпх                   | 0.0770000      | 0               | 0            | 0           | select n        | localhos    | ip-172-3       | 15mwq          | 0              | 0          | 0             | 0           | -                 | localhos                  | ip-172-3  | 3  |
| csnp95d                   | 0.0496000      | 0               | 0            | 0           | select fil      | localhos    | ip-172-3       | f9w2jkj0       | -              | -          | -             | -           | -                 | localhos                  | ip-172-3  | 3. |
| 5ms6rbz                   | 0.0207000      | 0               | 0            | 0           | -               | localhos    | ip-172-3       | 19s40r         | -              | -          | -             | -           | -                 | localhos                  | ip-172-3  | 3. |
|                           |                |                 | Tue 26 Apr 2 | 022 15:51:1 | 0               | laaslbaa    | in 170 0       | <u>066535</u>  |                |            | Tue 26 Apr    | 2022 15:51: | 10                | laaalbaa                  | in 170 /  | 2  |
|                           |                |                 |              |             | 0               |             |                | Diam's LD As   | 5              |            | n ^           |             |                   | A                         |           |    |
| CPU Time (ms              | s) (Most Exec  | uted) 10s       | Ц ••••       | Parses      | (bytes) (Most E | xecuted)    | 105            | Physical Bytes | s Read (Most   | Executed   | ) 🗋 ***       | # Phys      | sical Read Coun   | (Most Exec                | uted 4    | ł  |
| 4ms                       |                |                 | -            | 200B        |                 |             |                |                | 1              |            |               | 15          | 5                 |                           |           |    |
| 3ms                       |                |                 |              | 150B        | 1.1.1.1         | 1 1         |                | 195KiB         |                |            |               | 10          |                   |                           | _         |    |
| 2ms                       |                |                 |              | 100B        | h. and a        | d marketine | di di di di di | 98KiB          | 1 11           |            |               |             |                   |                           | T III     | 1  |
| 1ms                       | and the second |                 | min          | 50B         |                 |             |                |                |                |            |               |             |                   |                           |           |    |
| 0                         |                | ~~~             |              | 0           |                 |             |                | 0              |                |            | 1 11 1        | (           |                   | <u>11 111 111111 1111</u> |           |    |
|                           | 15:40          | 15:45           | 15:50        |             | 15:40           | 15:45       | 15:50          |                | 15:40          | 15:45      | 15:50         |             | 15:40             | 15:45                     |           | -1 |



# **Splunk Infra Mon Alerting**

#### AutoDetect Patterns

Sustained Global Resource Utilization

•Sudden Change in Wait Times

Sudden Change in Lock Counts

•Sudden Change in Error Rates

#### Custom Detectors

Create Detector from Any KPIAdvanced Anomaly Detection

#### Alerts and Notifications

Send to Email, External System (e.g. Splunk On-Call)
Notification Preferences, Groups, Escalations





# **Splunk APM Correlated Views**

**?** А

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Measured External Performance

- Captured at SQL Client
  - Inferred Service
  - RED Metrics
- Traces Impact to User Experience
- Quickly Identify Outliers
  - Worst Case
  - Percentiles
- Captures Exemplars for Investigation

| АРМ  |  |   |   | Q + D   |
|--|--|---|---|---|
| -15m • prod-dbquery (1) • All Workflows • Services •   | Tags 🔻   |   |   | Clear All                                     |
| Database Query Performance Database  | ase: mysql:mysql-prod-1 💌  |   |   | ×   |
| Top Queries  | Compare to: -1h 💌  | Sort: Total Time   Datab mysg                     | ase Overview<br>I:mvsql-prod-1  |   |
| QUERY  | TOTAL TIME   | P90 TOTAL REQ REQ/S                               |   |   |
| <pre>select "business_profiles"."id", "business_profiles"."business_id", "bu<br/>siness_profiles"."created_at", "business_profiles"."person_id" from "bu<br/>siness_profiles" where "business_profiles"."id" = ? limit ?</pre> | 16.67min<br>8.33min<br>12.05:20 PM<br>TODAY<br>12.05:20 PM<br>TODAY<br>12.02:20 PM<br>TODAY  | 1.4min 1k 1.16/s Datab<br>10/s 5/s                | Ise Requests & Errors<br>9.93<br>8<br>(   | 3/s II Requests<br>.9k total<br>D/s II Errors |
| <pre>select ? as one from "fields" where "fields"."business_profile_id" = ?<br/>and "fields"."name" = ? and "fields"."value" = ? and "fields"."source"<br/>= ? and "fields"."reported_at" = ? limit ?</pre>                    | 1s<br>500ms<br>12:05:20 PM<br>12:05:20 PM<br>12:02:20 PM<br>TODAY<br>12:02:20 PM<br>12:02:20 PM  | 85ms 1.1k 1.31/s 0/s Datab                        | 12:05:20 PM 12:20:20 PM TODAY TODAY   |   |
| <pre>select "business_aliases".* from "business_aliases" where "business_ali<br/>ases"."alias_id" = ? limit ?</pre>  | 1.5s<br>1s<br>4<br>500ms<br>12:05:20 PM<br>12:05:20 PM<br>12:02:20 PM<br>12:02:20 PM<br>12:02:20 PM  | 85ms 1.1k 1.27/s<br>1.33min<br>1min<br>40s<br>20s | 1.4m<br>40.8<br>73  | nin   P99<br> 3s   P90<br>ms   P50            |
| <pre>insert into views (cta_id, user_agent) values (?)</pre>   | 1s<br>500ms<br>12.05.20 PM<br>12.05.20 PM<br>12.05.2 | 85ms 1.1k 1.26/s                                  | 12:05:20 PM<br>12:205:20 PM<br>TODAY<br>TODAY<br>Tag Spotlight: Request Latency   | ر ا   |
| <pre>insert into "fields" ("name", "value", "source", "reported_at", "busine<br/>ss_profile_id", "value_json") values (?) returning "id"</pre>   | 1s 1.2min Total Time<br>+3.57%<br>1.2min History<br>1.2min History<br>1.2min History   | 85ms 1.1k 1.24/s                                  | Endpoint db.system<br>↓P90<br>CartDetails ··· 41.85s mysql                        | ↓P90<br>41.85s                                |
| <pre>select distinct on (name) * from "fields" where "fields"."business_prof ile_id" = ? order by "fields"."name" asc, "fields"."reported_at" desc</pre>   | 1s<br>500ms<br>12:05:20 PM<br>12:20:20 PM<br>TODAY<br>12:20:20 PM<br>TODAY<br>12:20:20 PM  | 85ms 1.1k 1.25/s                                  | Workflow db.name<br>2 P90<br>api/checkout ··· 41.85s mysql-prod-1<br>db.sql.table | ↓ P90<br>… 41.85s                             |
| <pre>select "business_aliases".* from "business_aliases" where "business_ali<br/>ases"."business_profile_id" = ?</pre>   | 1.5s<br>1s<br>500ms<br>12:05:20 PM<br>12:05:20 PM<br>12:02:20 PM<br>TODAY<br>12:02:20 PM   | 85ms 1.1k 1.22/s                                  | GuCzl6wrkS<br>db.operation<br>No discovered tag                                   | 41.85s  |



# **Observability : Inside out and Outside in**

Two ways to measure query response, why both?

#### **External Metrics**

- Correlated to Application what is the impact?
- Query Performance detail better characterization of distribution
  - Mean
  - Median
  - p90
  - p95

#### **Internal Metrics**

- All queries focus on identifying the bottlenecks
- Query Detail the why
  - Parses
  - Locks
  - CPU/Memory
  - I/O



# **Database Observability**





# **Simple First Steps**

- 1. Start Using Splunk Observability
- Deploy Splunk OTel Collector (QR is link below\*) to your Host
  - a. onboarding script install (recommended)
  - b. OS packages, Mass-deployment options available
- 3. Configure connection to your database
  - a. Needs a credential to query data
- 4. Check out the views
  - a. Infrastructure Navigators
  - b. Dashboards
  - c. AutoDetect Detectors





<sup>\*</sup> https://docs.splunk.com/Observability/gdi/opentelemetry/opentelemetry.html

# Thank You



