



Using WorkloadTools to Modernize your SQL Server Instances

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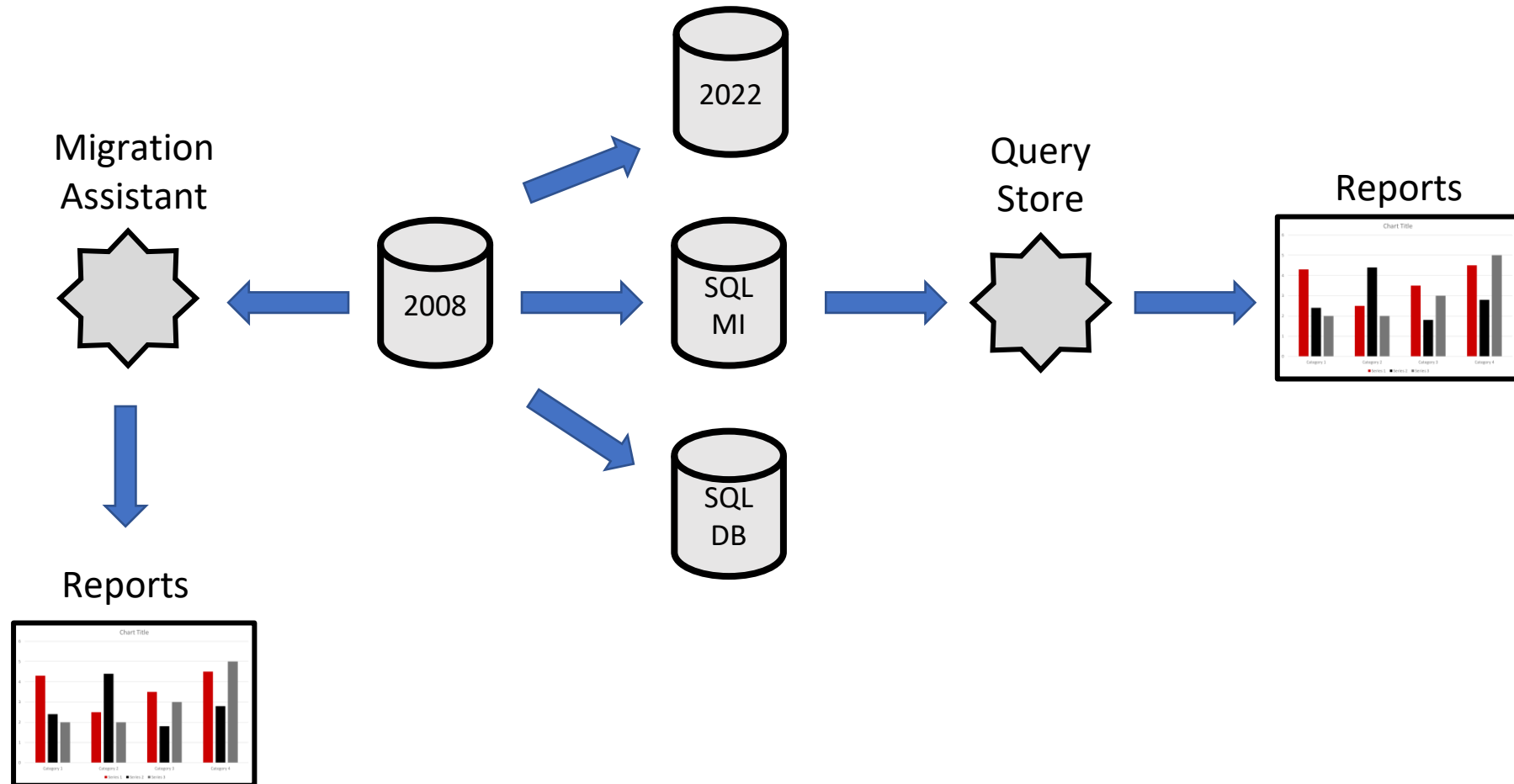


Agenda

- Modernization Scenarios
 - Tools and Challenges
 - Introducing WorkloadTools
 - Working with WorkloadTools
- 

Modernization Scenarios

Modernization Scenarios



What is a Benchmark?

Describes performance in a given scenario

Evaluates *whatif* scenarios

HW/Software Upgrade

Virtualization, Migration

Helps rating tuning efforts

Server-wide configuration changes

Addition / removal of indexes

What's in a Benchmark?

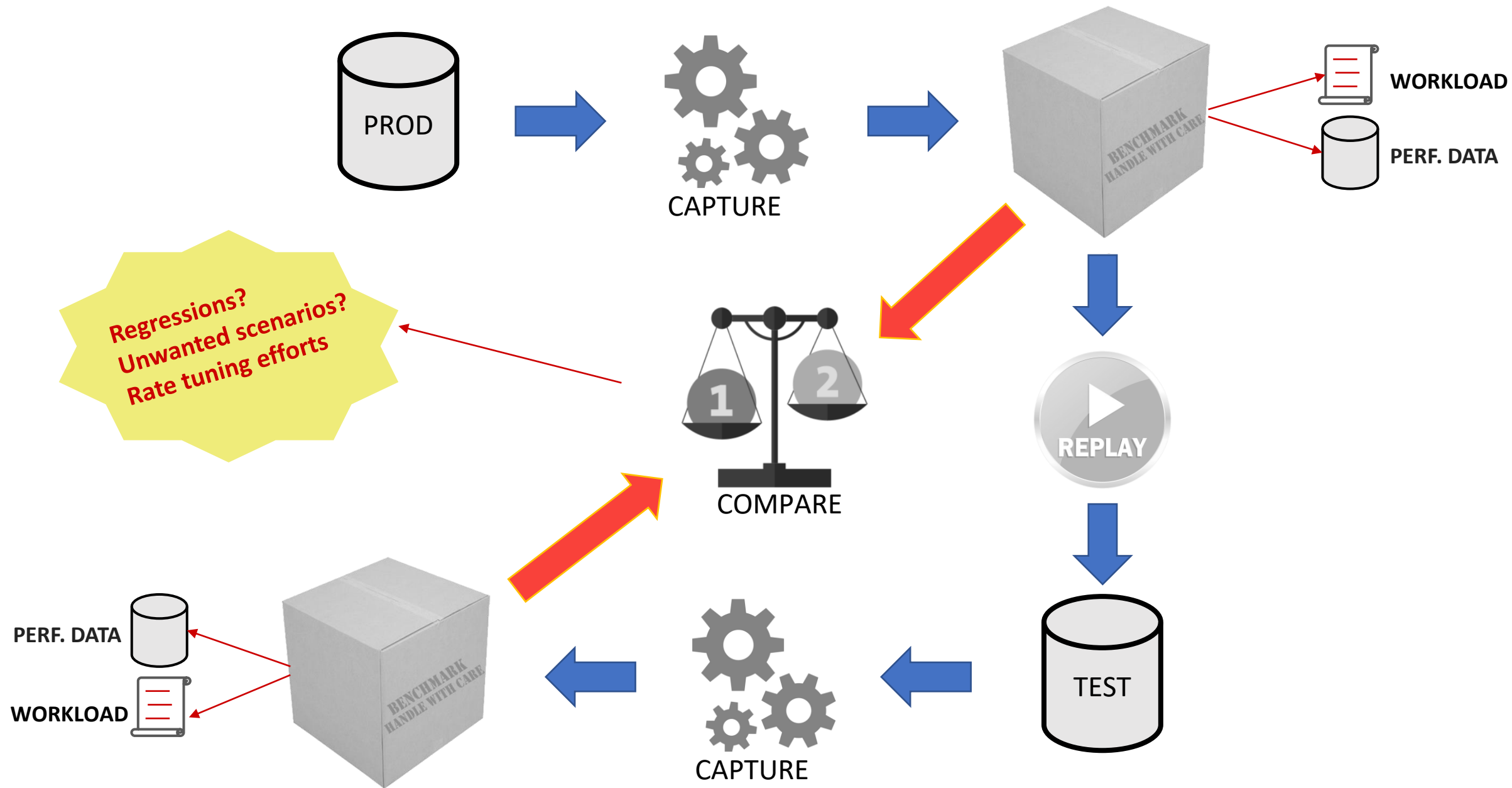


Performance data

- Batches / sec
- CPU
- Wait Stats

Source workload

- Queries
- Duration
- CPU
- Reads
- Writes



Tools and Challenges

Benchmarking is hard

- **Capture source workload and performance data**
 - Which tool?
 - What to capture?
- **Replay and capture performance data**
 - Which tool?
 - What to capture?
- **Compare results**
 - Which tool?



Capture Tools - SQLServer

- **Profiler**

- Non-negligible performance impact on the server

- **Extended Events**

- Low performance overhead

- Big files

- Non compatible with all versions of SQL Server

- **SQL Trace**

- «Old school» and deprecated

- Compatible with all versions and many analysis/replay tools



Analysis Tools

- **RML Utilities**

ReadTrace
Reporter

- **SQLNexus**

Based on RML Utilities

- **ClearTrace**

Can analyze trace files

- **PAL**

Performance counters analysis with thresholds

- **DEA**

Benchmarking tool with Dreplay and R charts



Replay Tools

- **Profiler**

Can set breakpoints for debugging

- **RML Utilities**

Ostress

Stress / Replay mode

- **Distributed Replay**

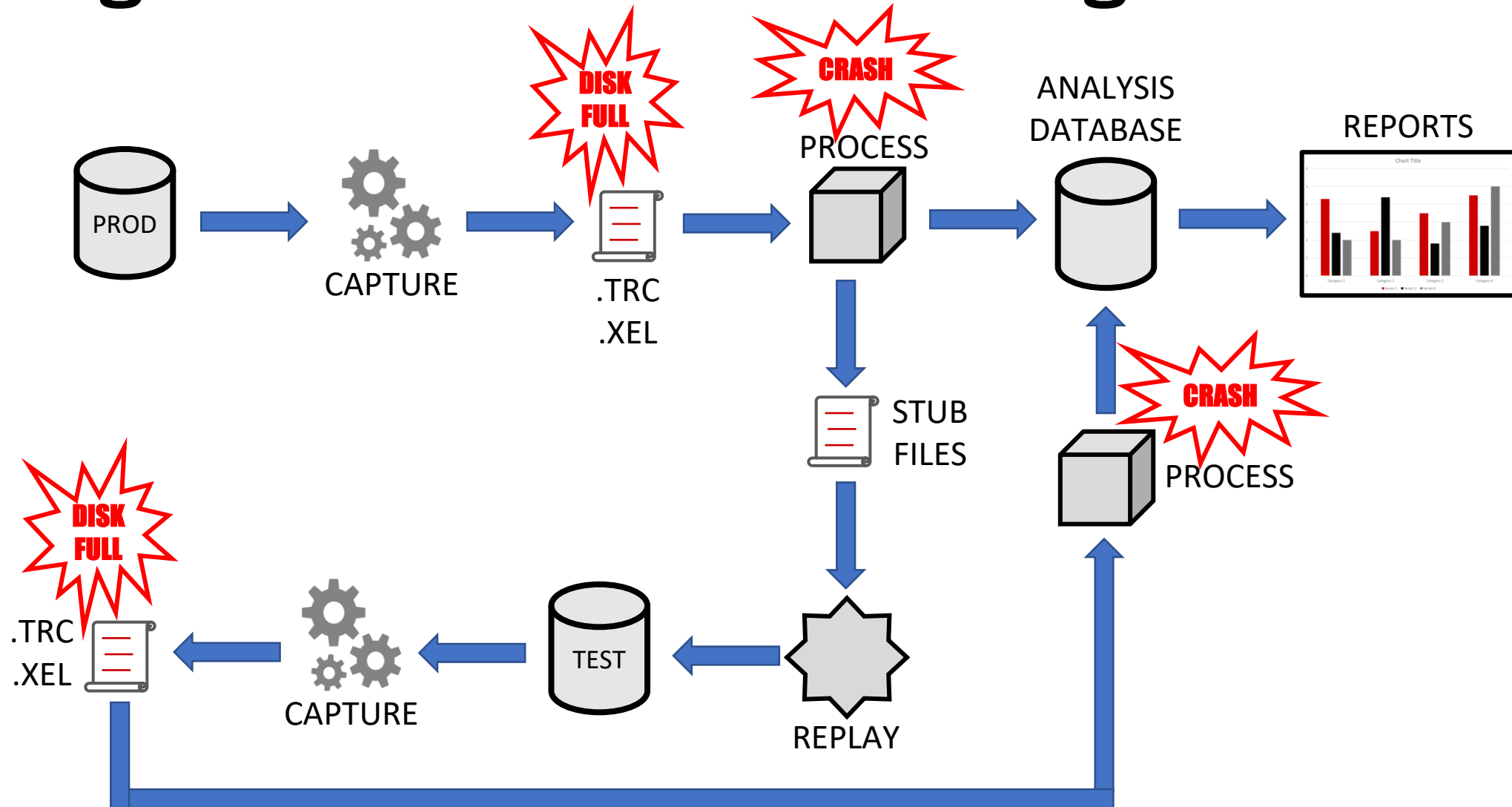
Introduced in SQL Server 2012

Can replay a workload from multiple clients

Supports synchronization mode



Using Traditional Benchmarking Tools



Benchmarking in the Cloud is even harder

IAAS: Azure VM

Same as on-premises

PAAS: Managed Instance

Traces not supported

Supports Extended Events:

- blob storage file target
- event streaming

Perfmon not supported

PAAS: SQL Database

Traces not supported

Supports Extended Events:

- blob storage file target
- event streaming ← NEW!

Perfmon not supported

Introducing WorkloadTools

Introducing WorkloadTools

- Collection of Open Source Tools
 - ✓ <https://github.com/spaghettidba/WorkloadTools>
- Takes care of all aspects of benchmarking
 - ✓ Workload Capture
 - ✓ Workload Analysis
 - ✓ Workload Replay
- Works against **Azure SQL Database** and **Azure Managed Instance**
- Can do **real-time** capture and replay



UNIQUE
FEATURES !!

WorkloadTools

- **Multiple Listener types**

- SqlTrace

- Extended Events

- File (saved workload)

- **Multiple Consumer types**

- File (save workload)

- Analysis

- Replay

- **Easy to configure**

- Accepts .json configuration files

- Scriptable via PowerShell

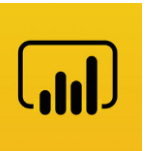
- **Easy to visualize**

- PowerBI for **data analysis**

- WorkloadViewer**

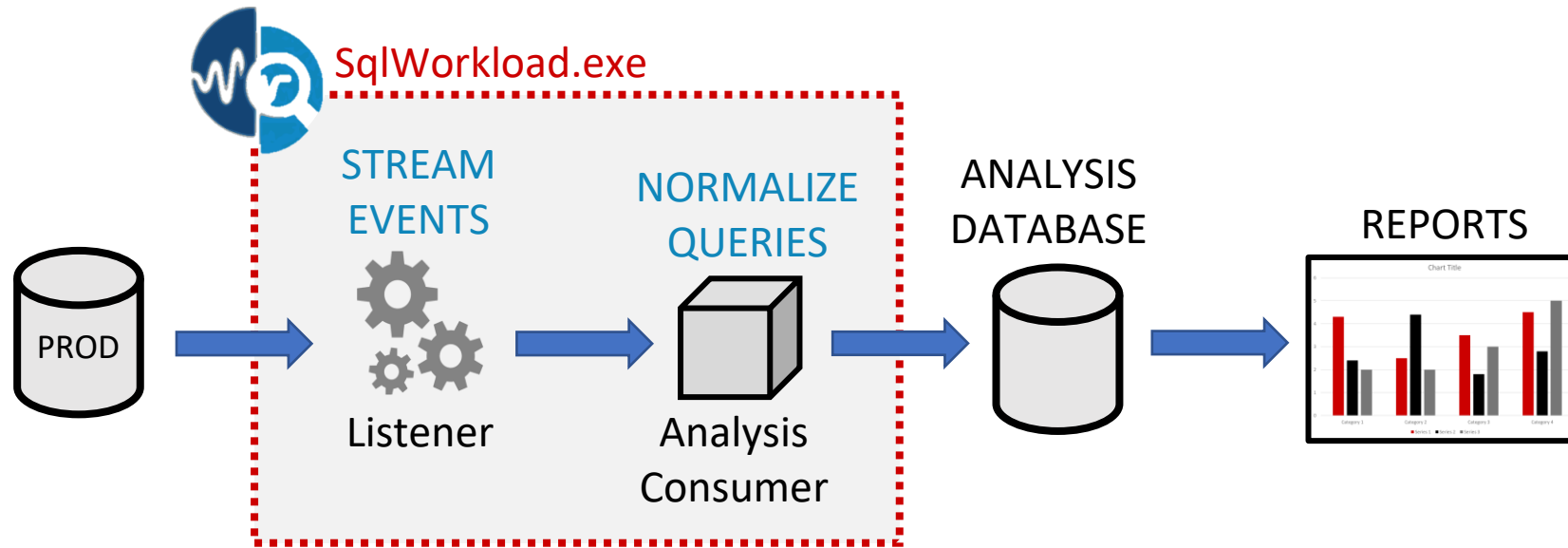
- Workload Analysis

- Workload Comparison

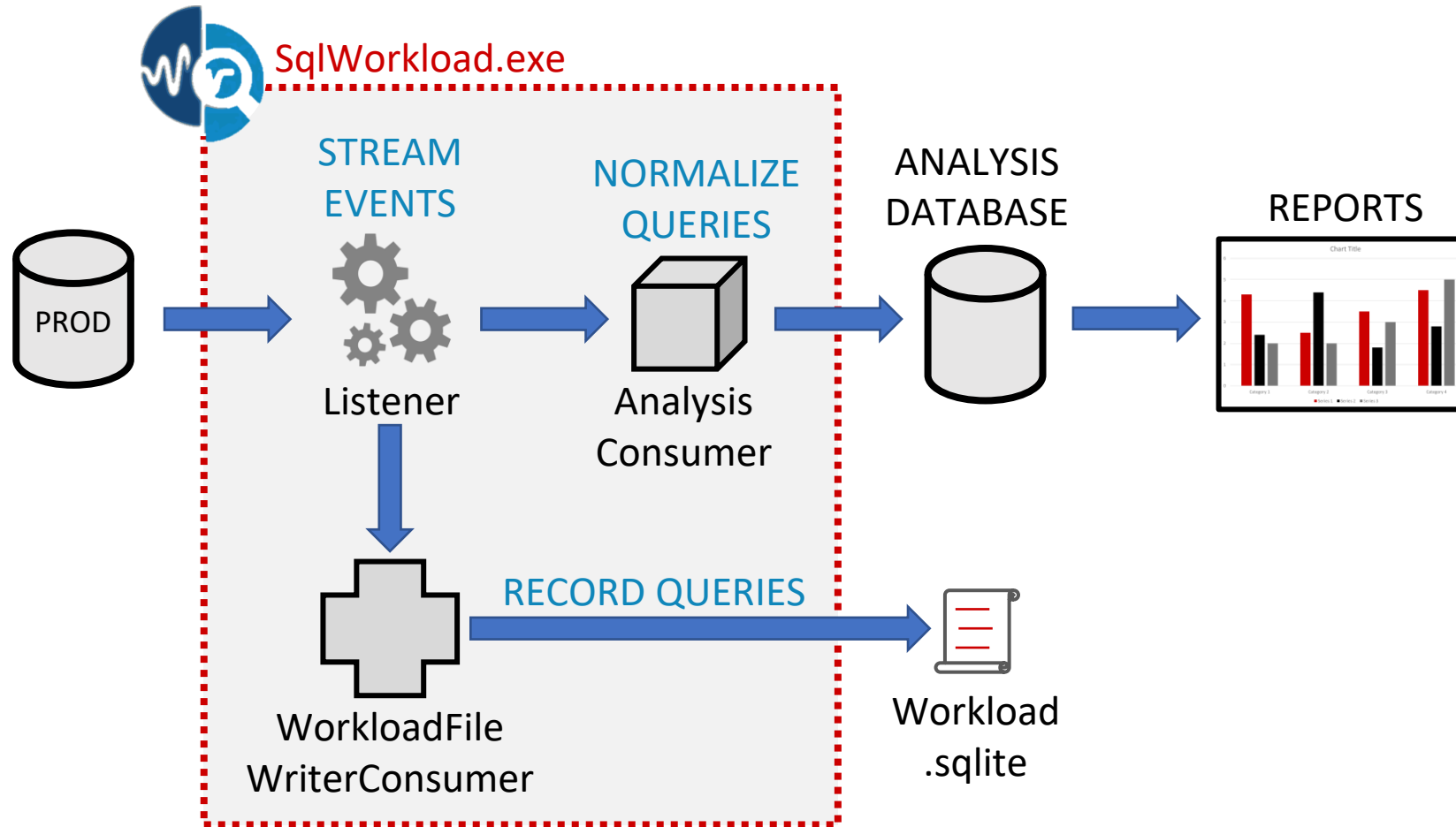


Working with WorkloadTools

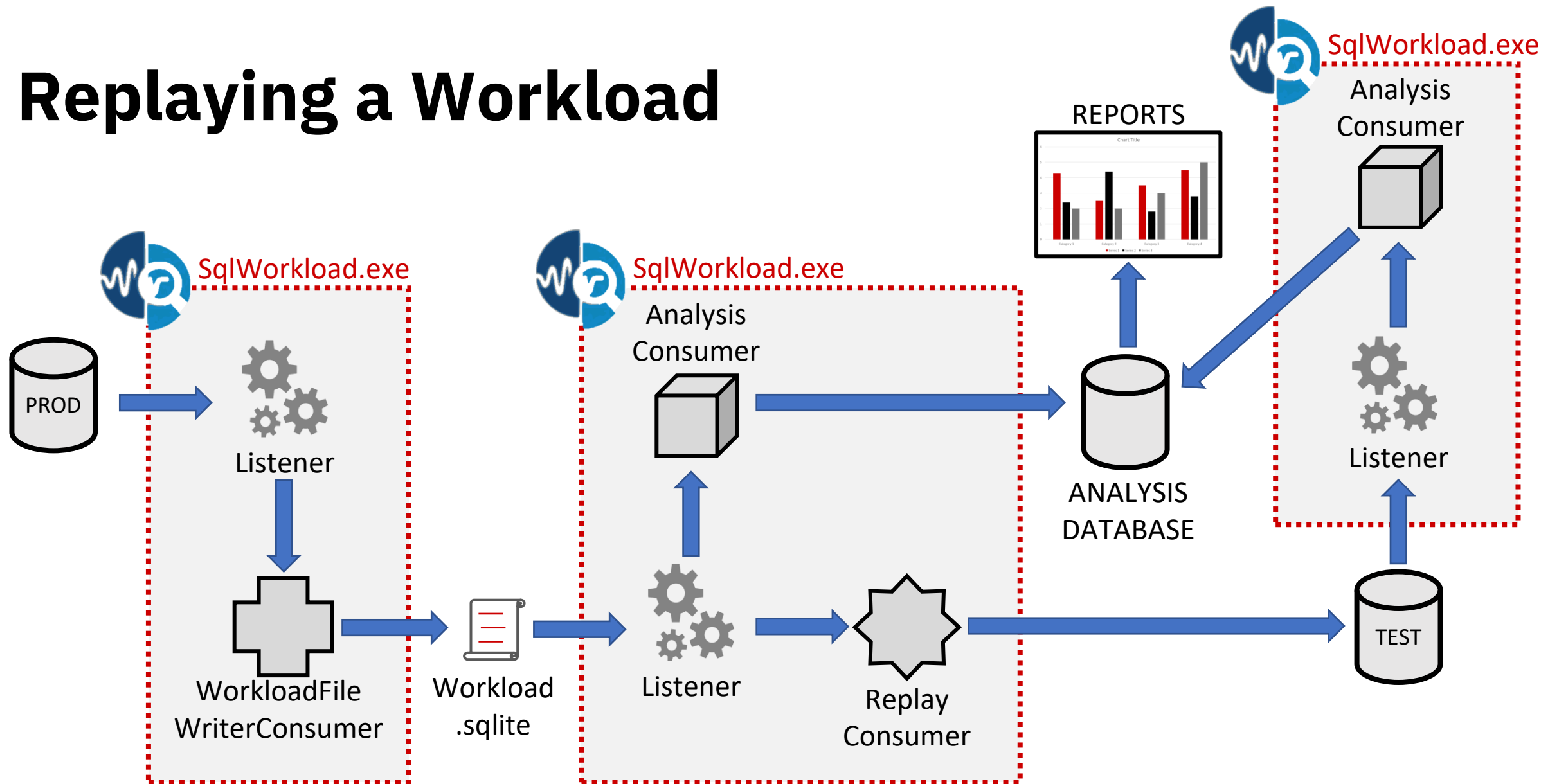
Analyzing a Workload



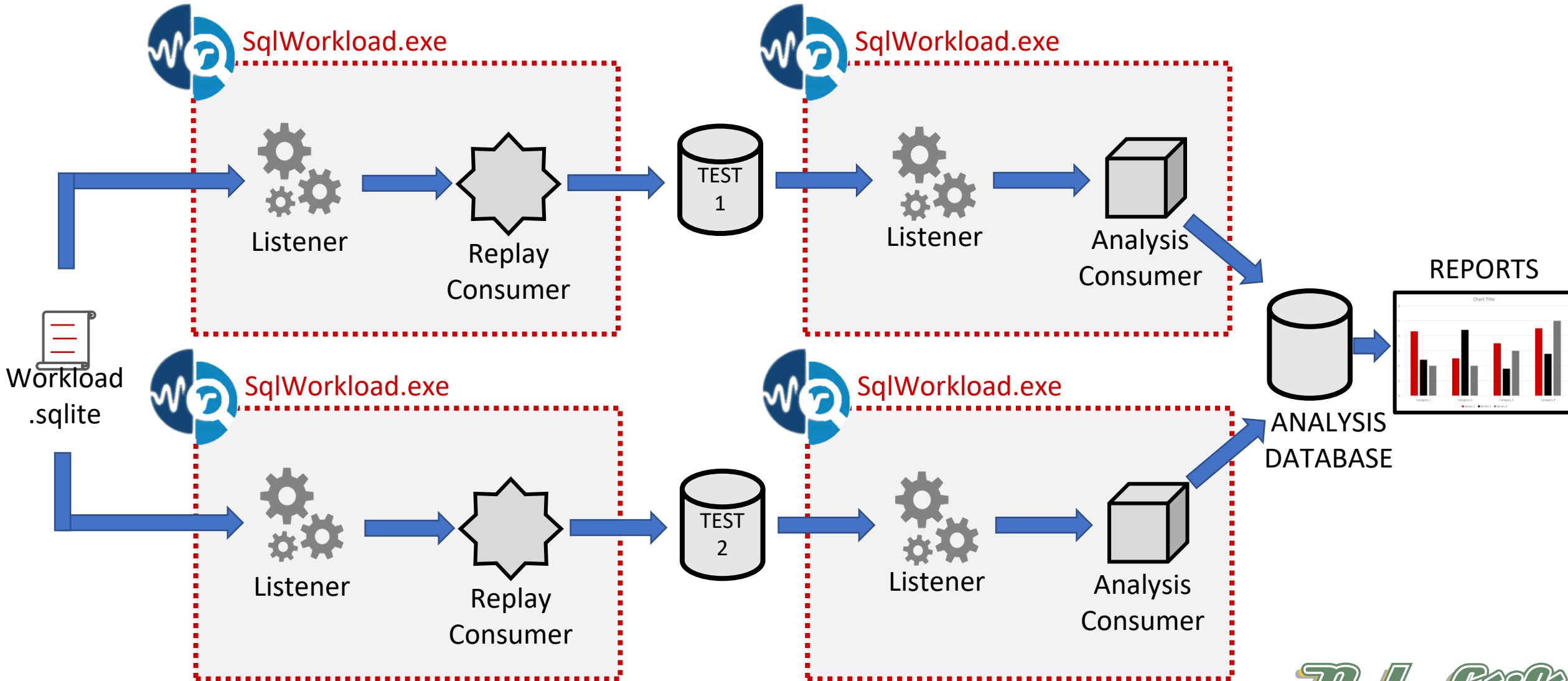
Recording a Workload



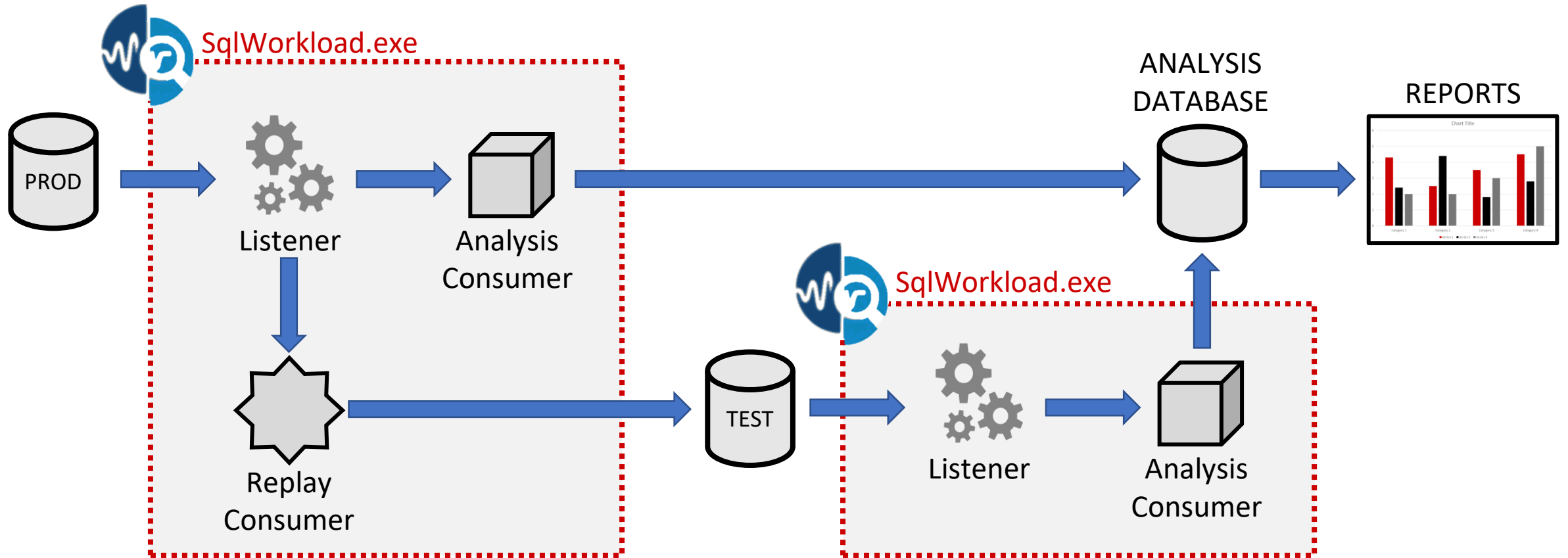
Replaying a Workload



Replaying a Workload



Real-time Replay



Benchmarking is ~~hard~~ a walk in the park!

- Capture source workload and performance data

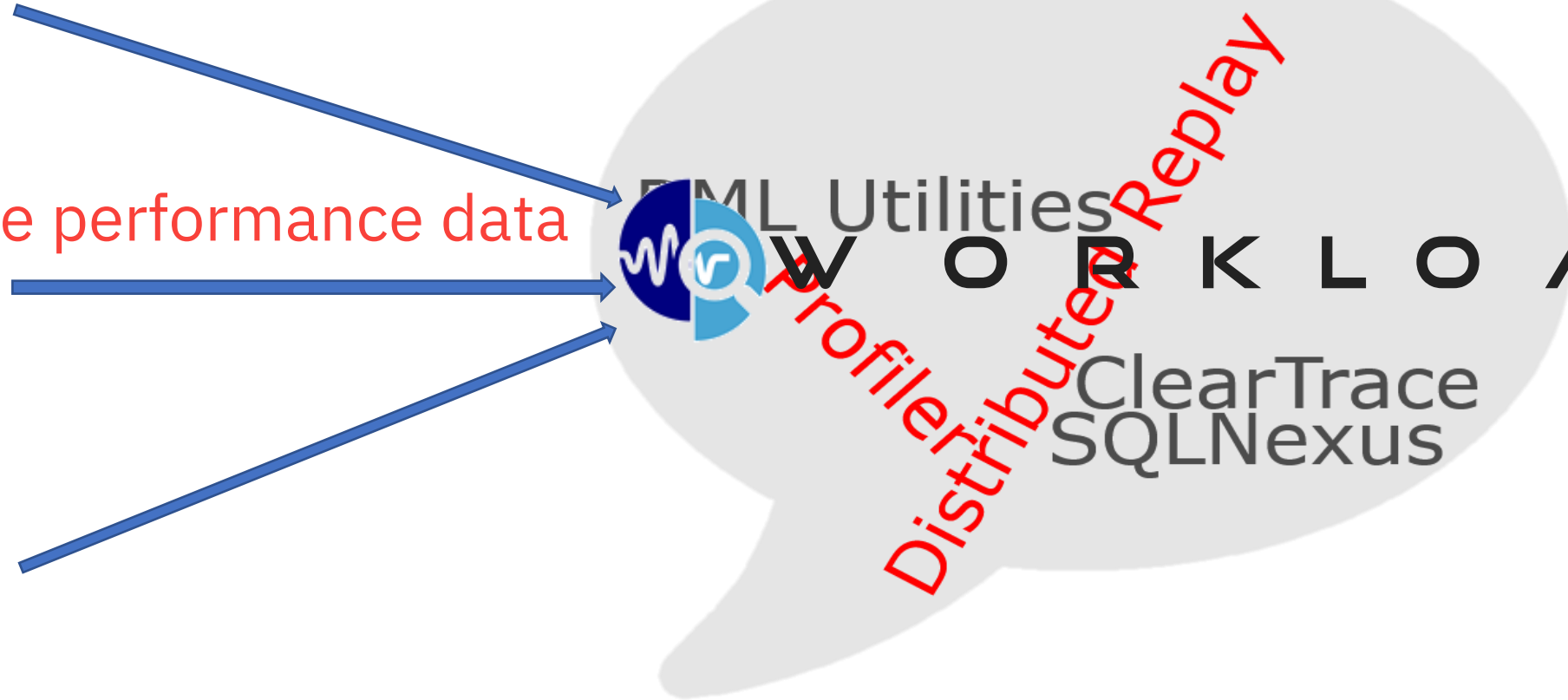
- Which tool?
- What to capture?

- Replay and capture performance data

- Which tool?
- What to capture?

- Compare results

- Which tool?



Resources

- This presentation

<https://github.com/spaghettidba/CodeSamples/tree/master/UsingWorkloadToolsToModernize>

- WorkloadTools on GitHub

<https://github.com/spaghettidba/WorkloadTools>

<https://github.com/spaghettidba/WorkloadTools/releases>

<https://github.com/spaghettidba/WorkloadTools/wiki>

<https://github.com/spaghettidba/WorkloadTools/issues>

- WorkloadTools blog posts

<https://spaghettidba.com/tag/workloadtools/>

- Capturing extended events to Azure blob storage

<https://learn.microsoft.com/en-us/azure/azure-sql/database/xevent-code-event-file?view=azuresql>

Thank you

Got questions? Ask me!

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