Monitoring & Performance

How do you monitor RDS performance and what metrics are important?

👉 **Level:**

- **Beginner** → "Use CloudWatch, monitor CPU/storage."
- **Mid-level** → Adds **replica lag, PI, event subscriptions**.
- **Senior** → Explains **query-level tuning via PI + proactive alerting setup**.

🎯 **Short Interview Version (2–3 lines each)**

- **Monitoring**: Use CloudWatch, Enhanced Monitoring, Logs, and Performance Insights.
- **Important Metrics**: CPU, memory, storage, IOPS, DB connections, replica lag.
- **Performance Insights**: Helps identify slow queries, bottlenecks, and workload patterns.

Alarms: Set for CPU >80%, storage <10%, high connections, and replica lag

---

❓ **1. How do you monitor RDS performance and what metrics are important?**

✅ **Tools:**

- **Amazon CloudWatch** → Default monitoring (every 1 min or 5 min).
- **Enhanced Monitoring** → OS-level metrics (CPU, memory, disk, processes).
- **Performance Insights** → SQL-level query performance.
- **Event Subscriptions** → Email/SNS alerts for DB events (failover, restart, backup).
- **Logs** → Slow query logs, error logs (can export to CloudWatch Logs).

✅ **Key Metrics (CloudWatch):**

- **CPUUtilization** → If >80% consistently, may need bigger instance.
- **FreeableMemory** → If too low, DB may slow down.
- **FreeStorageSpace** → Prevents DB from freezing when storage is full.
- **DatabaseConnections** → Too many = connection pool issues.
- **ReadIOPS / WriteIOPS** → Check if workload matches provisioned IOPS.
- **ReplicaLag** (for read replicas) → Should be low (seconds), otherwise queries return stale data.
- **NetworkThroughput** → Monitor DB traffic.

👉 Example: If CPU is <10% but queries are slow → maybe IOPS or connections are the bottleneck, not compute.

❓ **2. What monitoring and alerting setup would you implement for RDS?**

✅ **Setup:**

- **CloudWatch Alarms**:
  - CPUUtilization > 80% for 5 min
  - FreeStorageSpace < 10% of total
  - DatabaseConnections > threshold (e.g., 90% of max connections)
  - ReplicaLag > 30 sec
- **SNS Notifications** → Send email/Slack alerts.
- **Event Subscriptions** → Notify on failover, backup failures.
- **Dashboards** → Build CloudWatch dashboards with key metrics for NOC team.

👉 Example: For production RDS, I'd set alarms on **CPU, memory, storage, connections, replica lag** + use SNS to alert the on-call DevOps engineer.

❓ **3. How does Performance Insights help with RDS monitoring?**

- **Performance Insights (PI)** is **query-level monitoring** (built-in APM for RDS).
- Shows:
  - **Top SQL queries** consuming most DB load.
  - **Wait events** (CPU bottleneck, I/O bottleneck, locks).
  - **Load by user/host** → find noisy neighbors.
- Helps DevOps + DBAs decide:
  - Should I **tune queries**, **add indexes**, or **scale the DB**?

👉 Example: If PI shows 70% DB load from one slow SELECT *, you can fix the query instead of blindly upgrading to a bigger instance.

❓ **4. Setting up alarms for storage, CPU, connection, and replication lag**

Metric	Threshold Example	Why It Matters
CPUUtilization	>80% for 5 min	Prevents DB saturation
FreeStorageSpace	<10% of allocated storage	Avoids DB crash due to full disk
DatabaseConnections	>90% of max connections	Prevents app errors from connection exhaustion
ReplicaLag	>30 sec	Ensures read replicas are up-to-date

👉 Alarms → send to **SNS** → email, PagerDuty, or Slack.

.

Which AWS service provides **default monitoring** for Amazon RDS metrics like CPU, storage, and connections?

A. AWS Config

B. Amazon CloudWatch

C. AWS Inspector
D. AWS Systems Manager
✅ **Correct Answer: B. Amazon CloudWatch**
💡 **Explanation:** CloudWatch collects RDS metrics (CPU, memory, IOPS, connections) at **1 or 5-minute intervals** for basic monitoring.

Which metric in RDS monitoring helps detect if your **database storage** is about to run out?
A. DatabaseConnections
B. ReadIOPS
C. FreeStorageSpace
D. ReplicaLag
✅ **Correct Answer: C. FreeStorageSpace**
💡 **Explanation:** When **FreeStorageSpace** drops below 10%, RDS can freeze or crash; an alarm should be set to alert before that.

Which RDS CloudWatch metric indicates **CPU bottlenecks**?
A. DatabaseConnections
B. CPUUtilization
C. FreeableMemory
D. ReplicaLag
✅ **Correct Answer: B. CPUUtilization**
💡 **Explanation:** Sustained **CPUUtilization >80%** suggests CPU saturation — you might need to scale vertically or optimize queries.

What does the **ReplicaLag** metric represent in RDS?
A. The time difference between data writes on the primary and read replica
B. The time RDS takes to apply updates
C. The delay in CloudWatch alarm delivery
D. The duration of database backups
✅ **Correct Answer: A.**
💡 **Explanation: ReplicaLag** measures replication delay (in seconds).
A high value means the **read replica is outdated** — critical for apps relying on real-time reads.
