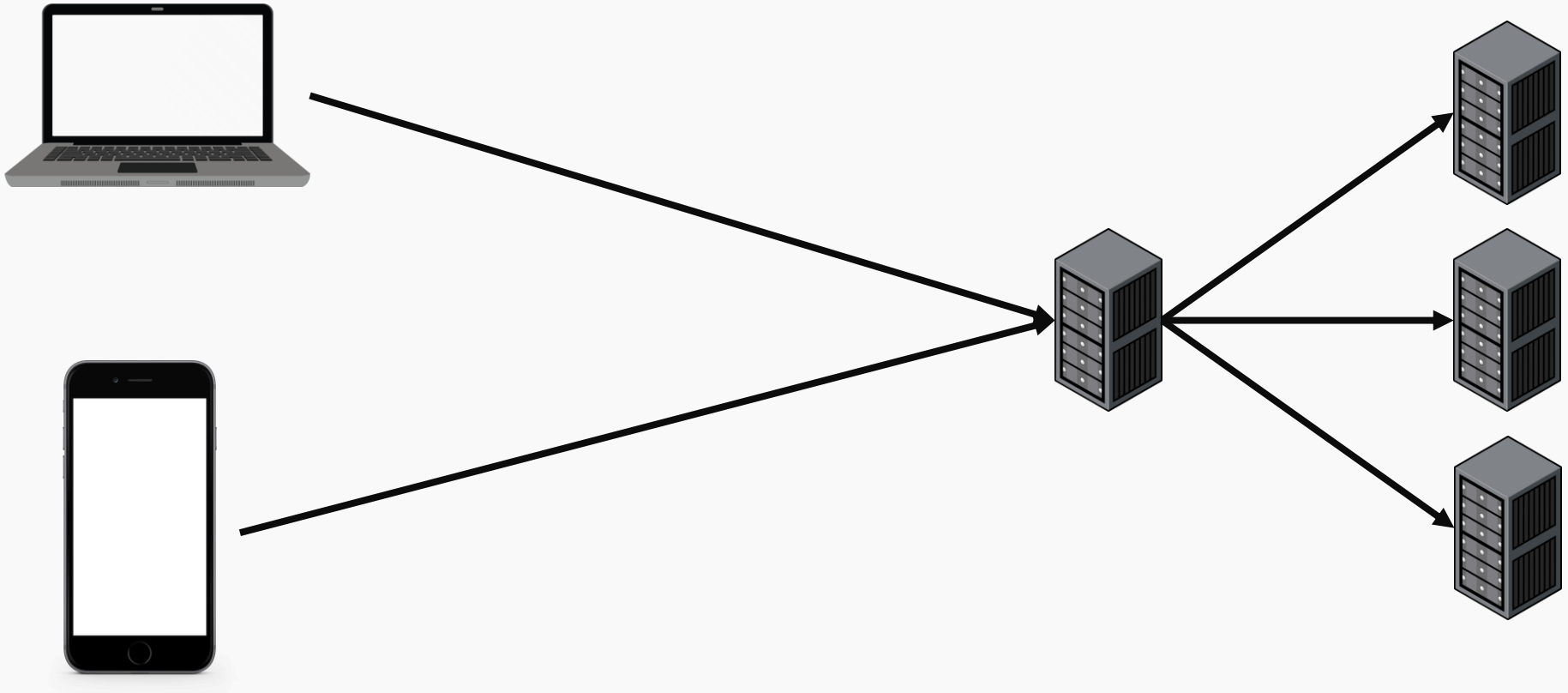
Sisteme Tolerante la Defecte
BIG Scale BIG Problems

Lect. Dr. Ing. Cristian Chilipirea – cristian.chilipirea@mta.ro

Load balancer



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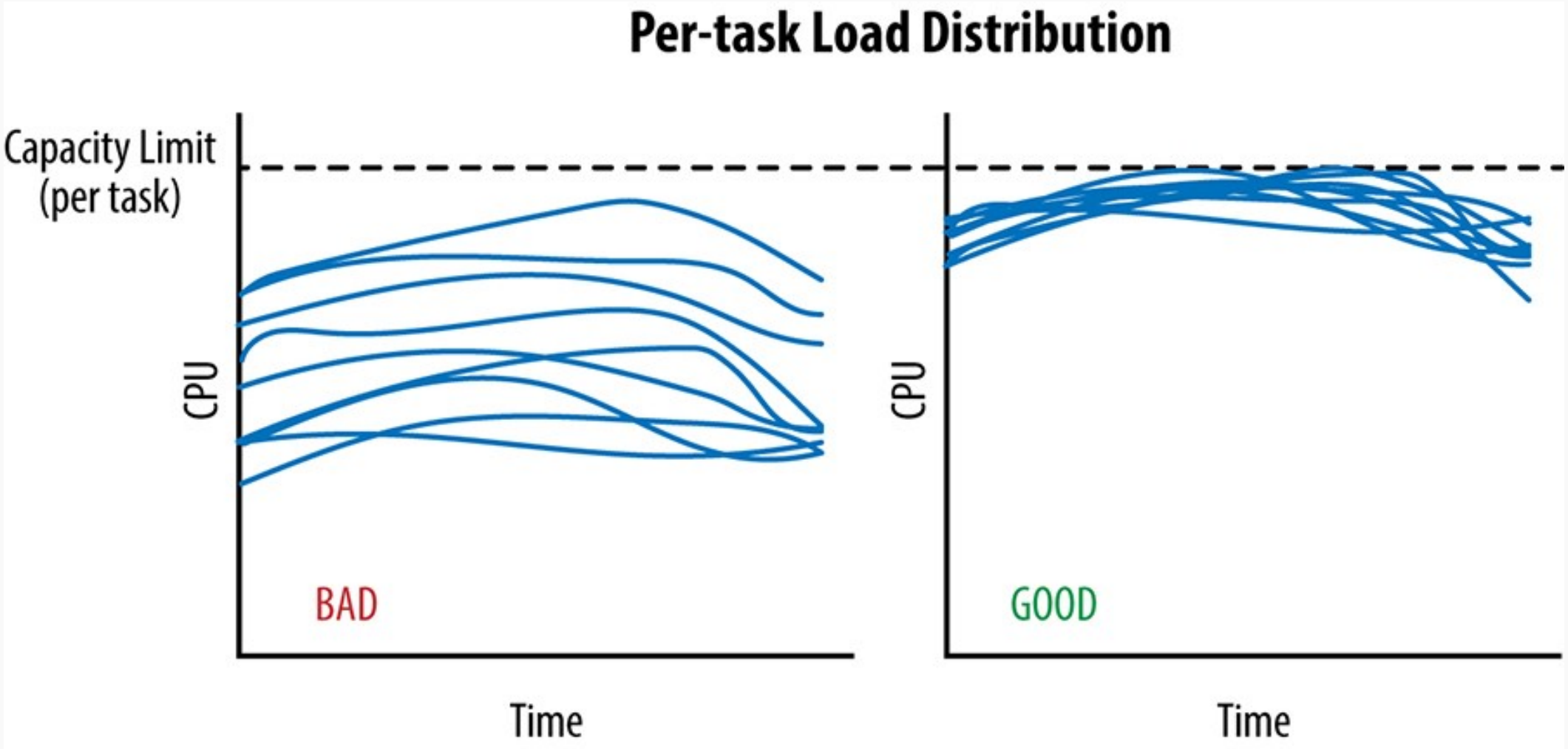


Picture from:SRE book

Load Balancer – Nivel Stivă Rețea (protocol)

- TCP/UDP
- HTTP/HTTPS
- DNS

Load balancer - Algoritmi

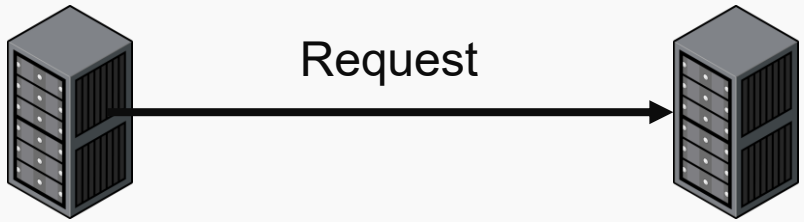
- Round Robin
- Weighted Round Robin (Ratio)
- Least Connections
- Least Time
- Weighted Least Connections
- Random
- Hash
- IP Hash
- Dynamic Ratio (based on load)

Load Balancer solutions

- Hardware
- Software: F5,
- Software HTTP(S): Nginx
- Software:
  - Docker Swarm – network overlay
  - Kubernetes load balancer
- Cloud: Global Azure Load Balancer

Cache

Cache



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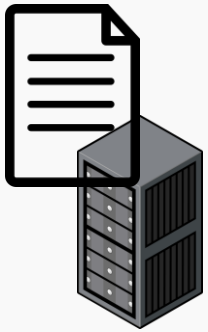

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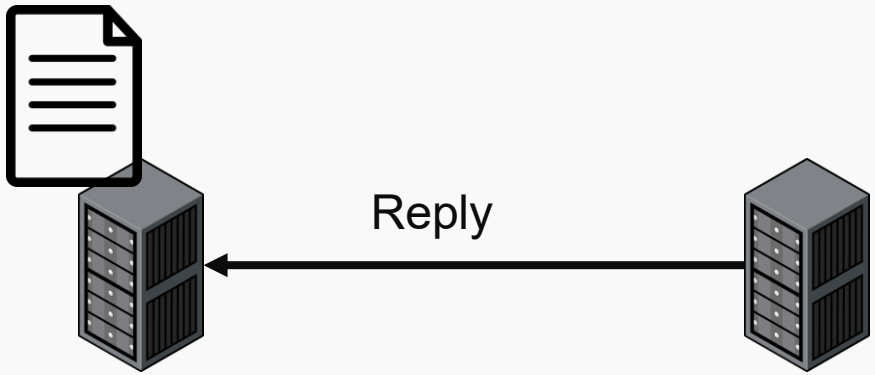

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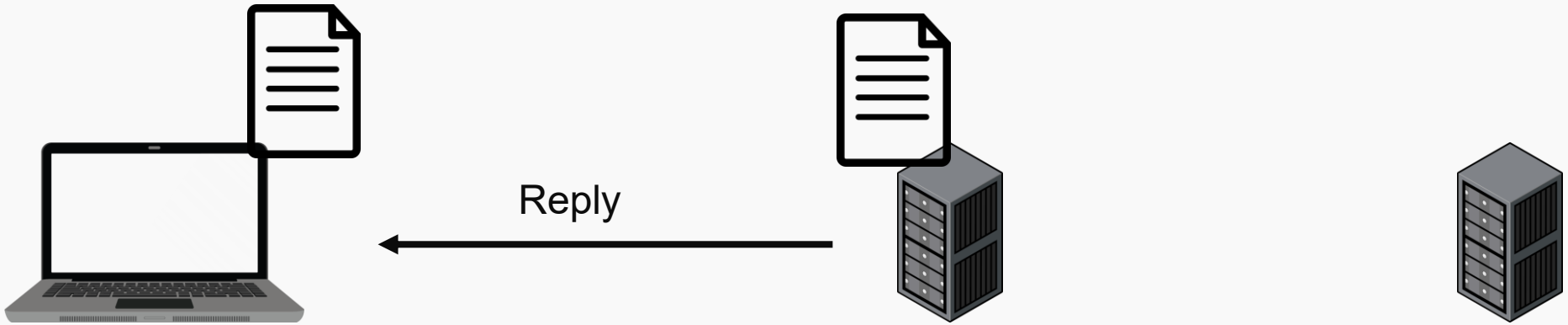

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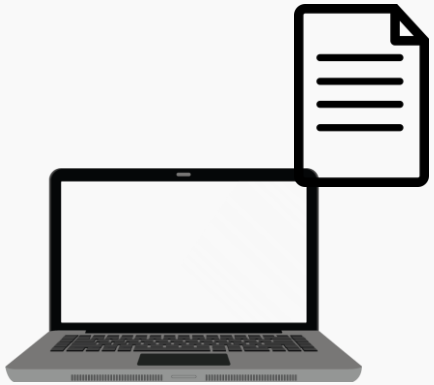

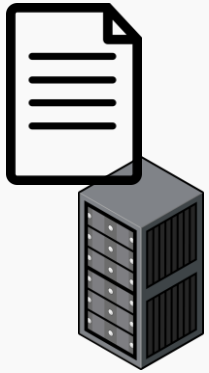

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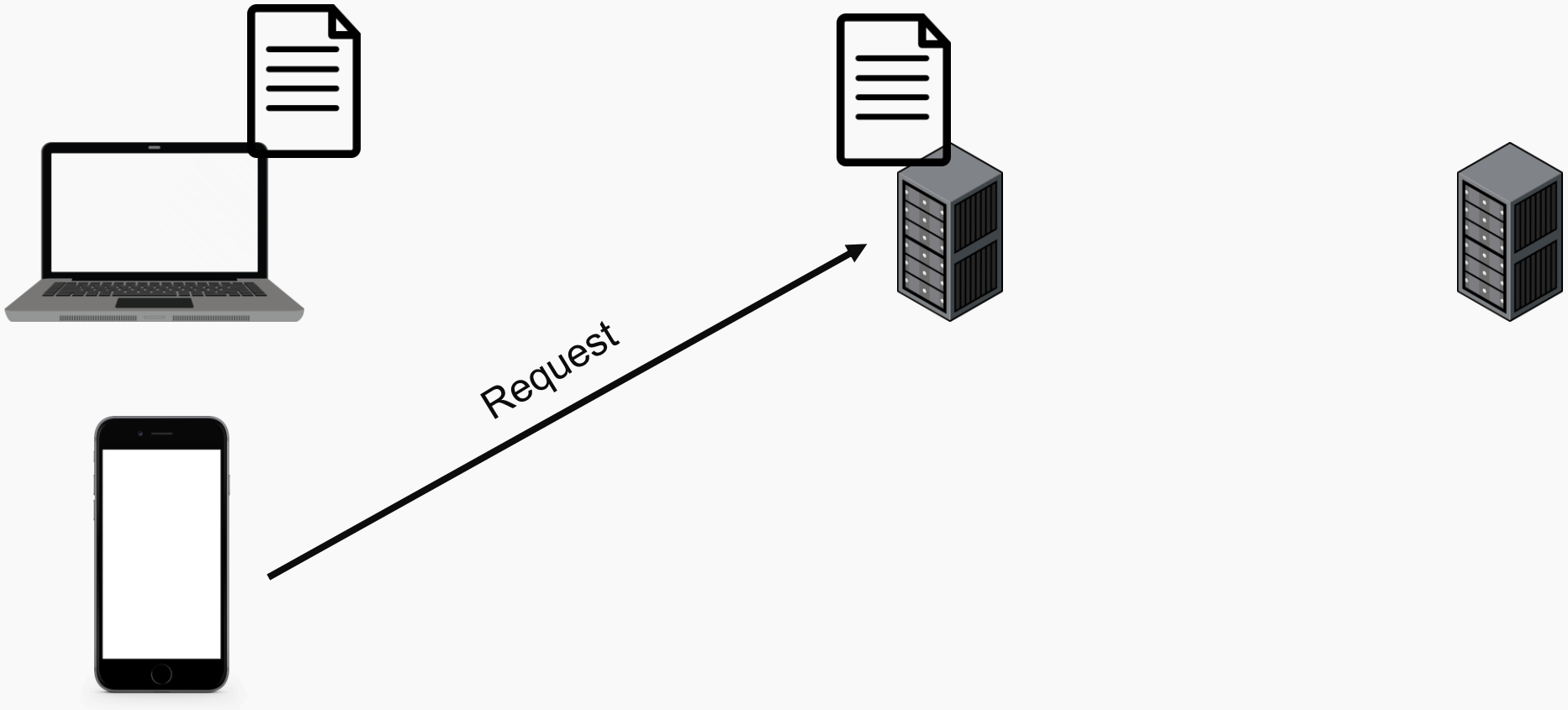

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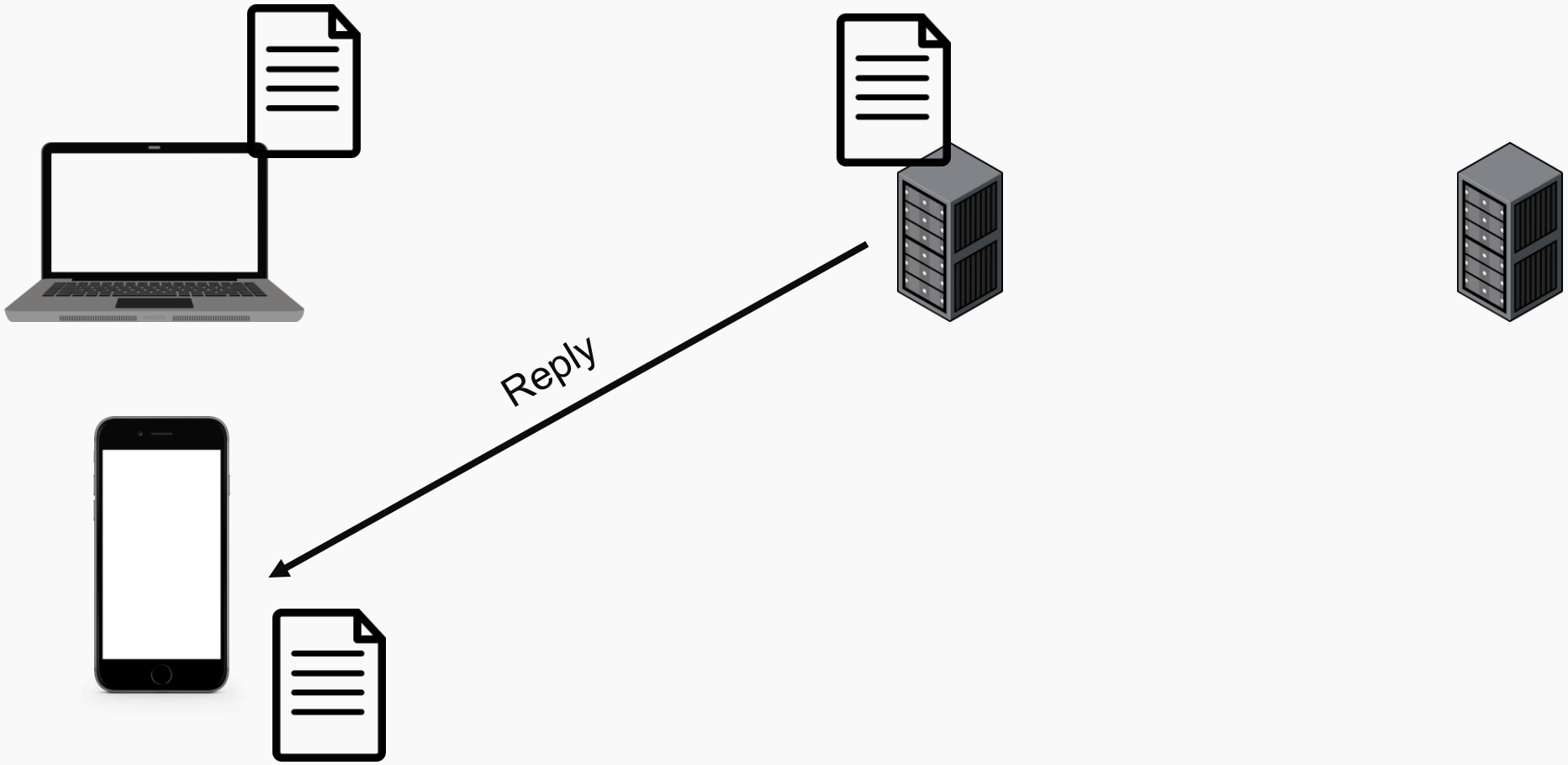


Tipuri de cache

- Cache procesor
- Server de cache (activ/pasiv)
- Cache la client (în browser)

- DNS cache

Probleme cache

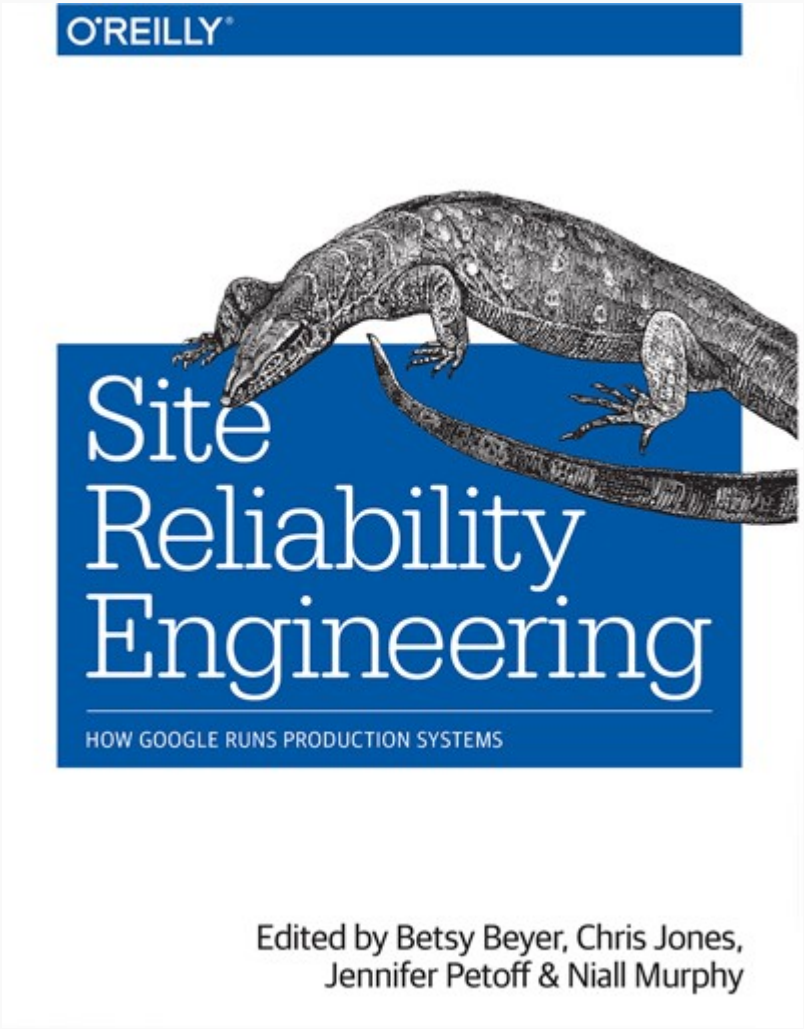
- Expirare
- Spațiu limitat
- Dacă este făcut la client, acesta decide politica
  - Mulți clienți cu același bug pot crea mari probleme

Cache replacement policies

- Random
- FIFO/LIFO
- Least Recently Used/Most recently used
- Least Frequently Used
- Bélády (clairvoyant)

Content Delivery Network

Site Relibability Engineering



Issues at scale

- Configuration
- Updates
- Certificates

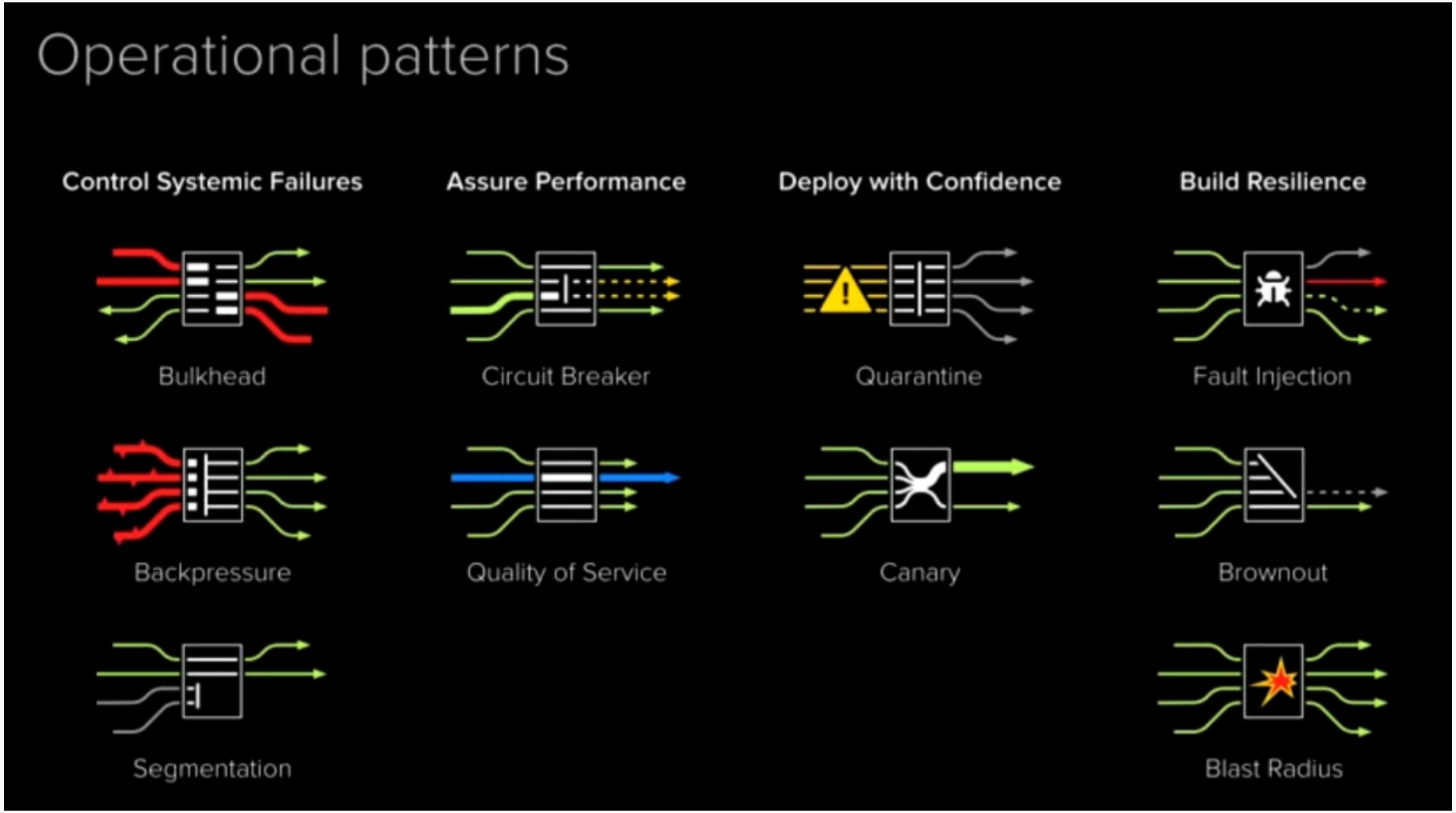
- Software bugs

- Cascading Failures

Traffic management

- Retry
  - Exponential backoff
  - Noise
- Throttling
- Graceful degradation instead of service failure
- Reject requests when overloaded
- Deadlines (time to live)
- Eliminate batch processes
- Counterintuitive:
  - Stop health checks
  - Change queues to stacks

Operational patterns



InfoQ talk

Proceduri

- Service Level Agreement (SLA)
  - Uptime 99.999% - five nines
  - Target și minim și maxim
- Chaos Monkey

- Postmortem – no blame
- Mean Time To Repair
  - Mean Time Between Failures

- Limitare timp on-call
  - Timp development (automatizare)

Monitorizare

- White-box monitoring (din interiorul mașinii)
- Black-box monitoring (din exterior)
- Alerte

- Semnale
  - Latency
  - Traffic
  - Errors
  - Saturation (cât de “full” sunt sistemele)
- Colectare agregată și extensibilă pentru detalii

Testare

- System Tests
- Integration Tests
- Unit Tests
- Sanity Checking - Smoke Tests
- Performance Tests –Stress test
- Regression Tests
- Canary Tests (faci update doar la o parte din infrastructură și autoamt rollback dacă sunt probleme)