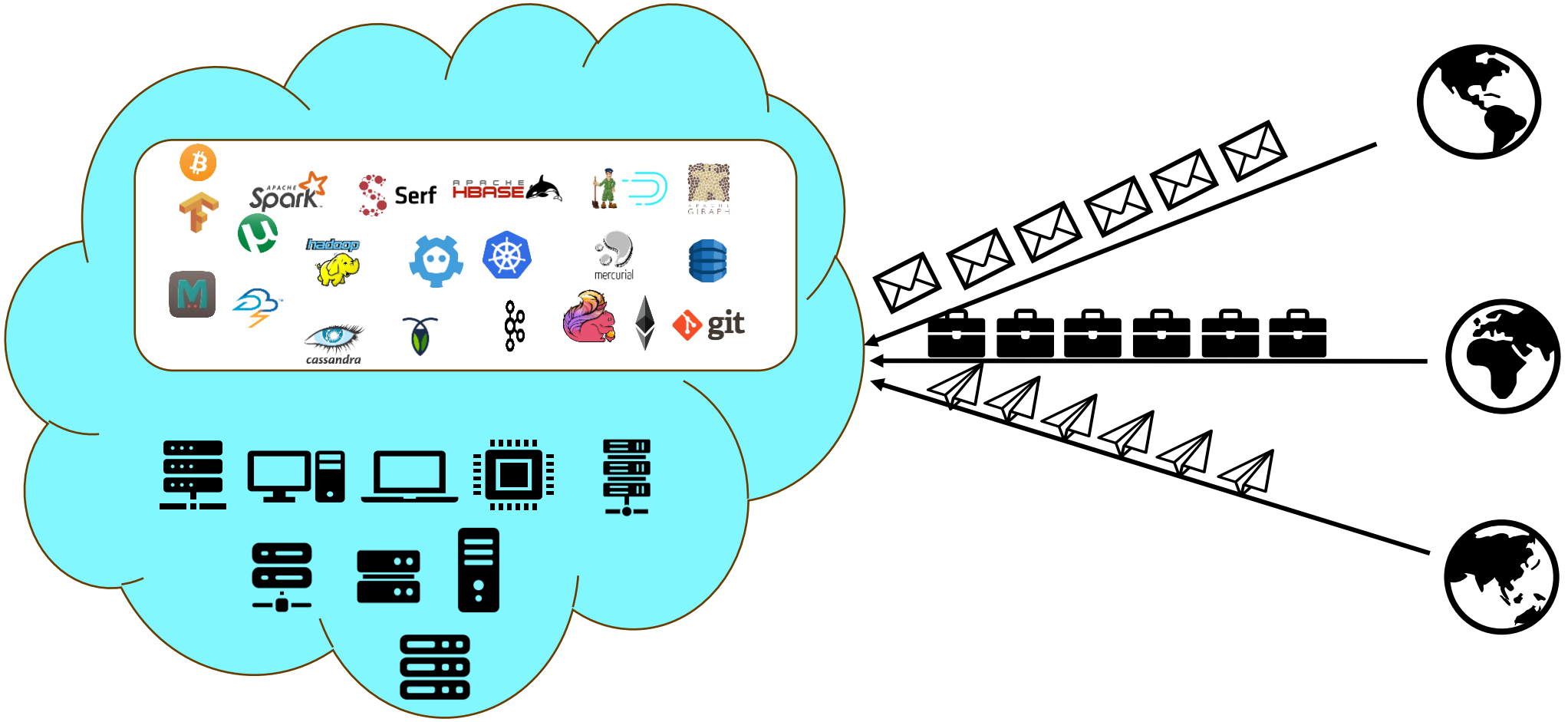
RELIABILITY IN MODERN CLOUD SYSTEMS

Summer 2025

WHY RELIABILITY???

CLOUD SYSTEMS EVERYWHERE



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By Emil Sayeg

Jul 31, 2024, 04:

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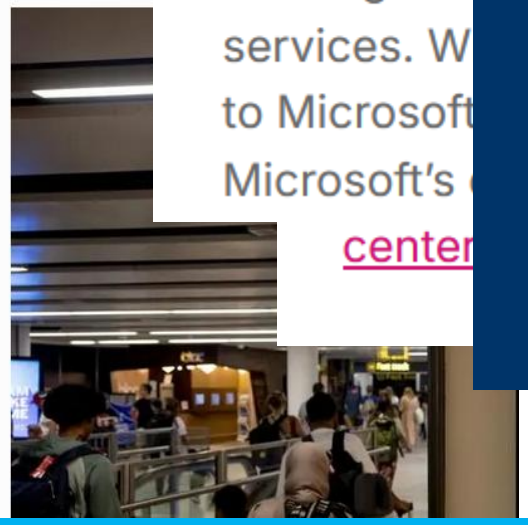

Consulting Report | 23 Jul 2024

The hidden costs of downtime: The $400B problem facing the Global 2000

In partnership with Splunk

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and disrupted operations for some AWS customers, including Atlassian, Twilio, and Capital One.

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RELIABILITY TO THE RESCUE

- Reduces the number of incidents
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Without reliability guarantees, cloud systems will cease to exist

FROM MONOLITHS TO MICROSERVICES

MONOLITHIC BEGINNINGS

- All the functionality is encapsulated in one
- Built + Deployed as a single standalone application
- Typical components include:
  - Frontend
  - Business Logic (i.e. functionality)
  - Database

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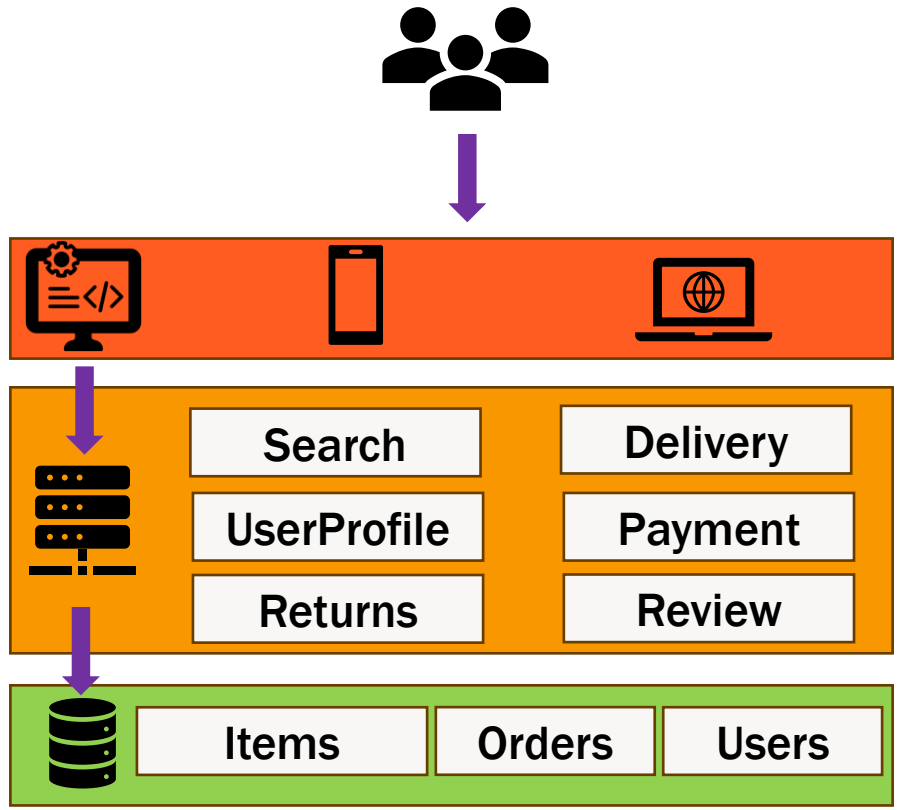

MONOLITHIC ADVANTAGES

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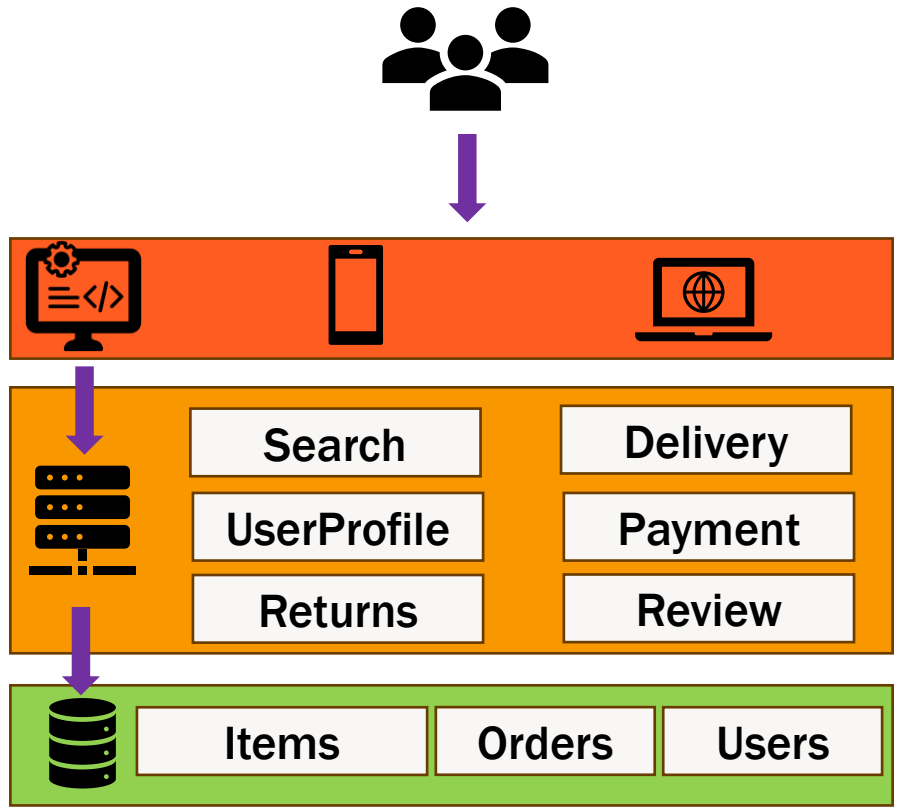
  - All code is in a single binary



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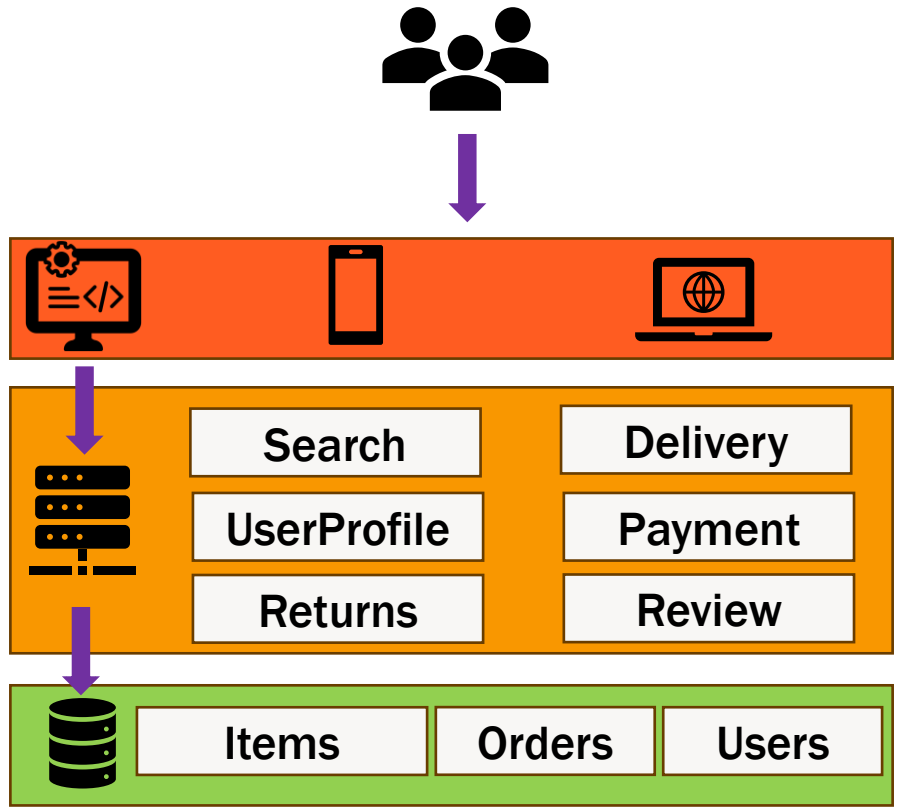

MONOLITHIC ADVANTAGES

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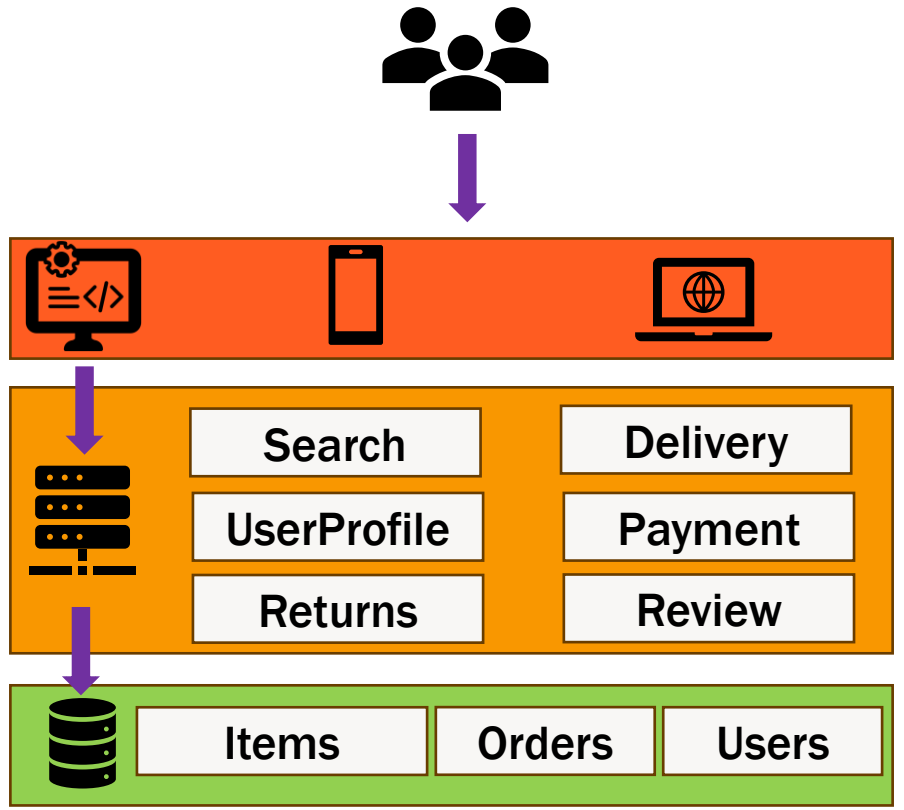
- Simple to debug
  - Better tooling
- Better Performance
  - No network communication cost



MONOLITHIC DISADVANTAGES

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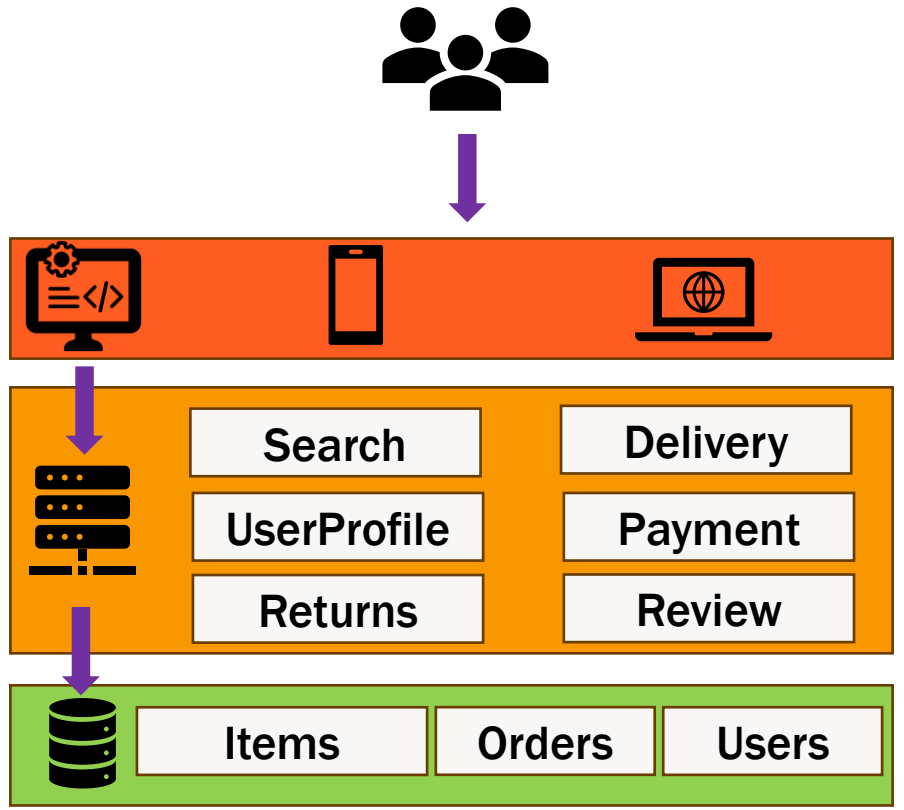
  - Can’t scale individual components



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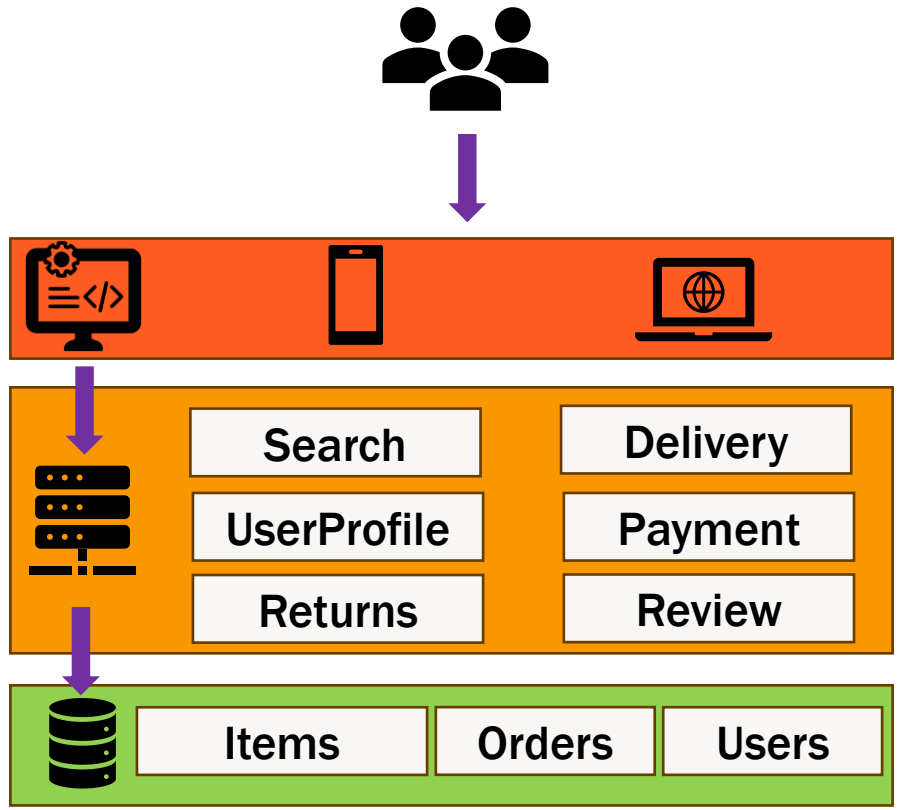
  - Bug in 1 system crashes the full app



MONOLITHIC DISADVANTAGES

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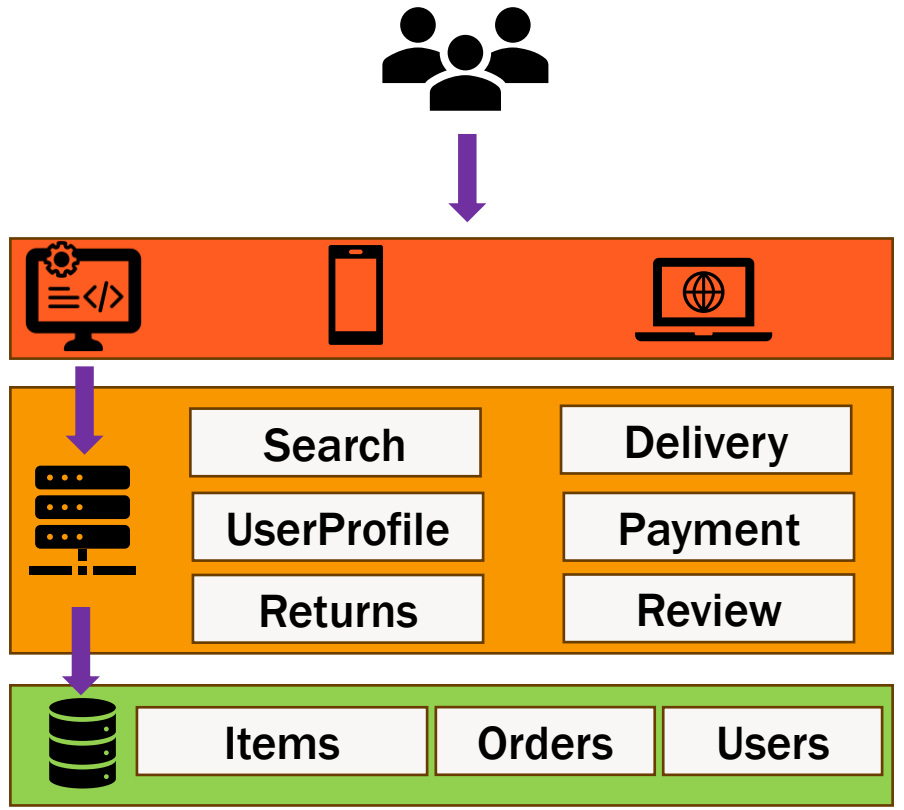
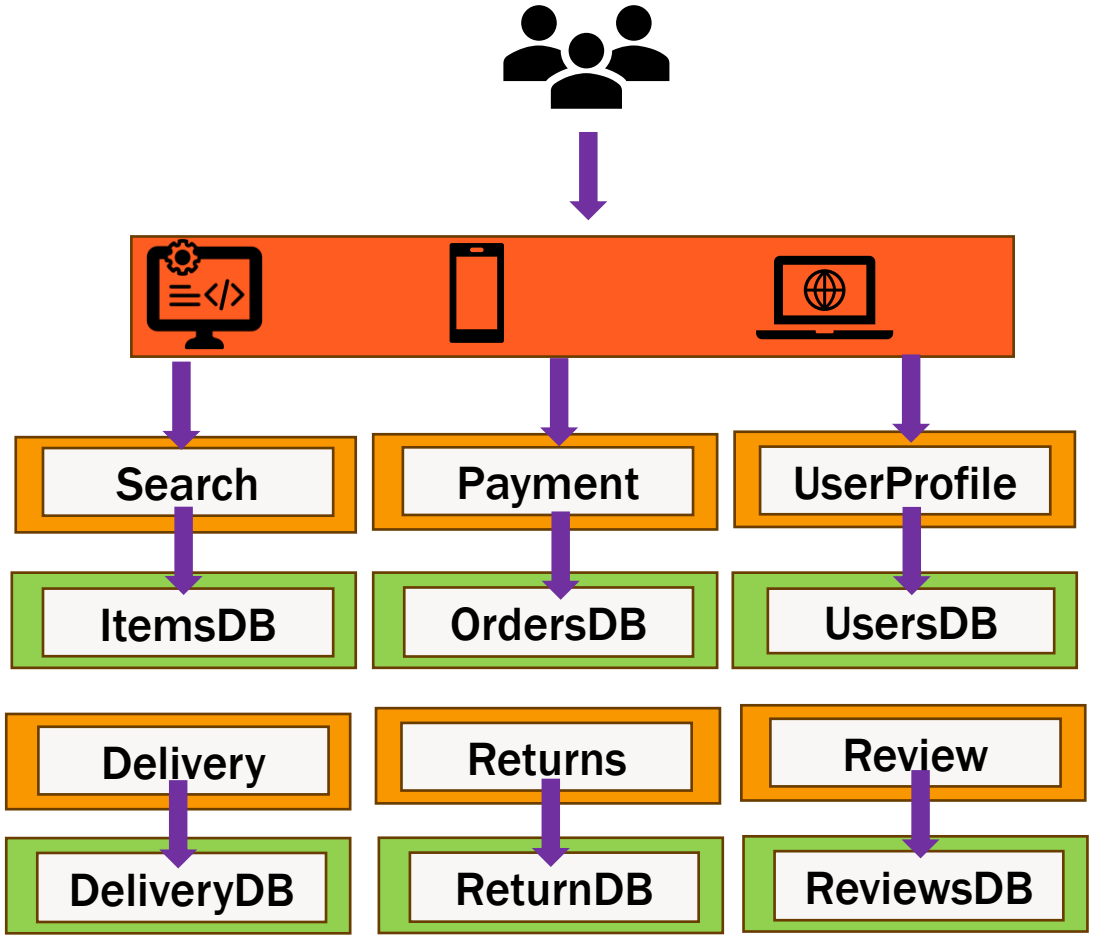
  - Bug in 1 system crashes the full app
- Harder to add new features
  - Lack of modularity

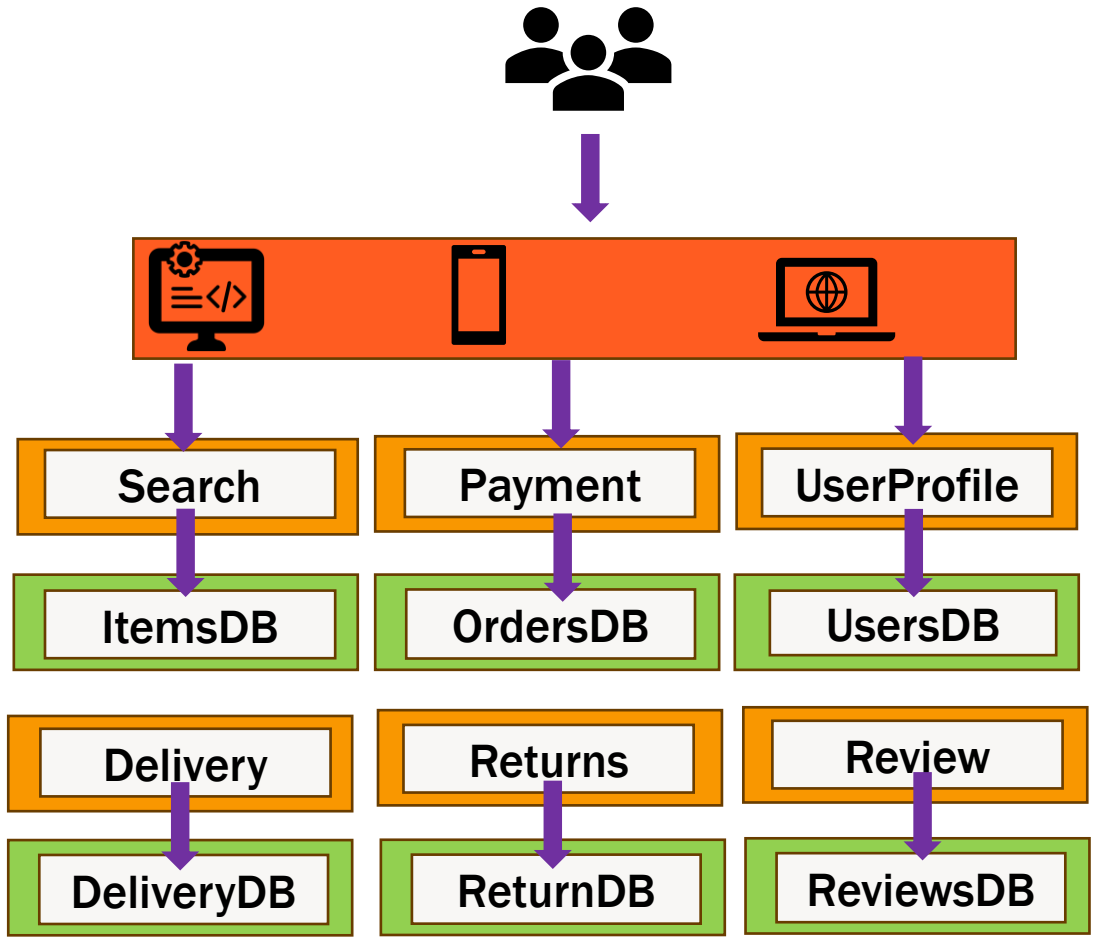


SHIFT TO MICROSERVICES



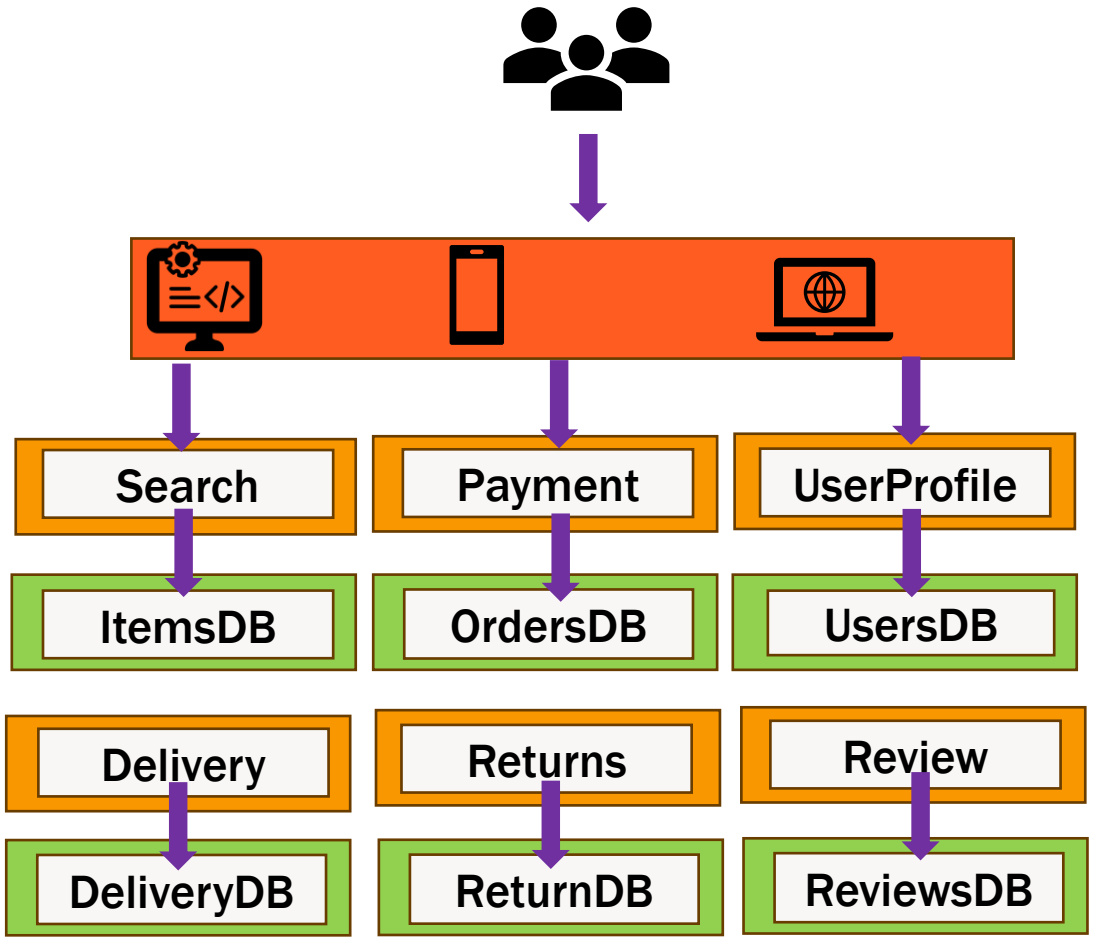
SHIFT TO MICROSERVICES

- Loosely coupled, modular units
  - Connected over the network
- Typically, each unit performs 1 business use-case
- Each unit
  - Scales independently
  - Potentially uses a different language, framework
  - Developed and deployed individually



MICROSERVICE ADVANTAGES

- Easier to maintain
  - Individual deployment
  - Updates rolled out independently



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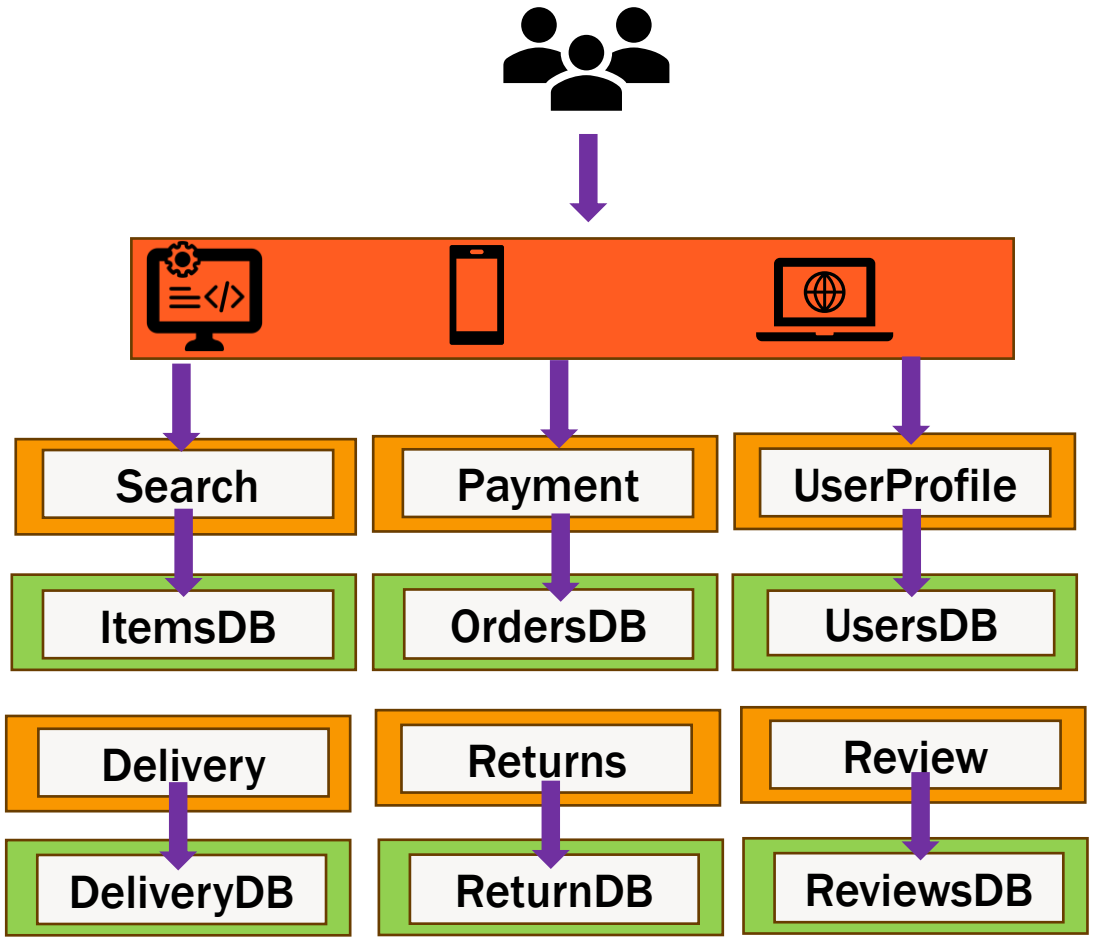

MICROSERVICE ADVANTAGES

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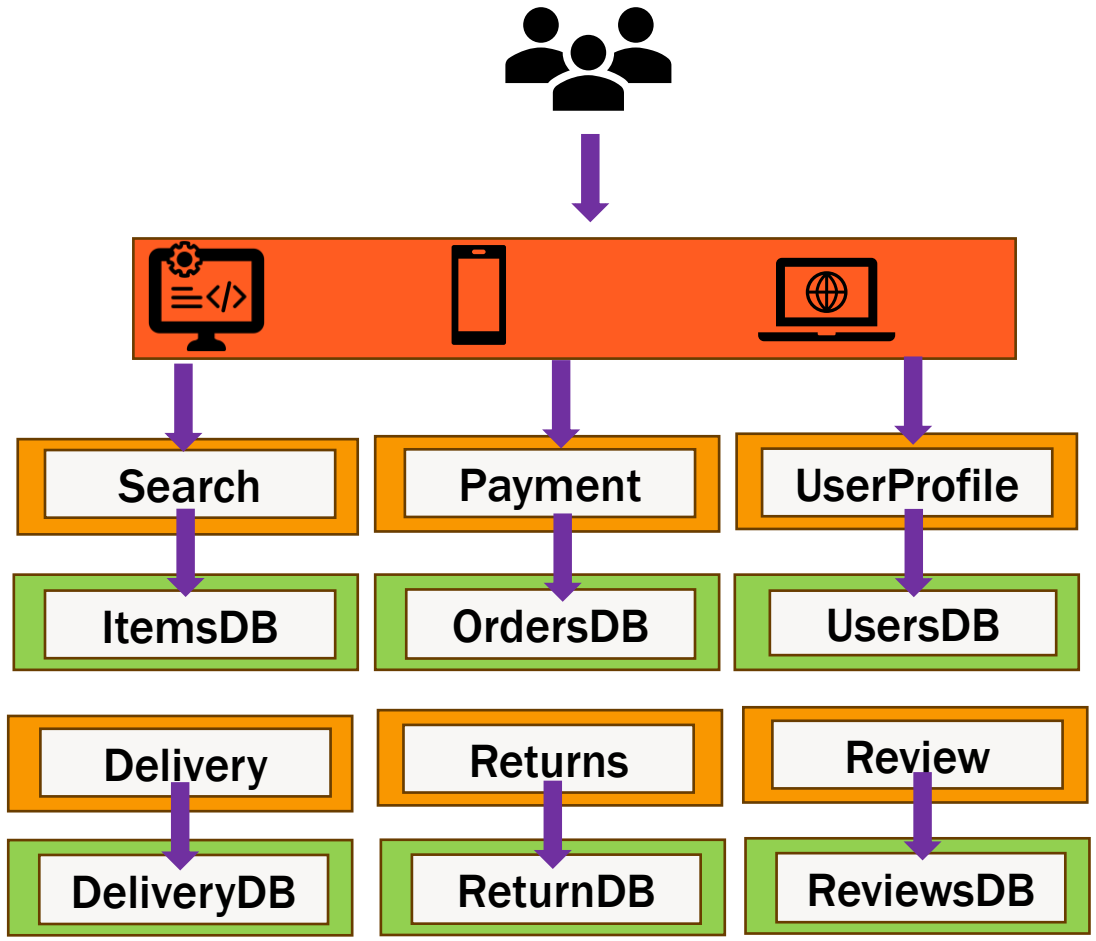
- Increased flexibility + scalability
  - Make impl choices independently of the rest of the system



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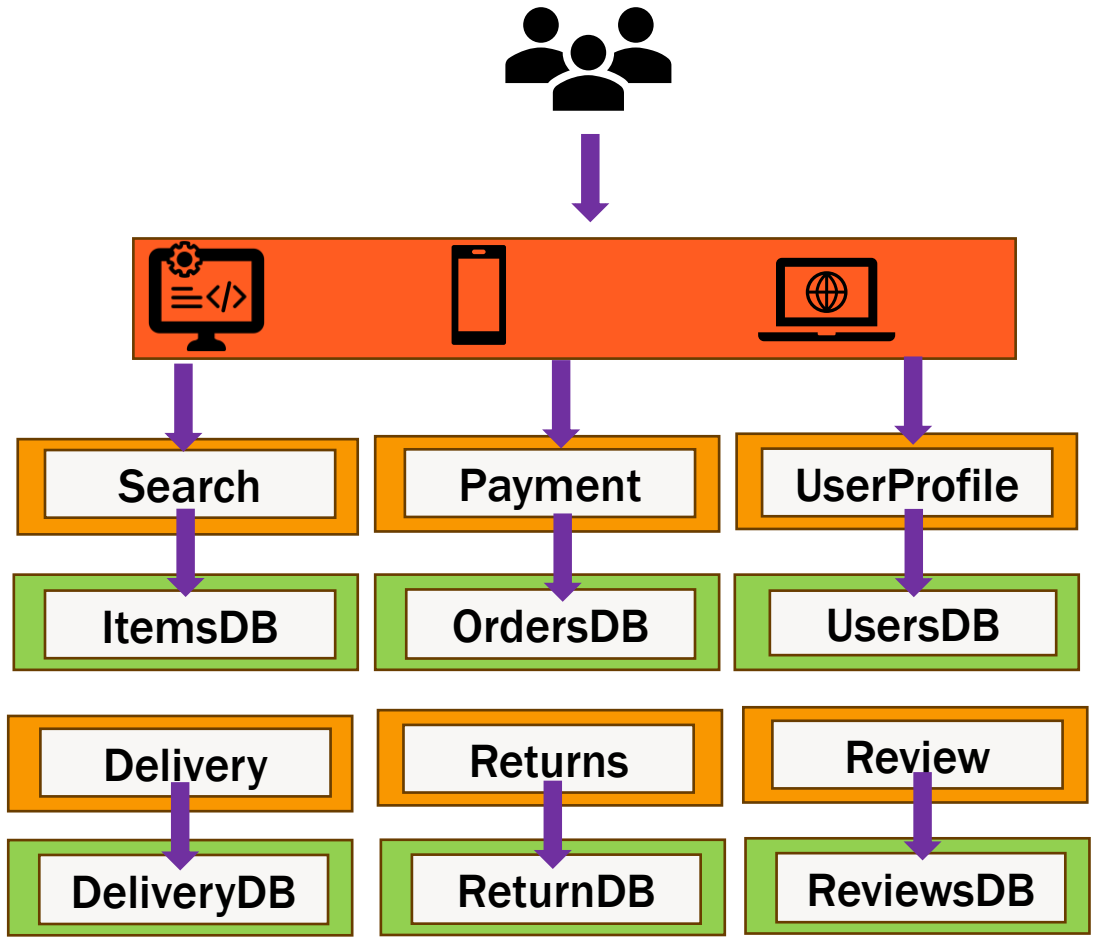

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- Performance hit!
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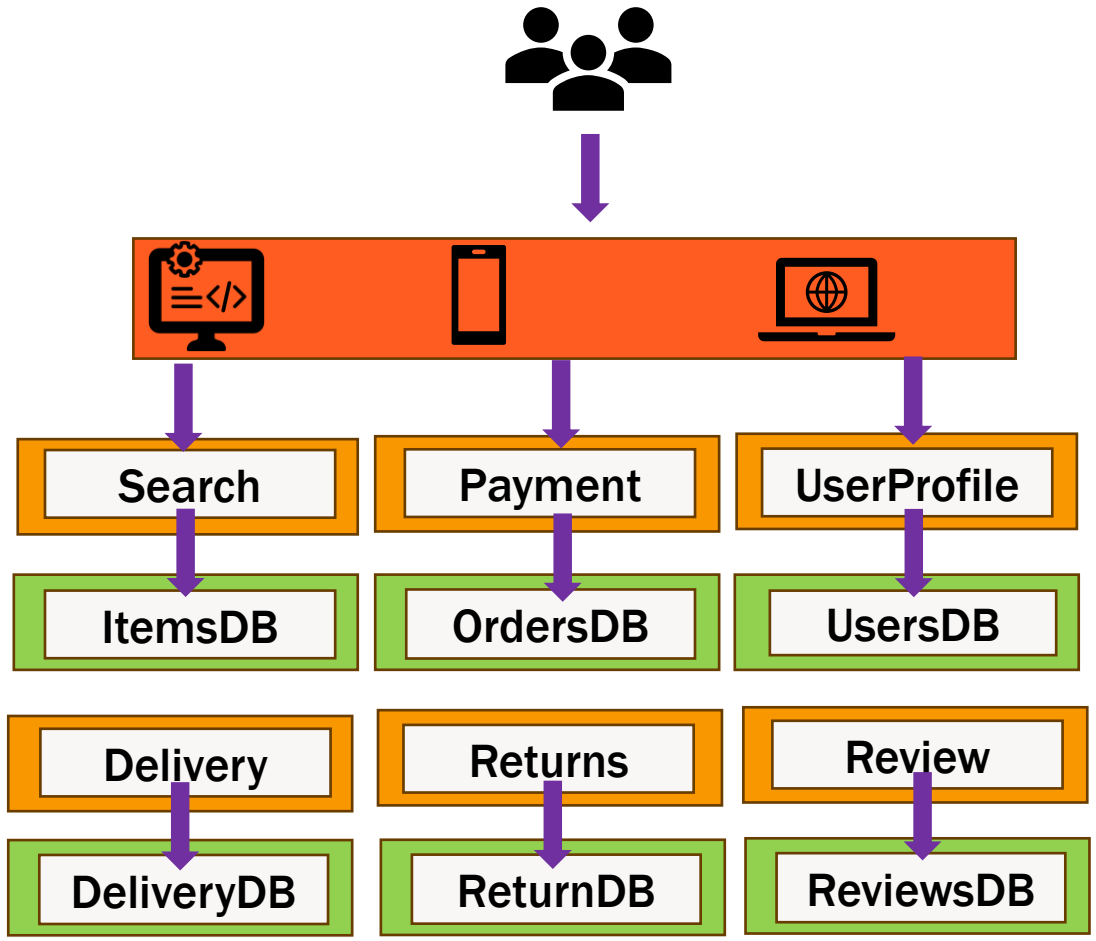

DISCUSSION THEMES

- When to use Microservices vs Monoliths?
- What is the right granularity for a microservice?
- What are the key components of a representative microservice system?
- Are microservices more reliable than monoliths?