# Monitoring and Troubleshooting Database Performance

**Hugo Barona**
AZURE SOLUTION ARCHITECT

@HmsBarona https://www.linkedin.com/in/hugomiguelbarona/

# Introduction

**On-premises versus PaaS model for database monitoring and troubleshooting**

**Metrics and Diagnostics Logging**

- Configure logging of diagnostics telemetry
- Manage Performance Metrics

**Using Query Performance Insight for Basic Performance Monitoring**

- Performance dashboards and metrics review

**Using Azure SQL Analytics for Advanced Performance Monitoring**

# On-premises vs. PaaS Model for Database Monitoring and Troubleshooting

## On-premises

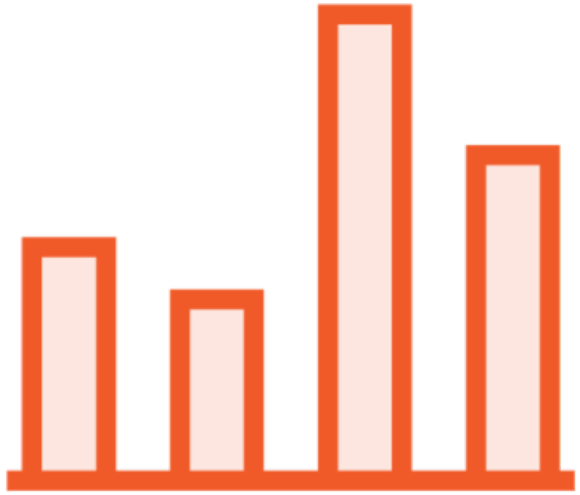
- May be time-consuming
- Requires expertise in the subject
- Extensive set of tools for monitoring and troubleshooting, such as SQL Profile and SQL Trace
- Fully manual analysis
- No Graphical User Interface available

## PaaS model

- No full administrative control
- Automated Performance monitoring and recommendations
- Extensive set of charts available to simplify analysis
- Built-in Artificial Intelligence to support your analysis
- Automated tuning
- Automated scalability

# Metrics and Diagnostics Logging

# Metrics and Diagnostics Logging Types Available



**Core Metrics**

**Custom Metrics**

# Configure Logging of Diagnostics Telemetry

Azure Portal

PowerShell

Azure CLI

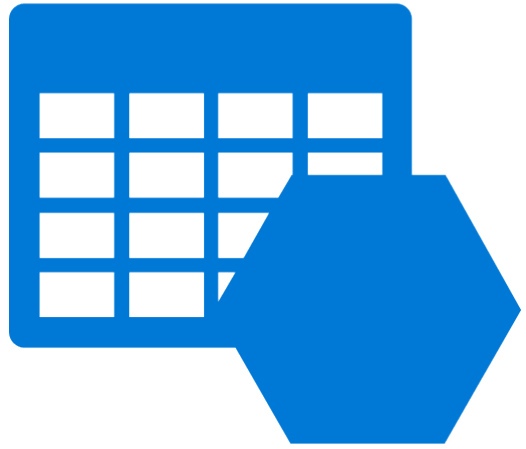
Azure Monitor REST API

Azure Resource Manager template

# Store Logging of Diagnostics Telemetry

Azure Log Analytics

Azure Event Hubs



Azure Storage

# Available Monitoring Telemetry for Databases

## Diagnostics Logs

- SQLInsights
- Automatic Tuning
- Query Store runtime statistics
- Query Store wait statistics
- Errors
- Database wait statistics
- Timeouts
- Blocks
- Deadlocks

## Metrics

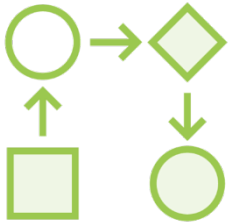
- Basic

# What Can You Do with Performance Metrics?

**Analyze**

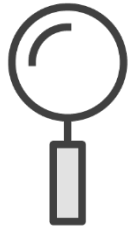
**Visualize**

**Alert**



**Automate**

**Export**



**Retrieve**

# Azure Monitor Metrics Vs. Diagnostics Logs

## Metrics

- Numerical values only
- Collected at regular intervals
- Ideal for fast detection of issues
- Lightweight and capable of near-real time scenarios such as alerting
- View them on Azure Portal - Metrics Explorer

## Diagnostics Logs

- Text or numeric data
- Analyzed with rich query language
- Ideal for deep analysis and identifying root cause
- View them on Azure Log Analytics

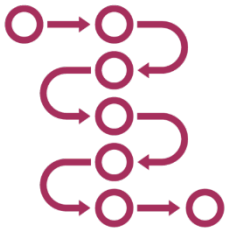
# Azure Monitor Alert

Alerts allows you to proactively monitor your Azure resources, by receiving notifications when important conditions are found in your monitoring data.

# Components of an Alert

**Target Resource**

**Condition**



**Actions**

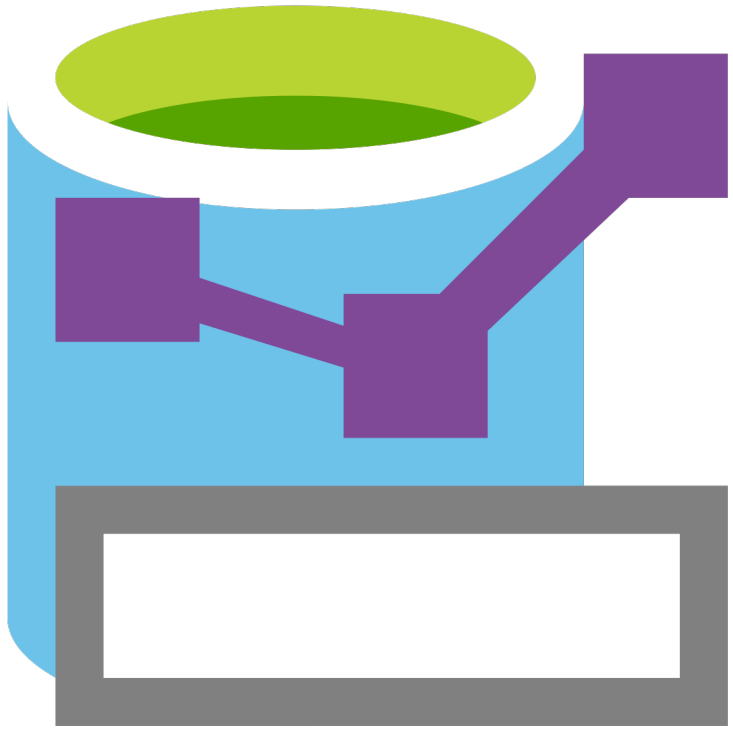
**Alert Details**

# Using Query Performance Insight for Basic Monitoring

# Query Performance Insight

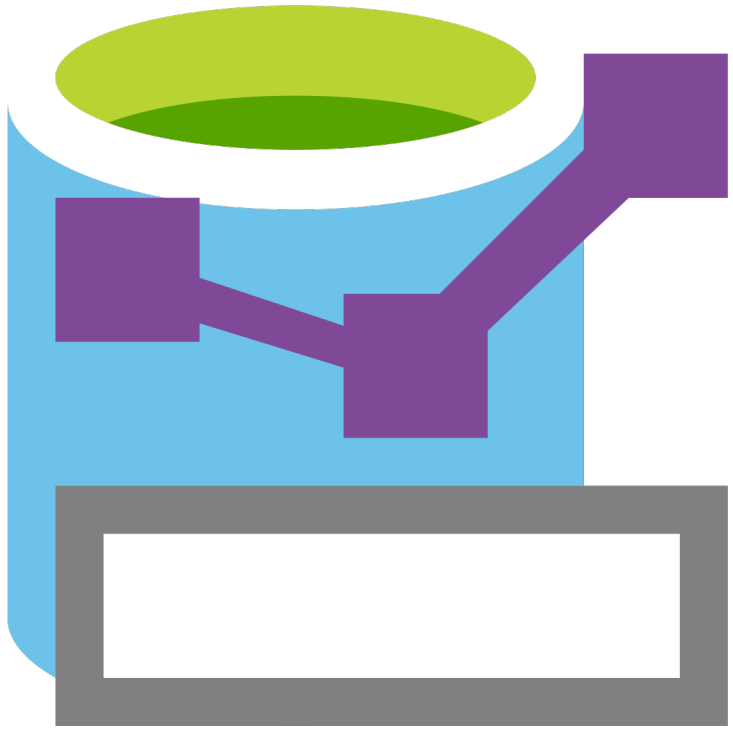
Query Performance Insight helps you understand the impact of queries running against your databases and how they are related to the consumption of resources allocated.

# Query Performance Insight



- Used in scenarios of basic performance troubleshooting
- Accessible from Azure Portal
- Provides Performance Recommendations from SQL Database Advisor
- Relies on Query Store
- Requires at least few hours of historic data

# Features of Query Performance Insight



- Review top CPU-consuming queries
- Review top queries per duration
- Review top queries per execution count
- View individual query details
- Understand performance tuning annotations

# Demo

**Steps**

- Using Query Performance Insight
- Explore some of the charts available

# Using Azure SQL Analytics for Advanced Monitoring

# Azure SQL Analytics

- Advanced monitoring scenarios
- Available in SQL Single Database, Elastic Pools and Managed Instances
- Requires a Log Analytics Workspace
- Supports Alerts to proactive monitoring
- Requires Diagnostics Settings to be configured in your databases
- Provides relevant performance data and charts

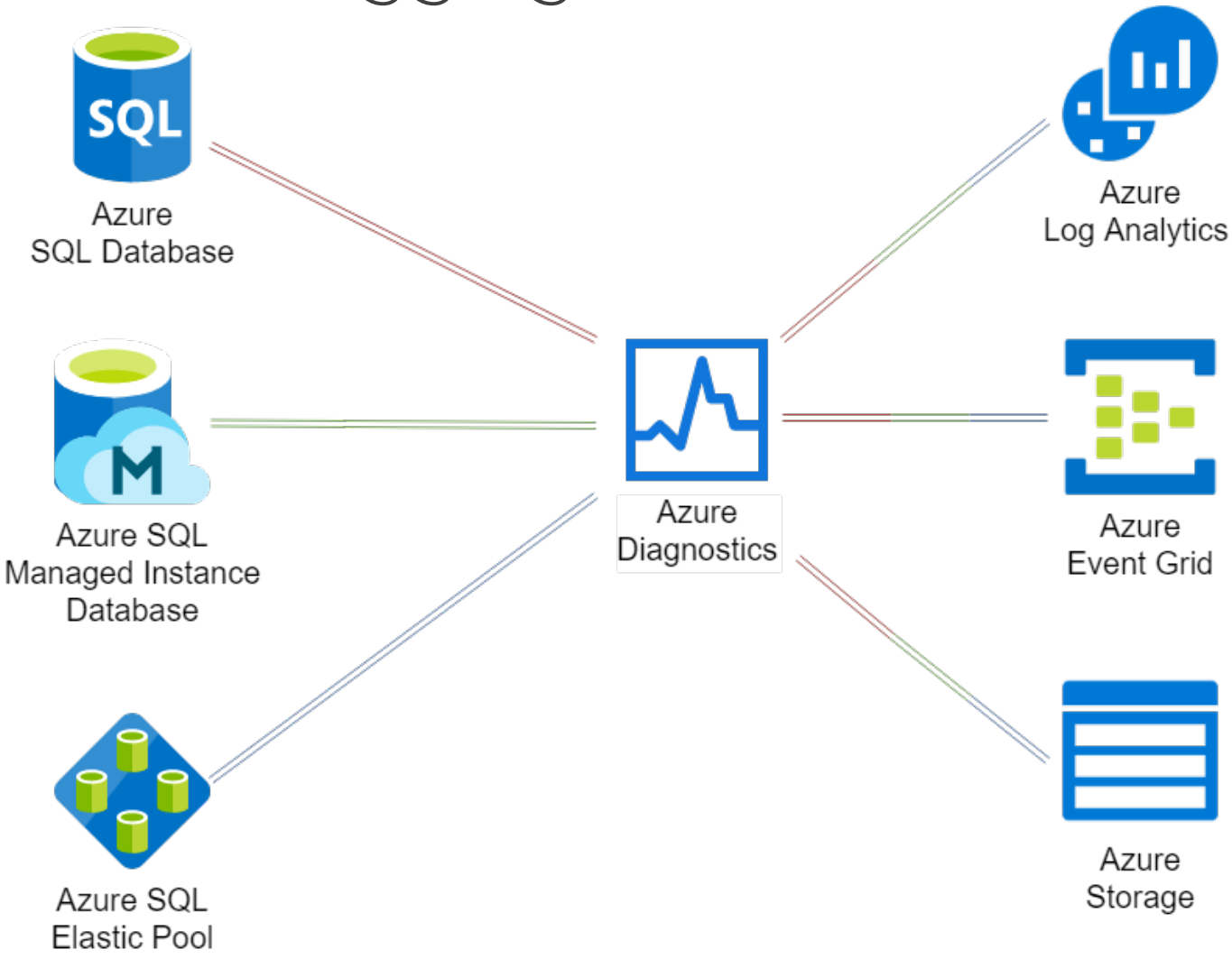
# Intelligent Insights

- Based on Artificial Intelligence
- Provides continuous database monitoring
- Relies on logs available in SQLInsights
- Detects temporary deviations of workload
- Performs root cause analysis and provides remediations for performance issues

# Detectable Database Performance Patterns using Intelligence Insights

- Reaching resource limits
- Workload increase
- Memory pressure
- Locking
- Increased MAXDOP
- Pagelatch contention
- Missing index
- New query
- Increased wait statistic
- TempDB contention
- Elastic pool DTU shortage
- Plan regression
- Database-scoped configuration value change
- Slow client
- Pricing tier downgrade

# Azure SQL Database Metrics and Diagnostics Logging Architecture



# Query Performance Insight Vs. Azure SQL Analytics

## Query Performance Insight

- Built-in feature with your Azure SQL database
- Requires Query Store enabled
- Charts with relevant performance metrics and resources consumption
- Visualize individual queries resources consumption and performance
- GUI to easily perform basic performance analysis
- Uses Azure Database Advisor to provide performance recommendations

## Azure SQL Analytics

- Requires Log Analytics Workspace with database telemetry available
- Requires Azure SQL Analytics workspace
- Automated database performance monitoring using Intelligent Insights
- Extensive GUI to easily perform advanced performance analysis
- Single place to monitor and troubleshoot performance of multiple databases

# Demo

**Steps**

- Create an Azure SQL Analytics workspace
- Explore some relevant features

# Summary

- Understand the differences between monitoring and troubleshooting your database on-premises and using PaaS model
- Enabling and using Diagnostics Telemetry to support you on monitoring and troubleshooting your databases performance
- How to use Query Performance Insight to perform basic database performance analysis
- How to use Azure SQL Analytics to perform advanced database performance analysis