What is Monitoring and Why it is needed ?

Monitoring

Continually watch the performance of an entity by evaluating the metrics collected from it. For example - website, software, infrastructure, servers, cloud services etc.

What to monitor

- Website, Network latency
- Uptime, Throughput
- Success rate, Error rate, Request rate
- CPU usage

Advantages

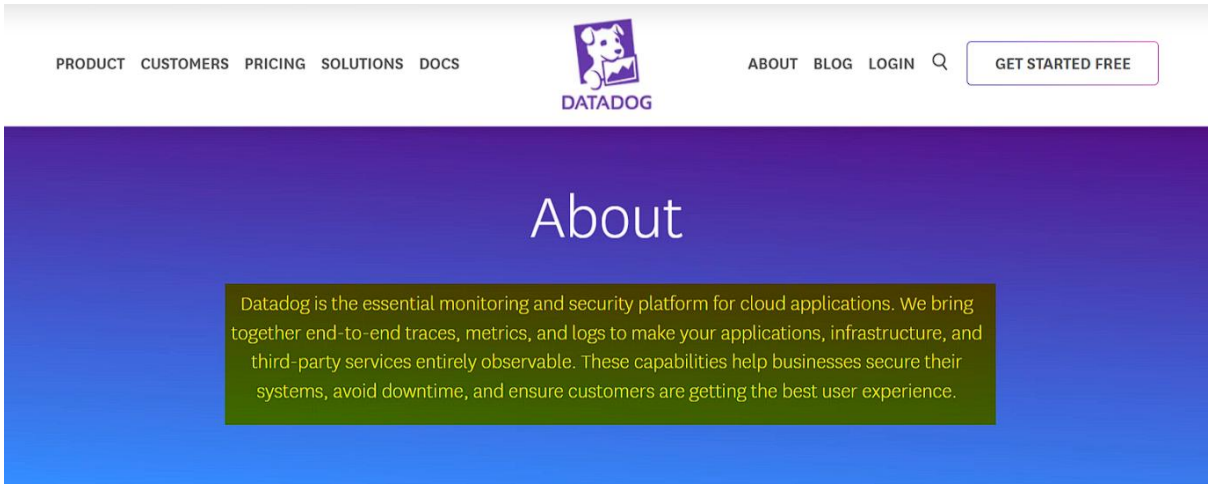
Underlying problems in an application can be detected **before they have an adverse effect.**

Reduced downtime, Higher conversion rate, Improved productivity, Ensuring SLA compliances etc

Need of it

Applications have moved from using few tools and a central infrastructure to a **wider range of tools and dispersed granular infrastructures.**

Monitoring several moving parts in a single application requires a strong monitoring solution.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DATADOG
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About
Datadog is the essential monitoring and security platform for cloud applications. We bring together end-to-end traces, metrics, and logs to make your applications, infrastructure, and third-party services entirely observable. These capabilities help businesses secure their systems, avoid downtime, and ensure customers are getting the best user experience.

Here's a concise breakdown of **logs**, **metrics**, and **traces** — the three pillars of observability:

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1. Logs

What: Timestamped records of discrete events.
Format: Unstructured (text) or structured (JSON).
Use: Debugging, audits, root-cause analysis.

Example:

2025-08-04T10:00:00Z GET /login 500 Internal Server Error

Key Characteristics:

- Tell **what** happened and **when**.
- Often very **detailed** but can be **voluminous**.
- Used after something goes wrong.

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2. Metrics

What: Numeric measurements over time.
Format: Time-series data (e.g., Prometheus).
Use: Monitoring system health and performance.

Example:

http_requests_total{status="200"} = 3450

cpu_usage_percent = 78.2

Key Characteristics:

- Lightweight and **efficient** for aggregation.
- Good for **alerting and dashboards**.
- Do not show detailed context or errors.

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3. Traces

What: Records of a single request's journey across services.
Format: Distributed trace (spans).
Use: Identifying bottlenecks and latency in microservices.

Example:
A user request traced across:

- API Gateway → Auth Service → Payment Service → DB

Key Characteristics:

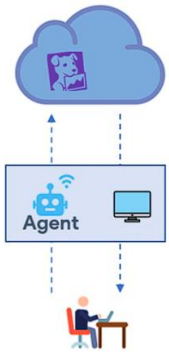
- Visualize **end-to-end flow** of a request.
- Show **duration** and **dependencies**.
- Crucial for understanding **performance issues** in distributed systems.

Summary Table

Aspect	**Logs**	**Metrics**	**Traces**
Type	Event records	Time-series numbers	Request journeys
Structure	Text (structured/unstructured)	Numeric (key/value + tags)	Hierarchical (spans)
Use	Debugging, RCA	Monitoring, alerting	Performance, latency analysis
Granularity	High	Aggregated	Per-request
Volume	High	Low to medium	Medium

DATADOG

It is an **observability service** for cloud-scale applications, **providing monitoring** of servers, databases, tools, and services, through a **SaaS-based data analytics platform.**



DATADOG

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End-to-End monitoring solution covering the collection of metrics, alerting system, troubleshooting and built-in dashboarding for visualizations of metrics.

- Infrastructure monitoring
- Database monitoring
- Cloud monitoring
- Log monitoring
- Application performance monitoring
- Real user monitoring
- Container monitoring
- Security monitoring
- Synthetic monitoring

DATADOG

Comes with **500+ built-in integrations** with pred-defined dashboard templates.

- Operating systems → Windows, Linux, and Mac.
- Cloud → AWS, Azure, Google cloud.
- Containers → Docker, Helm, Container-d
- Messaging services → Kafka, Apache active MQ, Hive MQ
- Security → Alcide, Apptrail, Okta, Hashicorp vault.

DATADOG

About DataDog Project

Was founded in **year 2010** by Olivier Pomel .

Datadog's agent code is **open-sourced on Github.**

Thousands of customers including Samsung, Shell, Sony, HashiCorp, Nikon, Deloiite and many more.

Very active developer and user community around the globe.

Metric Types

Work metrics

Indicate **the top-level health** of your system by measuring its useful output.

- **Throughput** – Ex: No. of requests or queries per second
- **Success rate** – Ex: Percentage of queries successfully executed
- **Error rate** – Ex: Percentage of queries failed executed
- **Performance** – Ex: Percentile response time

Resource metrics

Indicates **timely information of physical resource** components such as CPU, memory, disks.

- **Utilization** – Ex: Percentage time that device was busy
- **Saturation** – Ex: Wait queue length, Swap usage
- **Availability** – Ex: % of time resource responded to requests
- **Errors** – Ex: Internal errors or device errors

Basic Terminologies

Host in an entity which Datadog has to monitor. For example : Servers, VMs, Containers, IOT devices, Desktops etc.

Metric is a **time bound information** (the data value) pertaining to a system captured at a certain point in time.

Events happen at infrequent occurrences that usually provides the details of a **change that happened in the system**.

Agent is a service that runs alongside the application software system / host to **collect various events and metrics** from it and **sends it to the datadog backend** via internet

Alert a triggering event produced by a monitor when it determines a **metric value crosses a threshold.**

Architecture