

Microservices

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1 Monolithic Design

One big application. Each instance can handle any request on its own (other than help from DB).

When developer is testing new code, they can run one instance locally.

Monolithic design is easy to build, deploy, test, coordinate, and share data.

Monolithic disadvantages:

- creates bottlenecks during development
 - many devs working on one codebase
- big codebase can lead to messy, fragile code
- whole app must be redeployed for small new functionality
- must choose one programming language, build system, runtime env

2 Microservices

In **Service Oriented Architecture**, many smaller services work together.

Responsibilities split among specialized services.

To outside world, looks like one application.

Each **microservice** is a black box to the rest of the system, and handles requests from the network (implementation hidden). Language-independent network-level API needed to specify format of requests and responses.

Microservice disadvantages:

- more difficult to trace request handling code for debugging, since it spans many apps
 - but easier to test smaller services
- ACID transactions more difficult to support
 - monolithic design can manage a single DB connection with a transaction that can be rolled back
- devs get isolated in sub-projects, blocking collaboration and innovation

Microservices isolate codebases with clear network API boundaries, allowing parallel work.

When starting a new project:

- organize system into services and DBs
- agree on network-level API for each service
- assign engineers to each service and build independently

If application interacts with service under construction, can build **mock** of service (returns hard-coded data for testing).

Traditional web-app generates HTML on server. For JS single-page app, JS app runs in browser and makes REST requests and generates HTML.

Service API (REST, GraphQL) essential for supporting mobile and desktop apps with cloud-based data and services.

Single API can handle all client types.