Gaining Insights from Db2 Statistics and Accounting Data

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Virtual Db2 User Group – November 2023

Availability Intelligence

Agenda

- Challenges Gaining Insights from SMF Data
- Gaining Insights from Db2 Statistics Data
- Gaining Insights from Db2 Accounting Data
- Capabilities to Gain More Insights from SMF Data

Challenges Gaining Insights from SMF Data

Challenges Deriving Value from SMF Data

- Primarily used in reactive manner
- Siloed tooling across disciplines
- Need to anticipate desired views in static reports
- Focused analysis despite massive data volumes
- Declining expertise with retirements of tenured staff

Gaining Insights from Db2 Statistics Data

Agenda: Gaining Insights from Db2 Statistics Data

- Insights from Assessments of Key Metrics
- Insights from Buffer Pool Metrics
- Insights from Integrating IFCID 199 Data with Dataset I/O Performance Data (SMF 42)
- Insights from Other Db2 Statistics Metrics

Insights from Assessments of Key Metrics

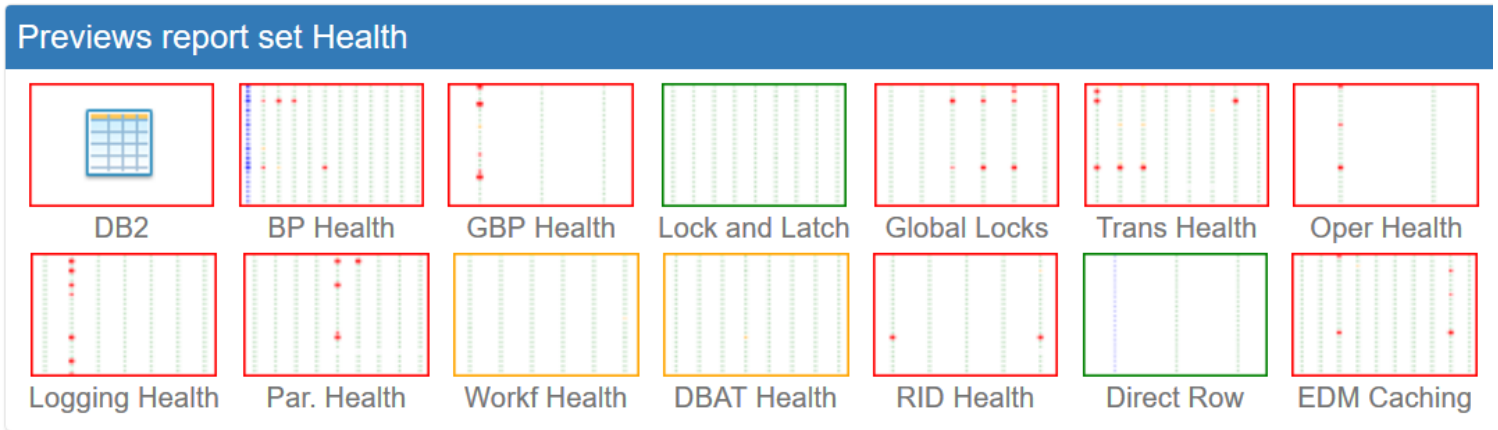
Db2 Statistics Health Assessments

Views direct your attention to potential issues

- 80+ metrics rated for health, based on best practices
- Summarized by DSG, drilldowns by member, buffer pool size and number

Examples include:

- Buffer Pools and GBPs
- Locks and Latches
- Logging
- Parallelism



Buffer Pool Health (all sizes) [rating: 2.42]

for all Buffer Manager Data by Data Sharing Group

Rating based on Buffer Manager data using DB2 Data Sharing Groups

Add to: Collected | Dashboard | Favorites | Edit report

Single day 7/2/2021

Interest group IGT, **All sysplexes**, **All shifts**

Reporting interval **Measurement**

Chart | Grid | Exceptions | Thresholds | Drilldown

Data Sharing Group	Getpages	Total Read I/O Rate	Page Residency Time in Buffer Pool	Random Buffer Pool Getpage Hit	Sequential Buffer Pool Getpage Hit	Prefetch Disabled - 90% Threshold	Prefetch Disabled - No Read Engine	Page-in for Read I/Os	Page-in for Write I/Os	Data Mgr Critical Threshold	Pages added to LPL	Migrated Data Sets Encountered	HSM Recall Timeouts
DB2F	●	■	■	■	■	■	■	■	■	■	■	■	■
DB2H	●	❗	❗	❗	❗	■	■	■	■	■	■	■	■
DB2J	●	■	■	■	■	■	■	■	■	■	■	■	■
DB2L	●	■	■	■	■	■	■	■	■	■	■	■	■
DB2M	●	■	⚠	■	■	■	■	■	■	■	■	■	■
DB2O	●	■	■	■	■	■	■	■	■	■	■	■	■
DB2W	●	■	⚠	■	■	■	■	■	■	■	■	■	■

Insights from Buffer Pool Metrics

z/OS Memory & Db2: A Match Made in Heaven

- Db2 is biggest mainstream exploiter of large quantities of memory
- Db2 keeps delivering new ways to leverage memory for improved application performance and CPU efficiency
- Db2 buffer pools represent the single biggest opportunity to leverage that incremental memory

Db2 Buffer Pool Tuning: Key Metrics

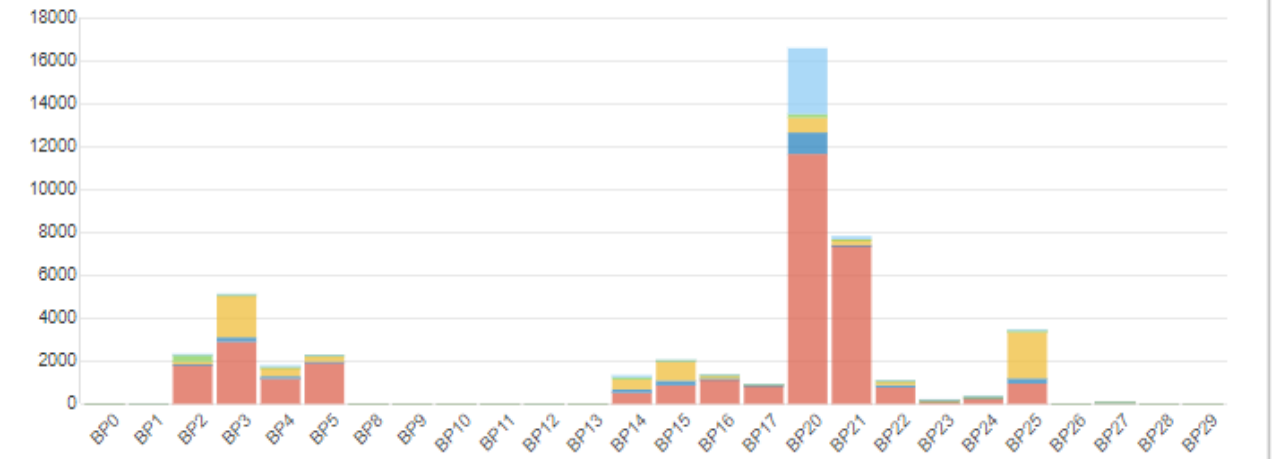
- Primary focus metrics differ across methodologies
  - Total read I/O rate
  - Page residency time
  - Random buffer hit ratio

READ DISK I/O ACTIVITY (4K BUFFER POOLS)

For Data Sharing Group 'DB2H' by DB2 Buffer Pool

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

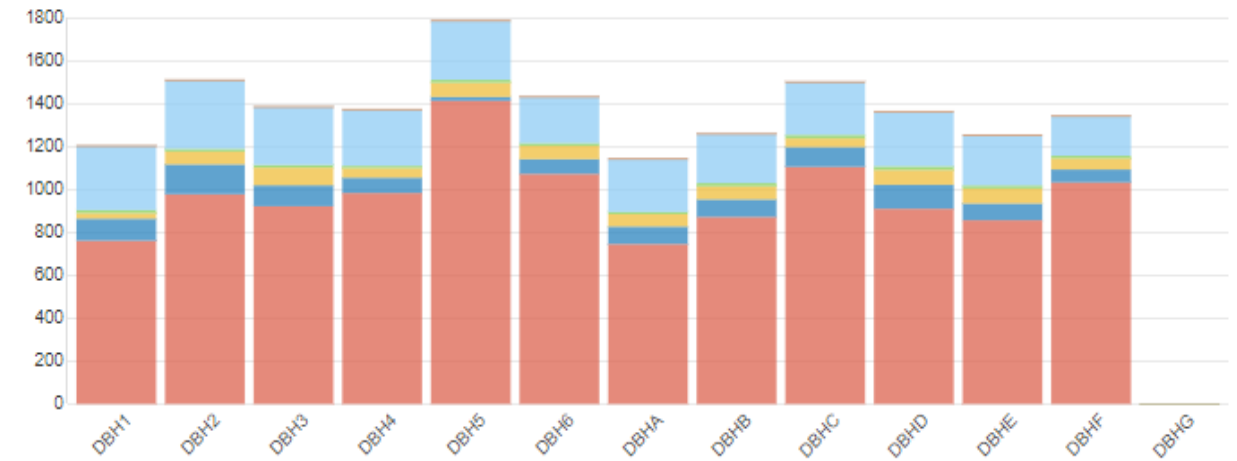


READ DISK I/O ACTIVITY (4K BUFFER POOLS)

For Data Sharing Group 'DB2H' by DB2 Member Name where DB2 Buffer Pool = 'BP20'

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

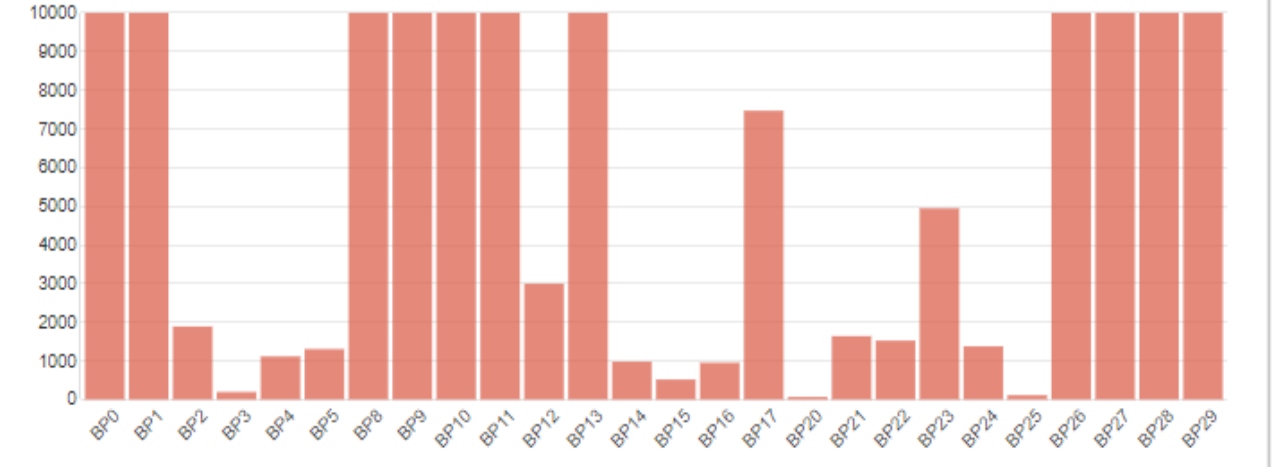


PAGE RESIDENCY TIME IN BUFFER POOL

For Data Sharing Group 'DB2H', for Buffer Size '4K' by DB2 Buffer Pool

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

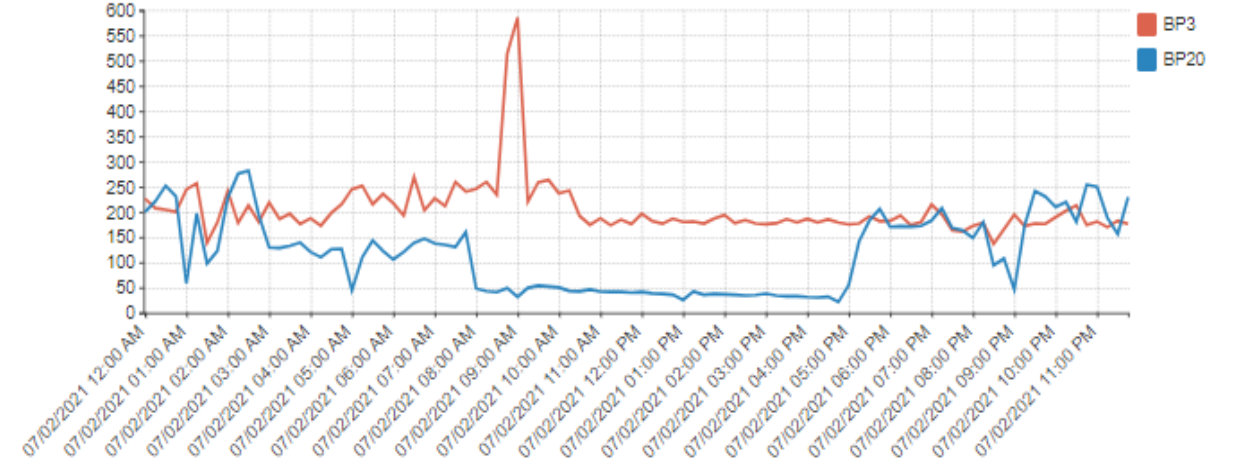


PAGE RESIDENCY TIME IN BUFFER POOL

For Data Sharing Group 'DB2H', for Buffer Size '4K' by DB2 Buffer Pool

Full report

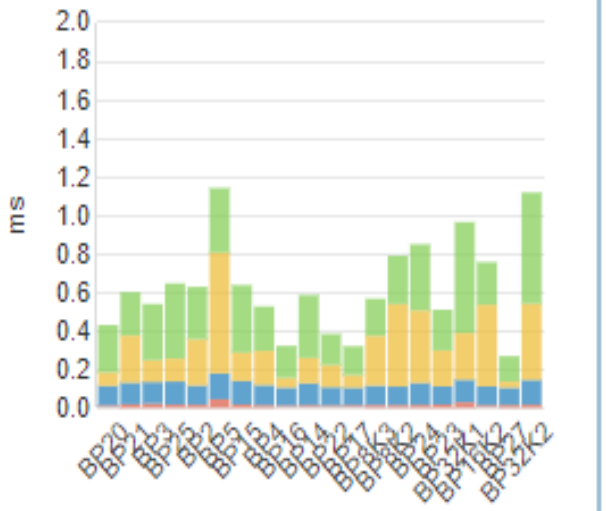
Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**



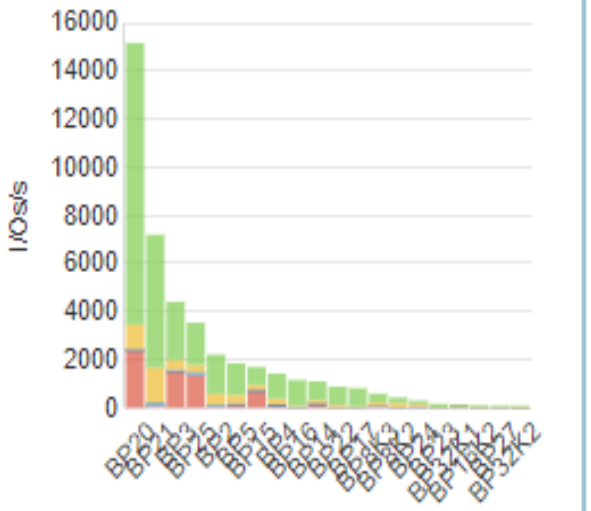
Insights from Integrating IFCID 199 Data with Dataset I/O Performance Data (42)

IFCID: Instrumentation Facility Component Identifier

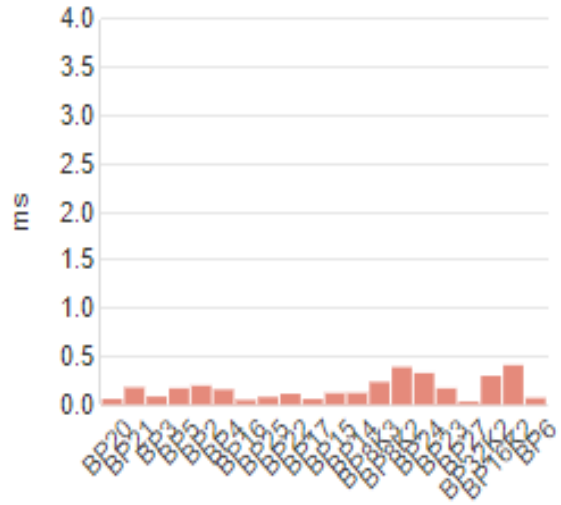
Disk Response Time Components (top 20)



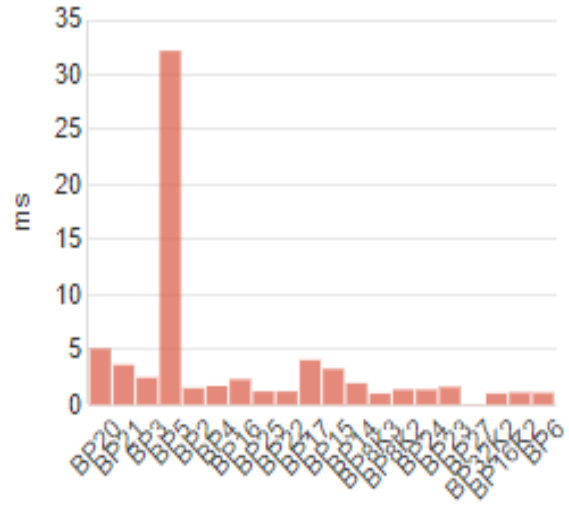
Synchronous Disk Cache Hit and Miss (top 20)



Read Disconnect Time (top 20)



Write Disconnect Time (top 20)



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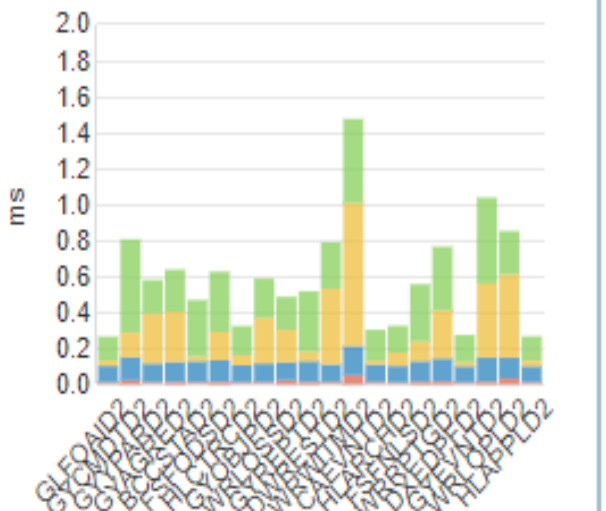

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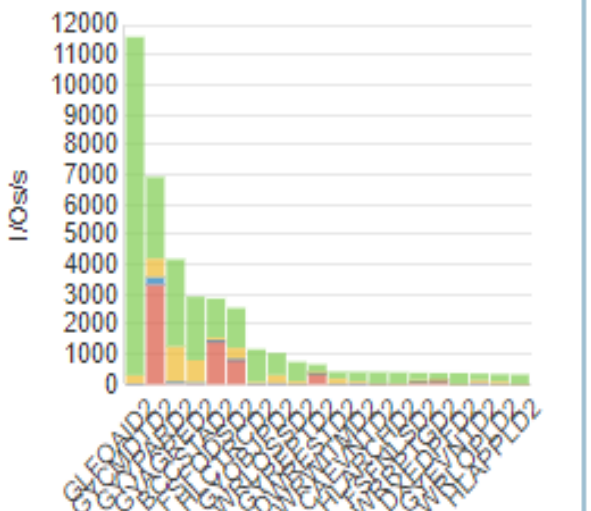

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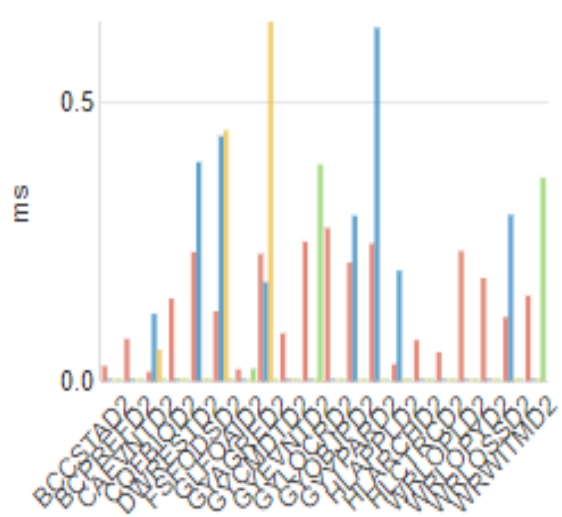

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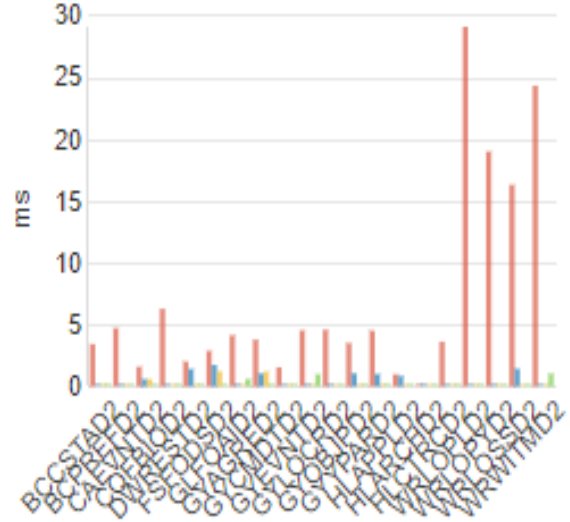
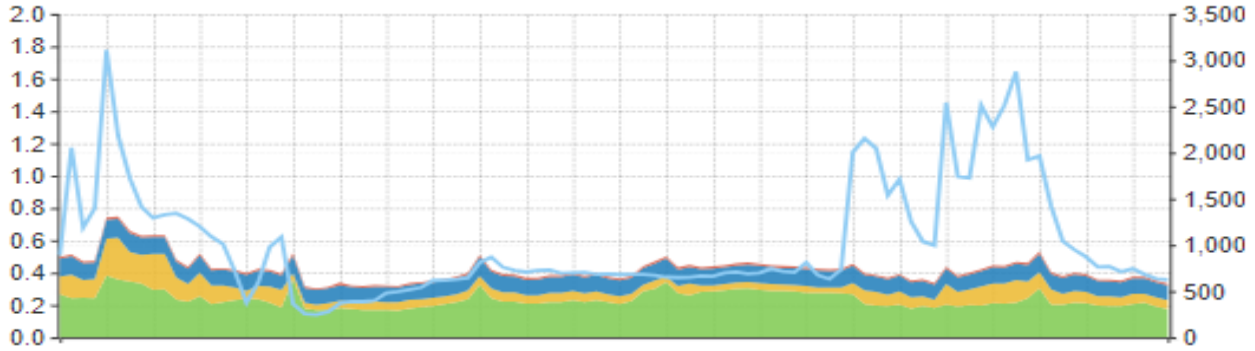


DISK RESPONSE TIME COMPONENTS

For DB2 Buffer Pool 'BP20'

Full report

Single day 7/1/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

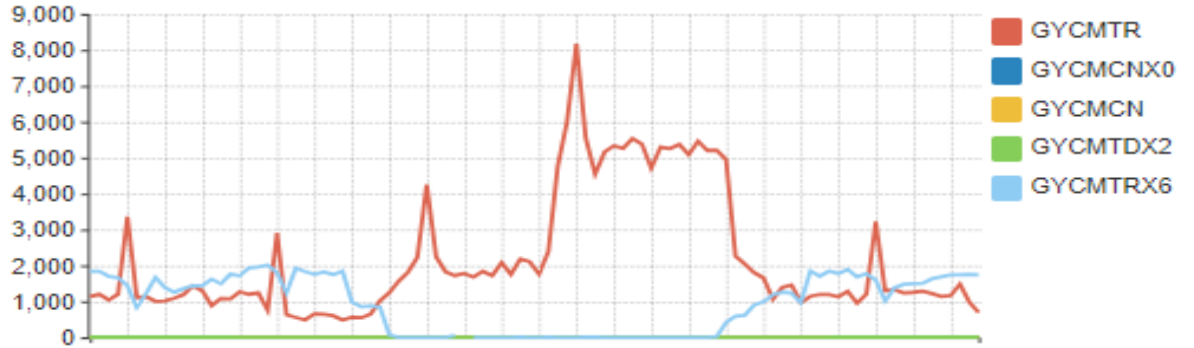


SEQUENTIAL I/OS (TOP 5)

For Database Name 'GYCMDTD2' by Page Set

Full report

Single day 7/1/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

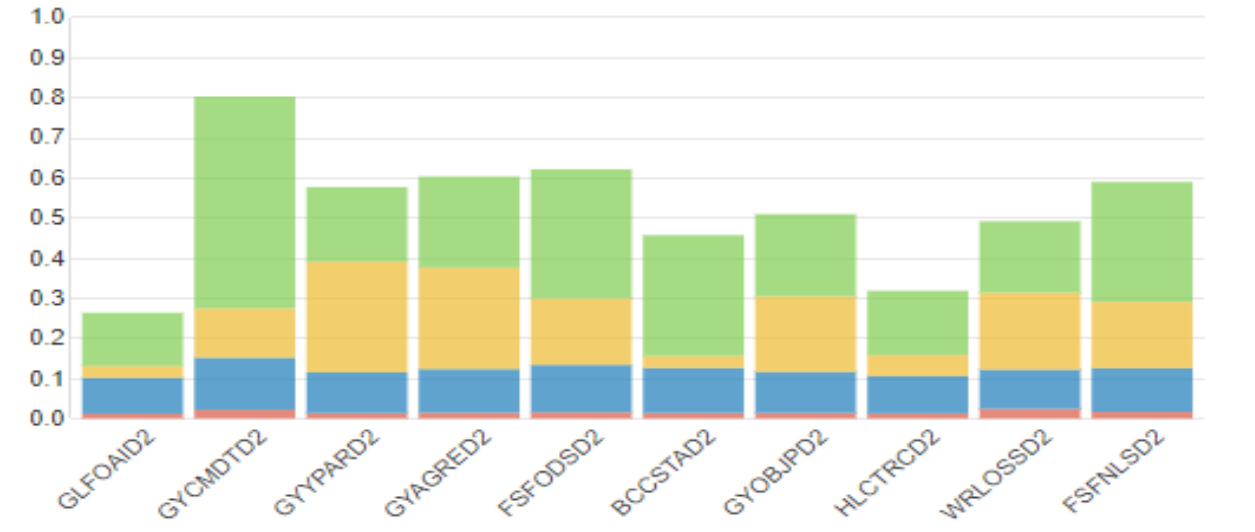


DISK RESPONSE TIME COMPONENTS (TOP 10)

for all Buffer Pools by Database Name

Full report

Single day 7/1/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

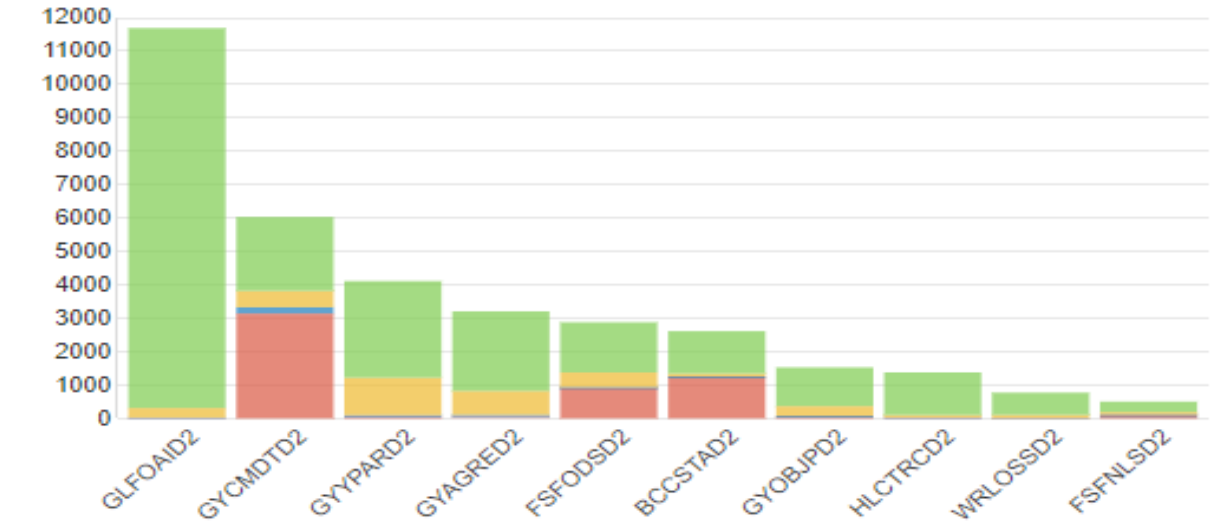


SYNCHRONOUS DISK CACHE HIT AND MISS (TOP 10)

for all Buffer Pools by Database Name

Full report

Single day 7/1/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**



Insights from Other Db2 Statistics Metrics

Exploring Other Db2 Statistics Metrics

- Commits
- Locks and Latches
- Global locking
- Logging
- SQL statement counts by type
- Prefetch requests and pages per I/O by prefetch type

TCB and SRB Usage

Commits and Failures

DB2 Commands

Latches

Locks

DDF Message Activity

Logger Statistics

DBAT Statistics

SQL Statistics

Parallelism

Workfiles

RID Processing

Global Locking

EDM Pool Usage

IFC 225 Address Spaces

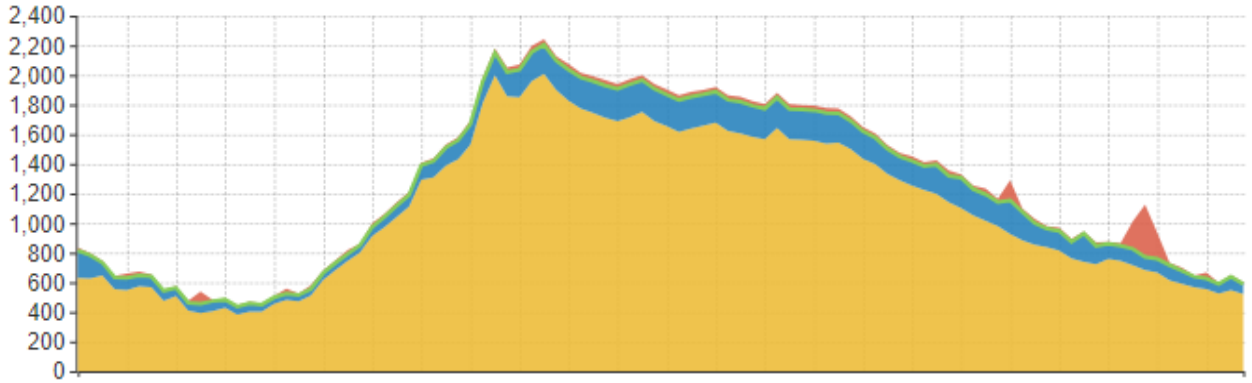
IFC 225 Shared and Common Storage

TRANSACTION COMMIT TYPES

For Data Sharing Group 'DB2H'

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

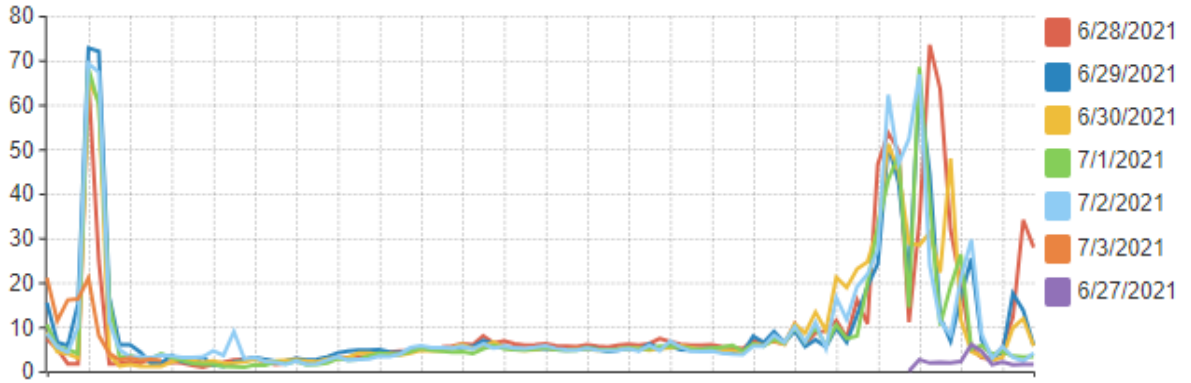


LOG THROUGHPUT

For Data Sharing Group 'DB2H' by Date

Full report

All data 6/27/2021 12:00 AM - 7/3/2021 2:59 AM
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

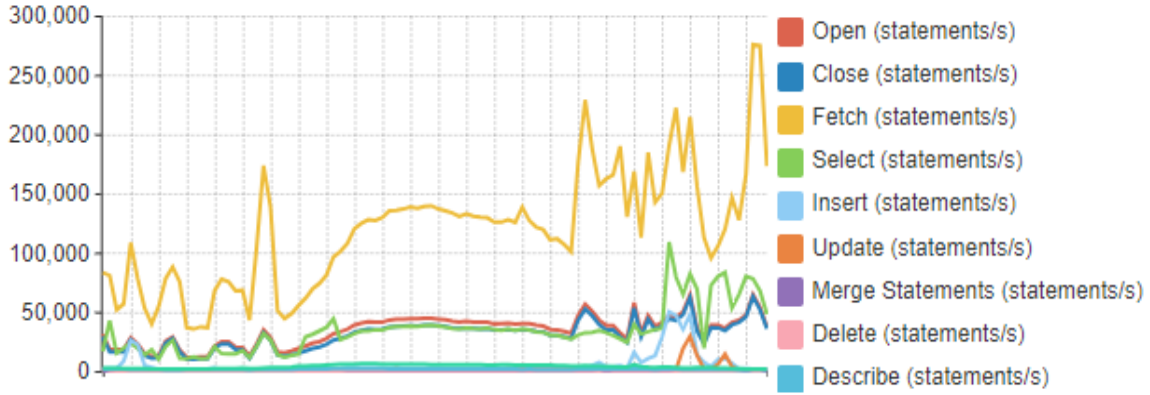


SQL STATEMENTS

For Data Sharing Group 'DB2H'

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

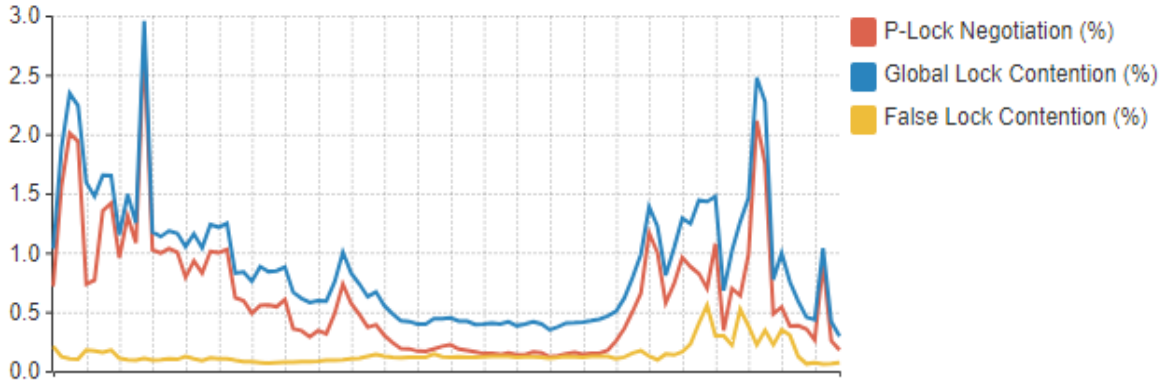


P-LOCK, TRUE AND FALSE LOCK CONTENTION

For Data Sharing Group 'DB2H'

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**



Gaining Insights from Db2 Accounting Data

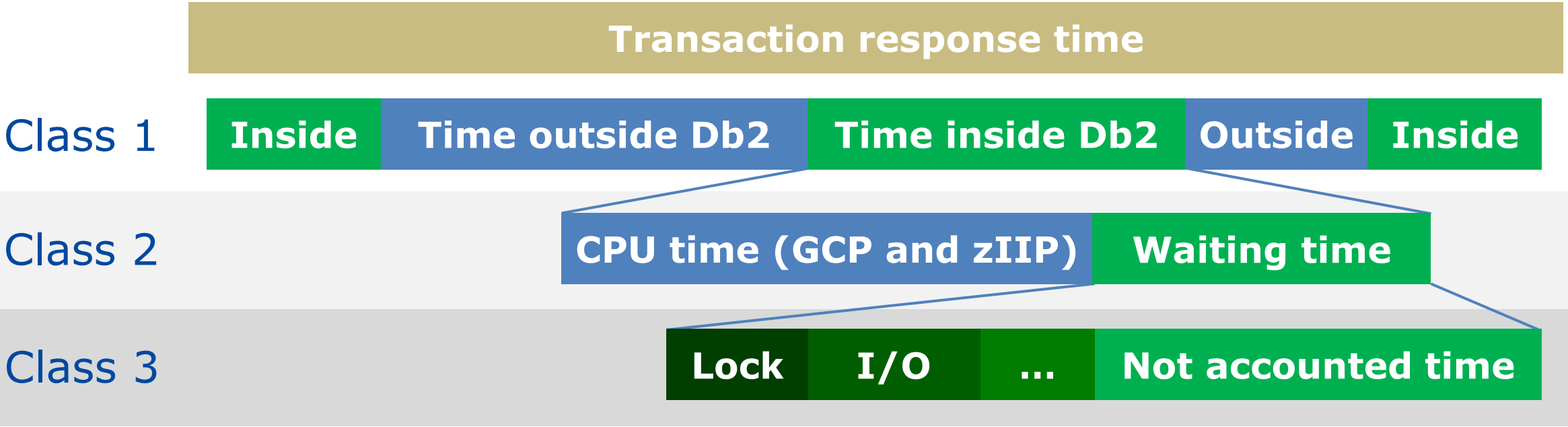
Agenda: Gaining Insights from Db2 Accounting Data

- Insights from Analysis by Connection Type
- Insights from Analysis by Correlation ID
  - Integrating Accounting Data with CICS Transaction Data (SMF 110.1)
- Insights from Analysis by Authorization ID
- Insights from Analysis by Plan or Package Name

Types of Metrics in Db2 Accounting Data

- Getpages
- Prefetch requests
- Commits
- CPU times (classes 1 & 2)
- Elapsed times (classes 2 & 3)
- Suspend events
- SQL statements
- Row activity
- Sync I/Os
- Log throughput

Class 1, 2 and 3 Plan Accounting Data



- Class 1 is application perspective from Db2 thread creation to termination
- Class 2 provides Db2 elapsed and CPU time (Class 7 for package)
- Class 3 provides wait reasons within Db2 (Class 8 for package)

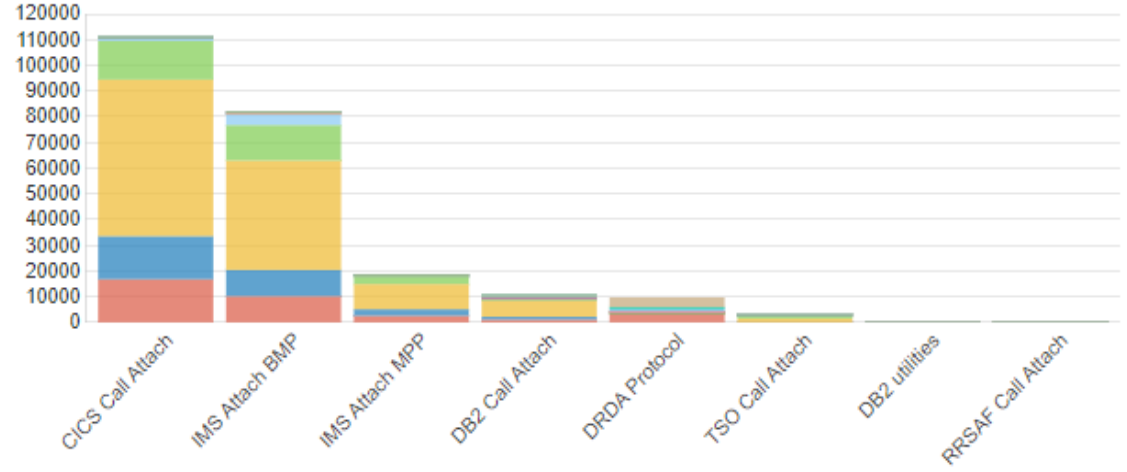
Insights from Analysis by Connection Type

SQL STATEMENTS

for all Plan SQL Commands by Connection Type

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

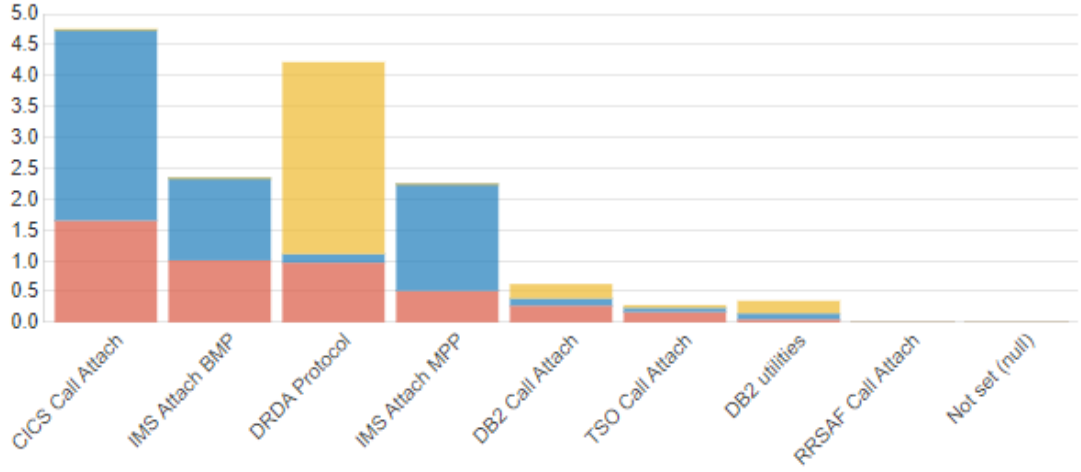


DB2 AND APPLICATION CP AND ZIIP USAGE

for all Plan Data by Connection Type

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

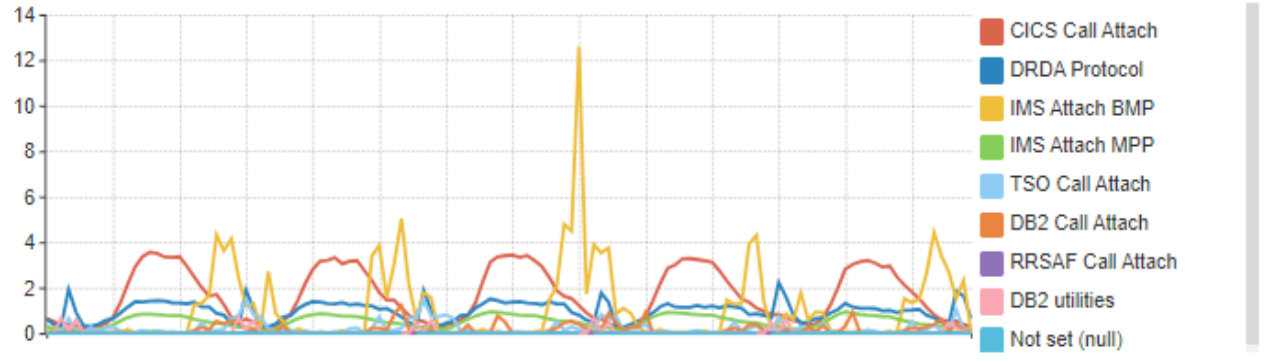


DB2 CP USAGE

for all Plan Data by Connection Type with filter on Data Sharing Group

Full report

All data 6/27/2021 12:00 AM - 7/3/2021 2:59 AM
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Hour**

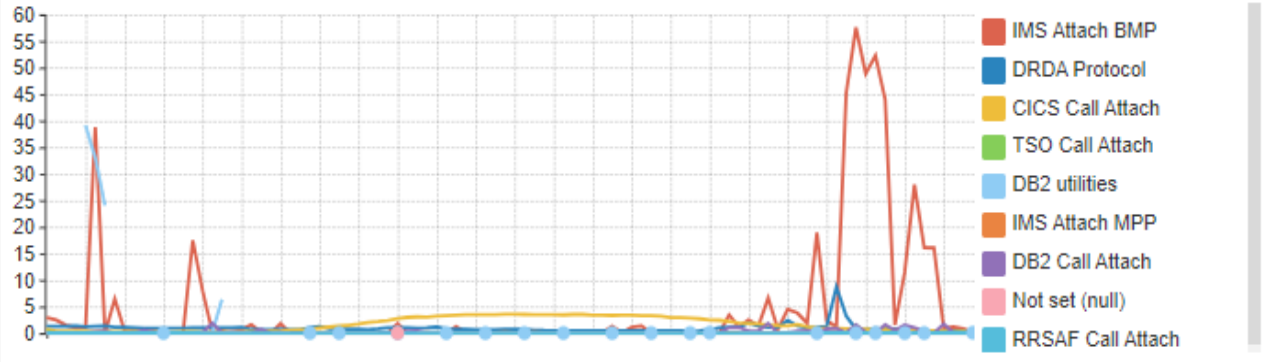


LOG THROUGHPUT

for all Plan Data by Connection Type with filter on Data Sharing Group

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**



Insights from Analysis by Correlation ID

Correlation ID Contents by Connection Type

- CICS – transaction ID
- Db2/TSO Call Attach (batch) – job name
- DDF – DDM external name (EXTNAM) for client
- IMS – PSBNAME
- TSO – logon ID

DB2 CP USAGE

for all Plan Data by Connection Type with filter on Data Sharing Group

Full report

All data 6/27/2021 12:00 AM - 7/3/2021 2:59 AM
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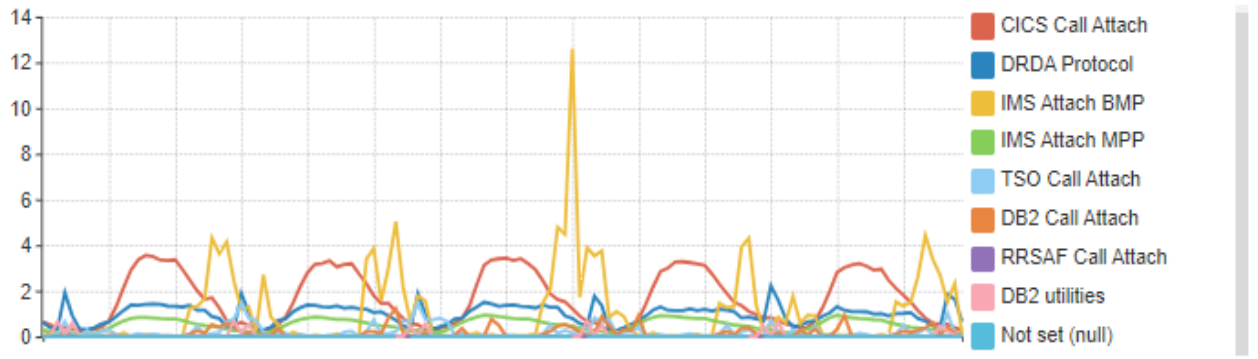
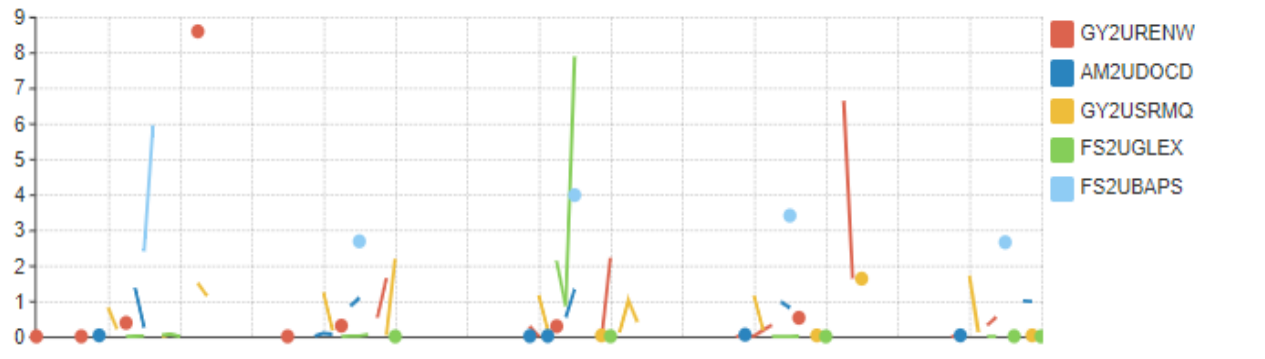


DB2 AND APPLICATION CP AND ZIIP USAGE (TOP 5)

For Connection Type 'IMS Attach BMP' by Correlation Name with filter on Data Sharing Group

Full report

All data 6/27/2021 12:00 AM - 7/3/2021 2:59 AM
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Hour**

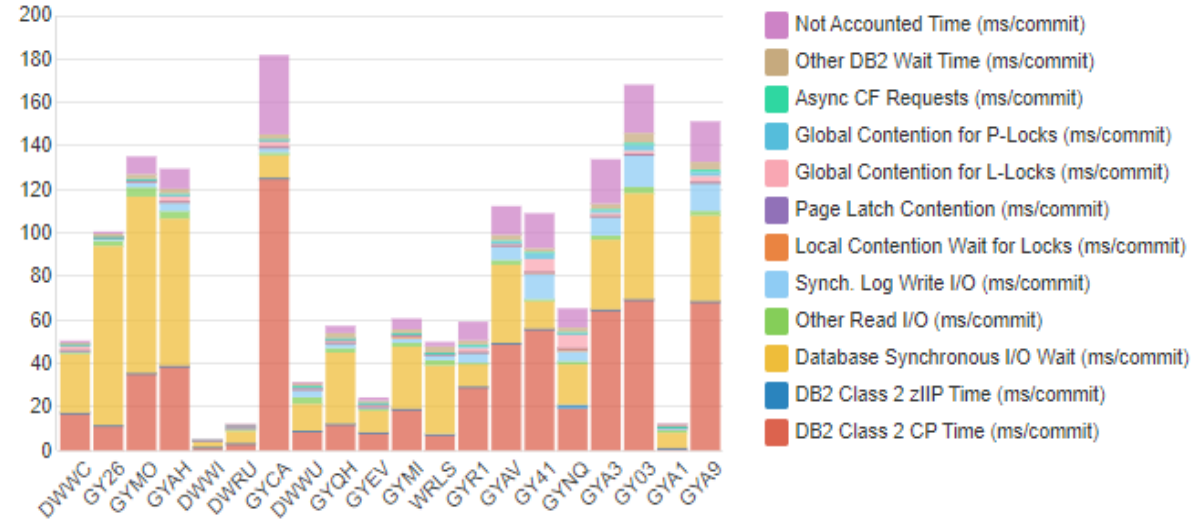


DB2 TRANSACTION RESPONSE TIME (TOP 20)

For Connection Type 'CICS Call Attach' by Correlation Name with filter on Data Sharing Group

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

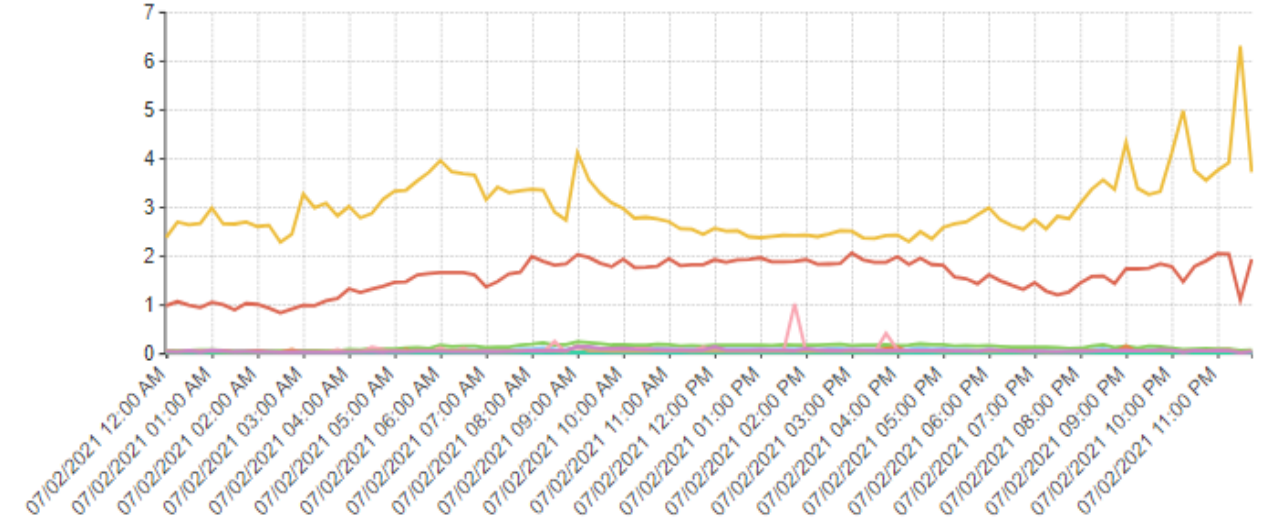


DB2 TRANSACTION RESPONSE TIME

For Connection Type 'CICS Call Attach', for Correlation Name 'DWWI' with filter on Data Sharing ...

Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**

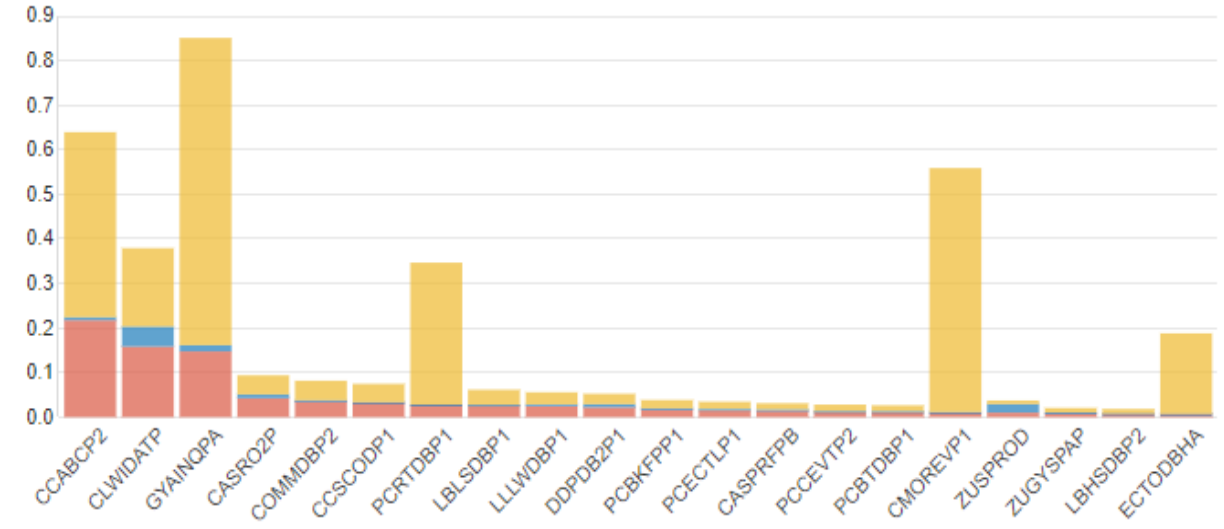


Insights from Analysis by Authorization ID

DB2 AND APPLICATION CP AND ZIIP USAGE (TOP 20)

For Data Sharing Group 'DB2H', for Connection Type 'DRDA Protocol' by Authorization ID with filt... Full report

Single day 7/2/2021
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Measurement**



DB2 GCP USAGE (TOP 5)

For Data Sharing Group 'DB2H', for Connection Type 'DRDA Protocol' by Authorization ID with filt... Full report

All data 6/27/2021 12:00 AM - 7/3/2021 2:59 AM
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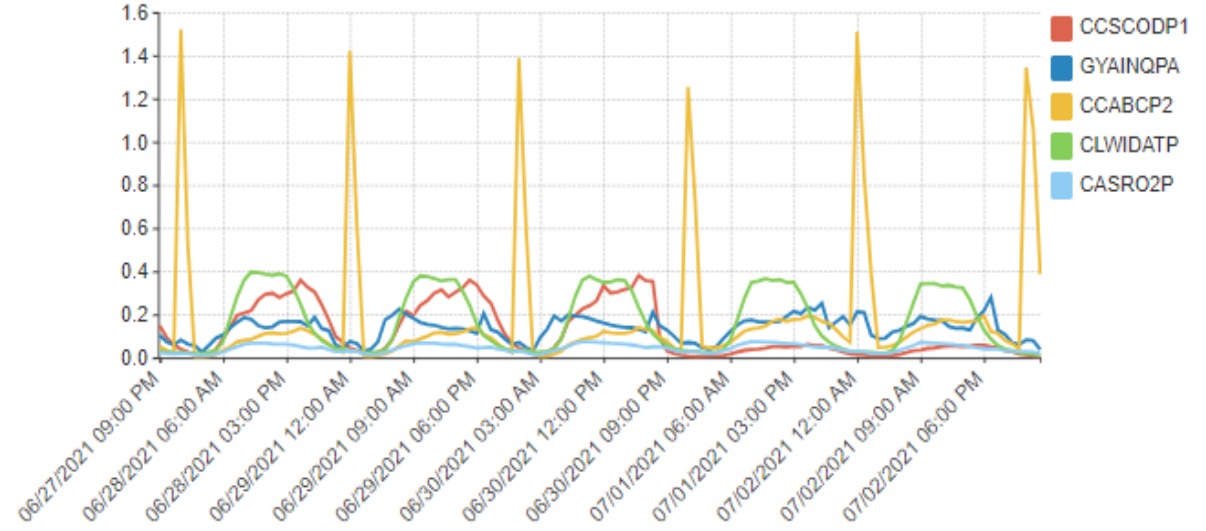
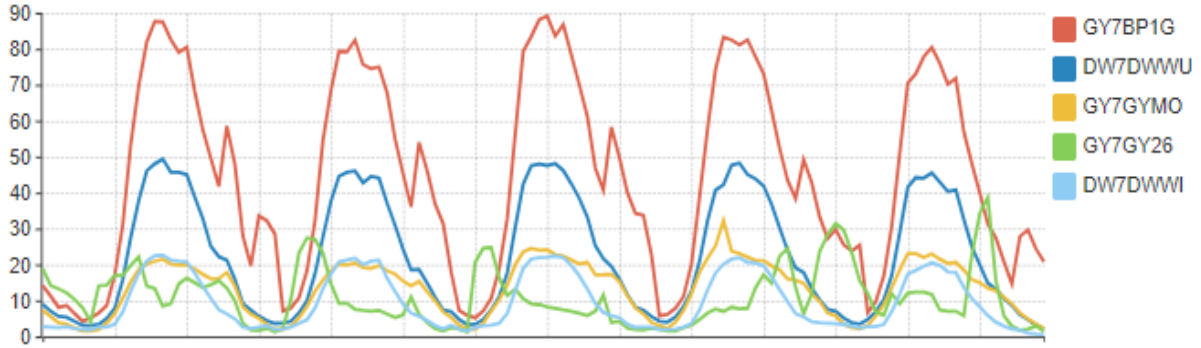


DB2 CLASS 2 CP TIME (TOP 5)

For Data Sharing Group 'DB2H', for Connection Type 'CICS Call Attach' by Plan Name with filter ... Full report

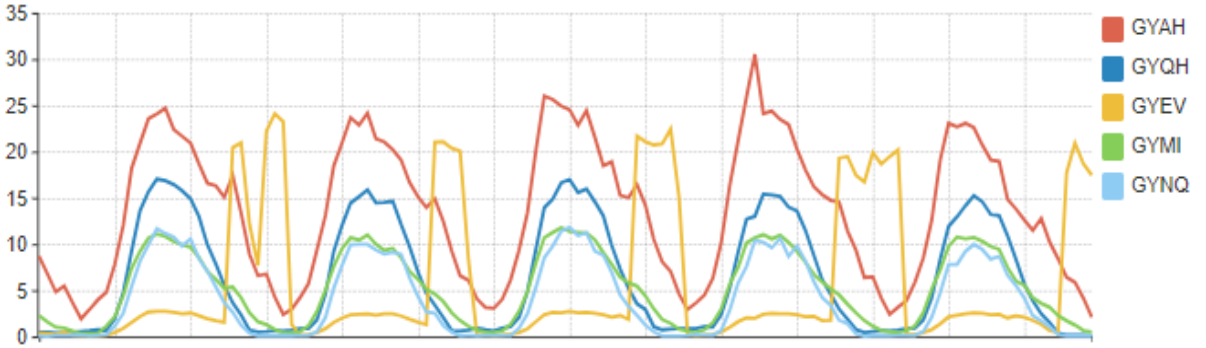
All data 6/27/2021 12:00 AM - 7/3/2021 2:59 AM
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Hour**



DB2 CLASS 2 CPU (TOP 5)

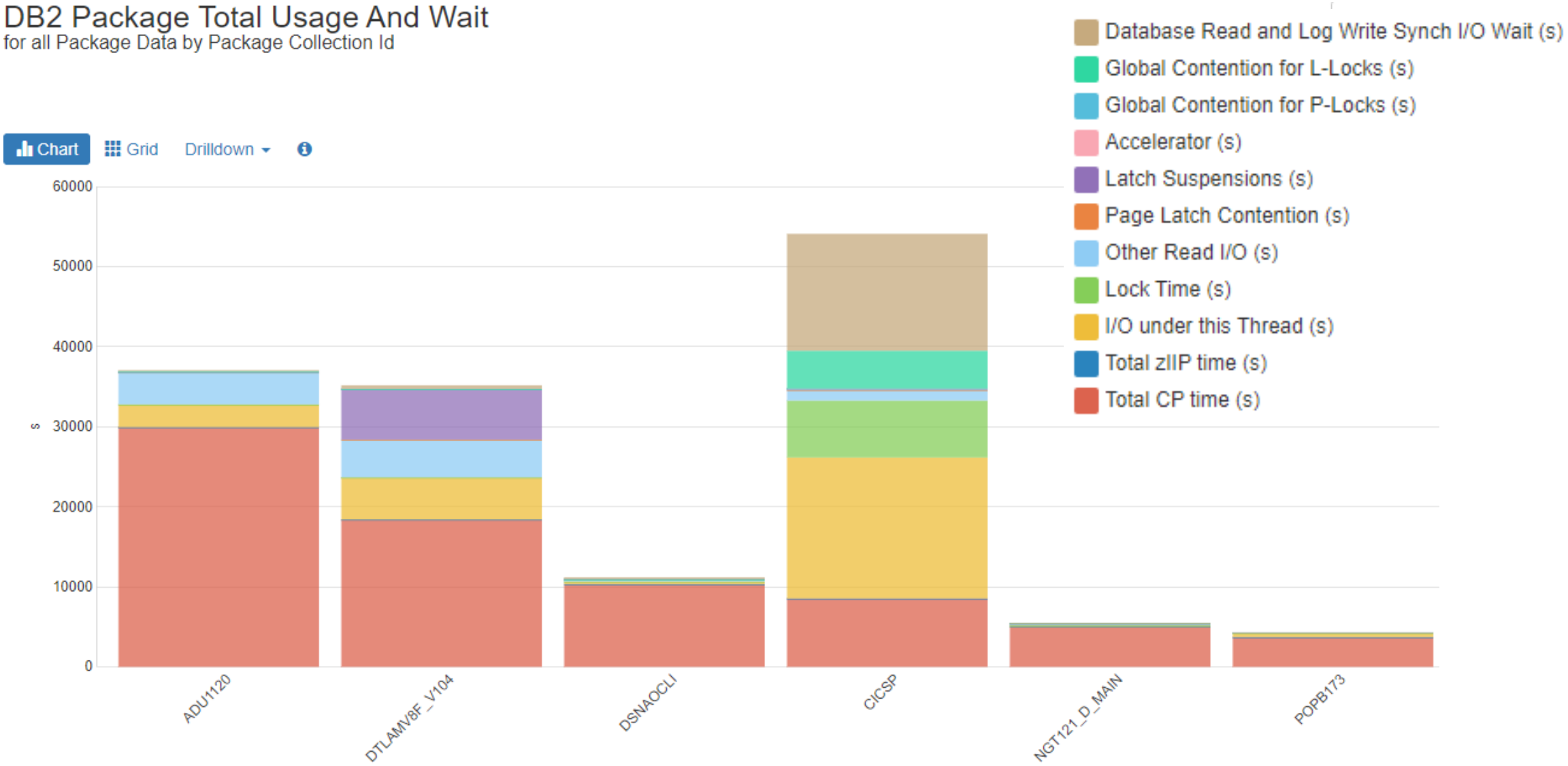
For Plan Name 'GY7BP1G' by Correlation Name with filter on Data Sharing Group, Plan Name Full report

All data 6/27/2021 12:00 AM - 7/3/2021 2:59 AM
Interest group **IGT**, **All sysplexes**, **All shifts**, Interval **Hour**



Insights from Analysis by Plan or Package Name

Package Data by Package Collection ID



Types of Metrics in Db2 Accounting Data

- Getpages
- Prefetch requests
- Commits
- CPU times (classes 1 & 2)
- Elapsed times (classes 2 & 3)
- Suspend events
- SQL statements
- Row activity
- Sync I/Os
- Log throughput

Capabilities to Gain More Insights from SMF Data

Gaining More Insights from SMF Data

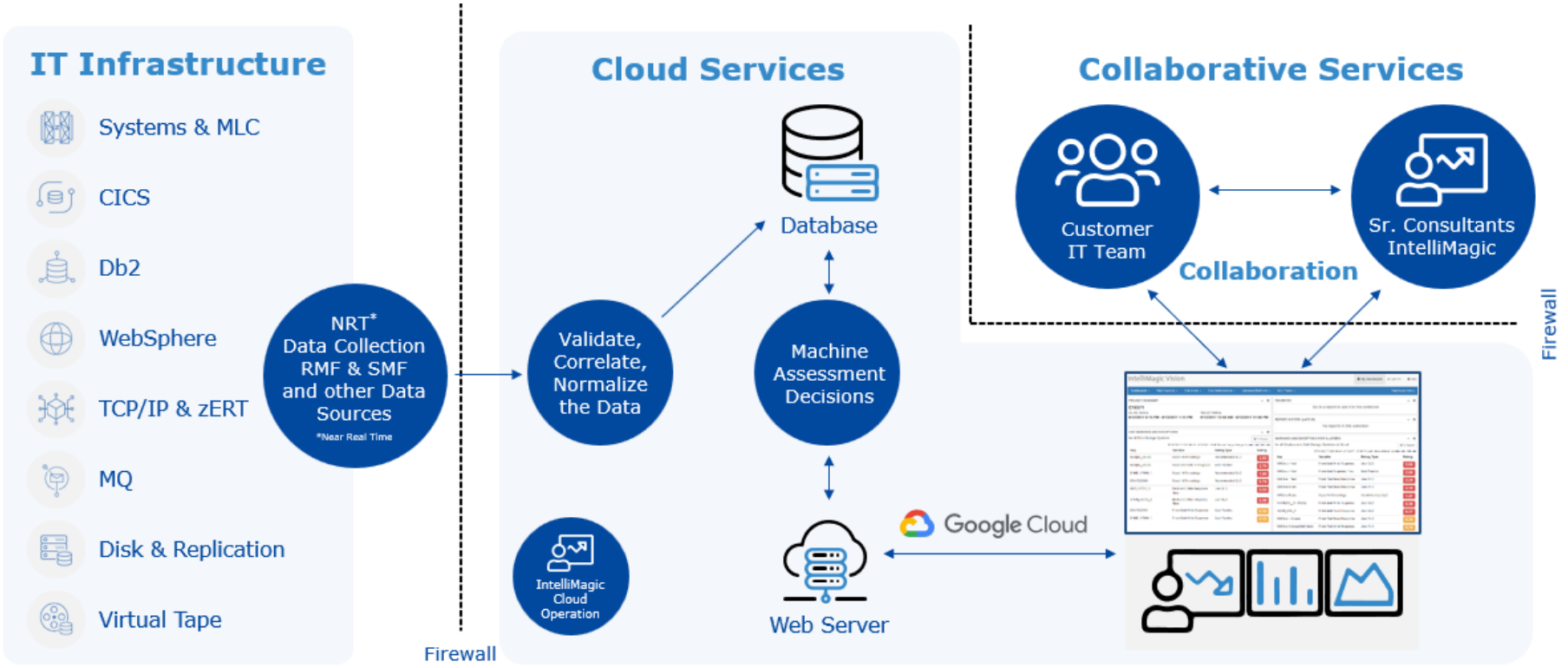
- Primarily used in reactive manner
  - Proactive identification of potential risks to availability and performance
- Siloed tooling across disciplines
  - Common interface into data types across platform promotes collaboration
- Need to anticipate desired views in static reports
  - Dynamic navigation to explore data based on current view

Gaining More Insights from SMF Data

- Focused analysis despite massive data volumes
  - Context sensitive drill downs to quickly focus on desired subset of data
- Declining expertise with retirements of tenured staff
  - Intuitive visibility expedites bringing newer staff up to speed
  - Interactive dialog to customize reports eliminates need to write programs

Questions?

IntelliMagic Cloud: Focus + Access to Experts



Product Infrastructure

IntelliMagic-provided product infrastructure and management

Implementation

Very fast implementation

Access to Experts

Fractional access to deep performance experts

Short-Term Services

Enables fast and cost-effective short term service engagements

Thank you for attending!

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For additional information, please contact
info@intellimagic.com