# Monitoring Capabilities of RedCap Azure Infrastructure

* **Azure monitor** & **Azure Application** Insights are both powerful monitoring solutions that have their own sets of capabilities and focus areas.
* While the metrics they monitor overlap, Application insight is specially designed for application performance monitoring, whereas Azure monitor provides broader infrastructure Platform level monitoring.
* It is to be noted that application Insights is a feature Azure monitor.
  + Application insights focuses primarily on application-level telemetry data.

## Cost of monitoring:

* For **Application Insights**, you are charged based on the volume of telemetry data ingested.
* i.e., Metrics, traces, exceptions & custom event sent by applications.
* In **Applications Insights**, longer retention periods may result in higher storage costs. Data storage is charged based on the amount of data retained beyond the free tier.
* Azure Monitor offers basic monitoring capabilities for Azure resources at no additional cost.
  + Every subscription comes with a free basic monitoring.

## App Services

* Application hosted within Azure’s App Services can be monitored using Application Insights.
* Insights also monitors various metrics together with telemetry data from Azure Web Apps to provide insights into application performance, availability, and usage.

### Application Insights Metrics:

#### Request Count

* **Request Count:** Number of HTTP requests processed by the web app.
* **Request Time:** Average time taken to process HHTP request.

#### Performance Metrics:

* **Server Response Time:** Time taken by the server to generate a response to client requests.
* **Client-Side Performance:** Metrics related to client-side performance, such as page load time & network latency.
* **Dependency Calls:** Metrics related to calls to external dependencies such as database queries, HTTP call.

#### User Interaction Metrics:

* **User Sessions:** Number of User Sessions and active users interacting with the web app.
* **User Flows:** Visualization of User journeys & path though webapp.
* **User retention:** Metrics related to user engagement, retention rates & session durations.

#### Exception Tracking:

* Exception Count: Number of exception and errors thrown by application

### Free Azure Monitor Metrices:

* **HTTP server Response Time:** Measures the time taken to process HTTP requests Served by the App services.
* **HTTP Server Errors:** Tracks the number of HTTP Server errors returned by the app services.
* **CPU Percentage:** Monitors the CPU utilization of the app service instance.

## Azure MySQL Database

* In addition to app services, Application insight can also be used to monitor Azure MySQL.
* Application Insight can be used to monitor database performance, server, and query performance.

### Application Insights Metrics:

#### Performance Metric:

* **Query Execution Time**: Measures the time taken to execute SQL queries on the database.
* **Database Throughput**: Measures the number of transportations processed per unit of time.
* **Slow Queries:** Identifies and logs SQL queries with long execution times.
* **Query Execution Plans**: Provides insights into the execution plans of SQL queries, helping to optimize query performance.
* **Index utilization**: Table and index fragmentation tells us when to rebuild or reorganize the index.

#### Error and Exception Monitoring:

* **Query Errors:** Tracks errors and exceptions encountered during SQL Query Execution
* **Database Timeout Errors:** Monitors timeouts during database operations
* **Deadlocks:** Detects & logs deadlocks that occur between transactions

#### Connection Monitoring:

* **Connection Pool Usage**: Monitors the utilization of database connection pools within the application.
* **Connection errors**: Tracks errors related to failed database connections or connectivity issues.

### Free Azure Monitor Metrices:

* CPU Usage, Memory Utilization, Storage utilization, connection counts, query Execution Time & error counts.

#### Resource Utilization Metrics:

* **CPU utilization**: Monitors CPU usage of the database server.
* **Memory Utilization**: Tracks the memory consumption of the Database server.
* **Storage Utilization**: Measure the amount of storage used by the database.

## Azure Application Gateway:

* Application Insights can be used to monitor the Azure App gateway load balancer.

### Application Insight Metrics:

* **End-To-End Request Tracing:**
  + Trace requests as they flow through the entire application stack including the azure application gateway, backend services & client-side components.
* **User session & behavior Analytics:**
  + Tracks user sessions and interaction with the application served through the application gateway.
* Live Metrics Stream:
  + View real time telemetry data such as Request rates, response times, error rates and a livestream dashboard.

### Free Azure Monitor Metrices:

* **Throughput**:
  + Incoming and outgoing data throughput: Measures the amount of network traffic processing by the application gateway.
* **Request Count**: Tracks the number of requests received by the application gateway.
* **HTTP status Codes**: Monitors the distribution of HTTP status codes returned by app gateway i.e., 200, 300, 400 etc.
* **Backend Health**: Tracks the number of unhealthy & healthy Backend instance.

## Azure Storage Account:

### Application Insight Metrices

* Storage Transactions:
  + Number of reads & write operations performed on Azure blob storage, tables & queues.
* Storage latency:
  + Avg, max, min latency for read & write transactions to Azure storage.
* Blob metrices.
  + Number of Blobs accessed, created, or modified.
* Blob storage Analytics:
  + Metrics for blob storage analytics, including storage capacity, request statistics and service latency.
  + Logging metrics for blob storage access & operations.
* Custom metrics & logs:
  + Log data from Azure storage diagnostics logs including detailed information about storage operations, errors & access patterns.

### Free Azure Monitor Metrices:

* Ingres/Egres metrics:
  + Total incoming & outgoing Data volumes: tracks the amount of data transferred to and from Azure storage accounts.
  + Ingress & egress data rate.
* Storage Transactions:
  + Number of reads & write operations performed on Azure blob storage, tables & queues.