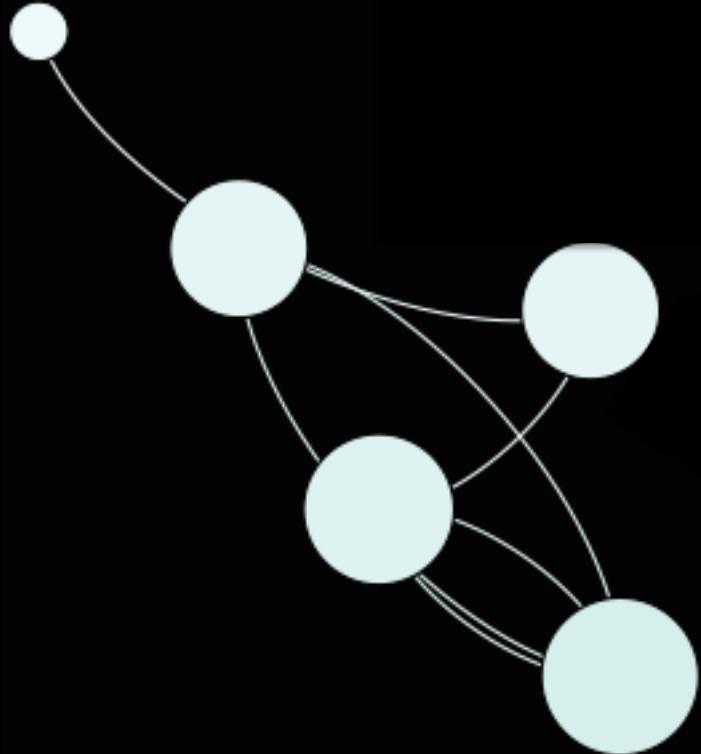


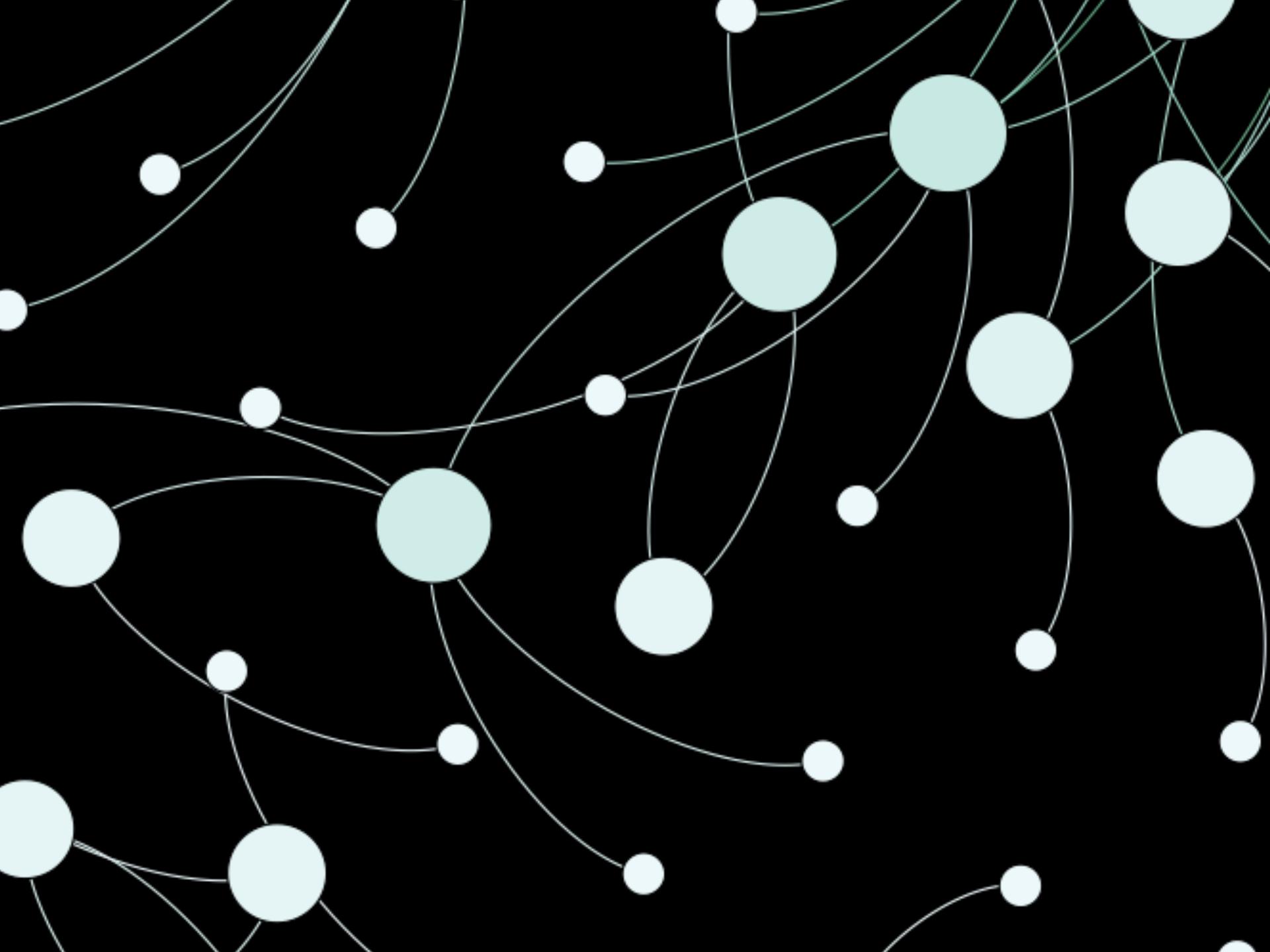
Microservices, Micro Operations?

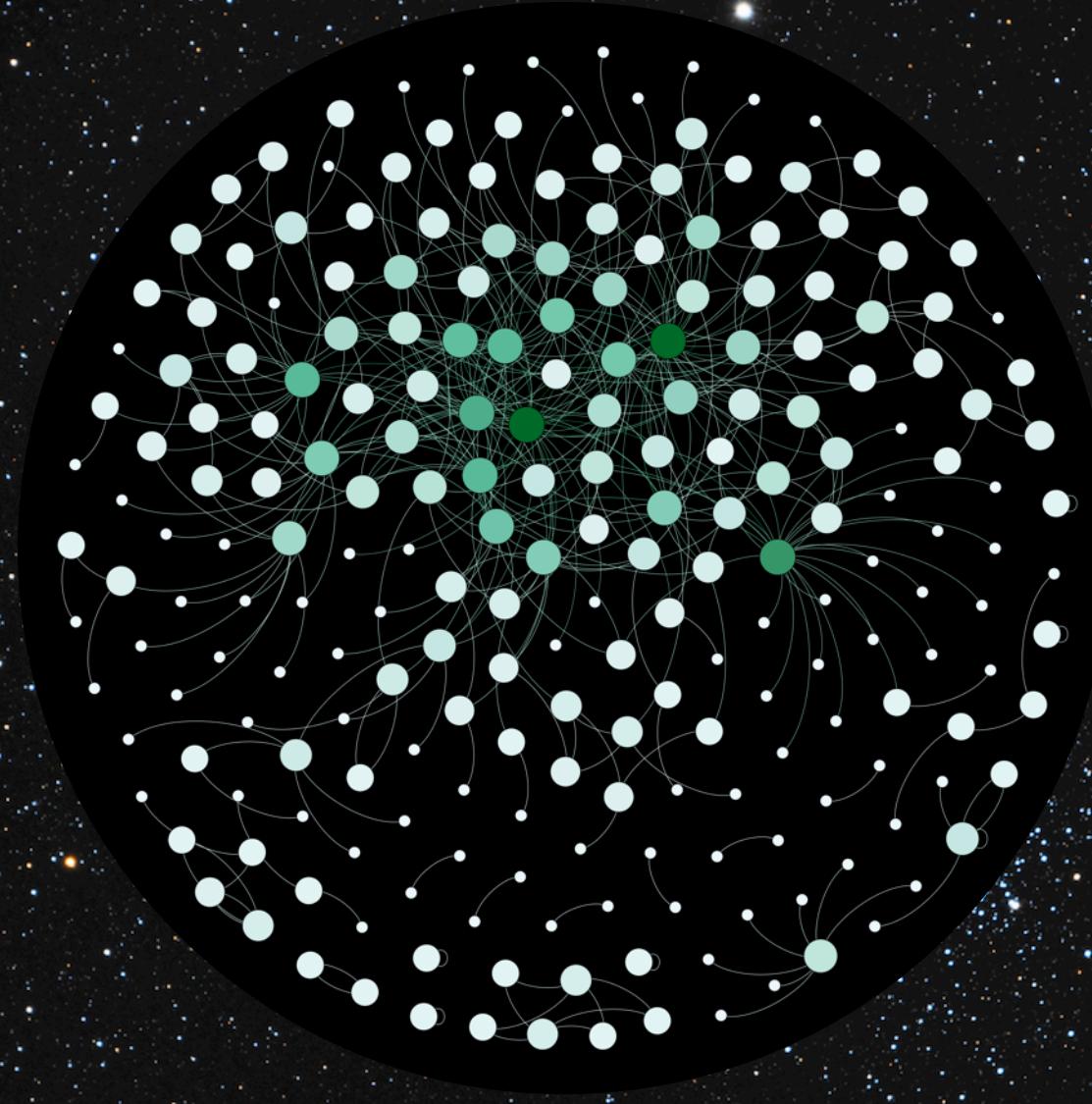
Challenges of Microservice models at the operations level

microchg²⁰¹⁵

Dustin Huptas
Andreas Schmidt







CASSINI CONSULTING

#DEVOPS #LINUX #CONFIGMGT
#VIRTUALIZATION #CONTAINERS #NETWORKING
#IPV6 #SECURITY #DEPLOY #RUN



CASSINI CONSULTING



DUSTIN
@DHPTS

SYSTEM ARCHITECTURE,
NETWORKING,
DEV'ING THE OPS

#DEVOPS #LINUX #CONFIGMGT #SECURITY
#VIRTUALIZATION #CONTAINERS #NETWORKING #IPV6

CASSINI CONSULTING



ANDREAS
@ASCHMIDT75

**INFRA-CODING, #SERVERSPEC,
#CONTAINERS & SECURITY,
#NETWORKING**

**#DEVOPS #LINUX #CONFIGMGT #SECURITY
#VIRTUALIZATION #CONTAINERS #NETWORKING #IPV6**

PHYSICAL SERVERS

Years

VIRTUAL SERVERS

Days to Months

CONTAINERS

Hours to Days

DYNAMIC WORKLOADS

Msecs to Seconds



- » Usually local development/test environment
- » Single host, single network
- » Mocked services



- Usually local development/test environment
- Single host, single network
- Mocked services
- Scaling of instances (failover+performance)
- Services instances scattered across different hosts
- Networking, Security, i.e. Firewalling
- Logging and Monitoring on a larger scale
- Stuff needs to be persisted

Non-functional REQUIREMENTS

Alex: Looking out at 2015, what are some of the issues that will be more complex in this distributed infrastructure world for customers – what are some of the top ones you see?

Mitchell: Number one is service proliferation, where your data center just becomes more and more services. Number two is, inherently becoming multi-data-center and highly-distributed at a much earlier stage. With things like Docker, where you can run things in much smaller units, it becomes a lot easier to start running a lot more services. As a result, we have a management problem, an orchestration problem, and distributed system problems in there.

- <http://thenewstack.io/new-stack-mitchell-hashimoto-containers-no-containers-one-question-2015/>

**Increasing Number
of Services**

.01

Discovery of Services

.02

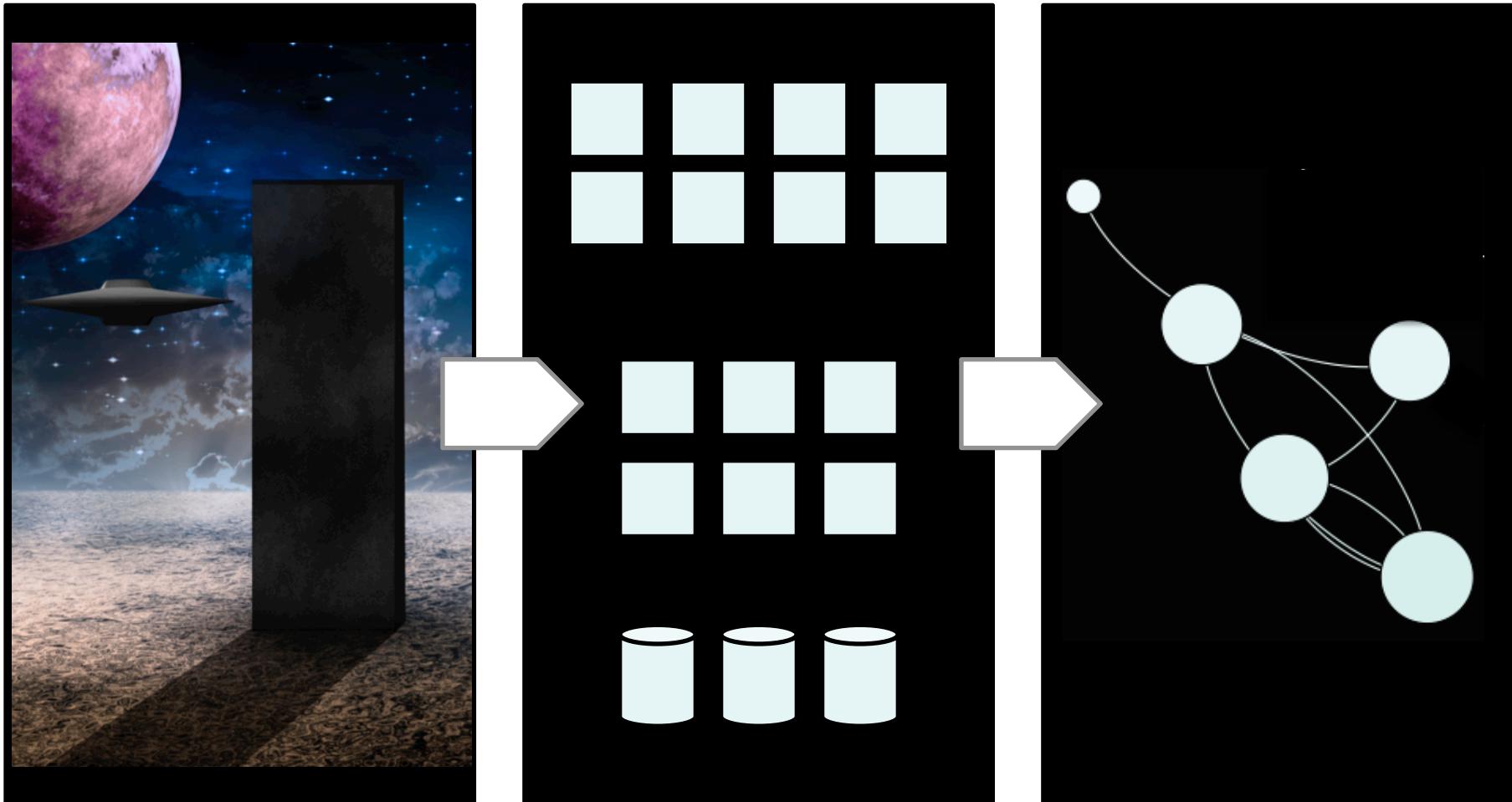
Dependencies

.03

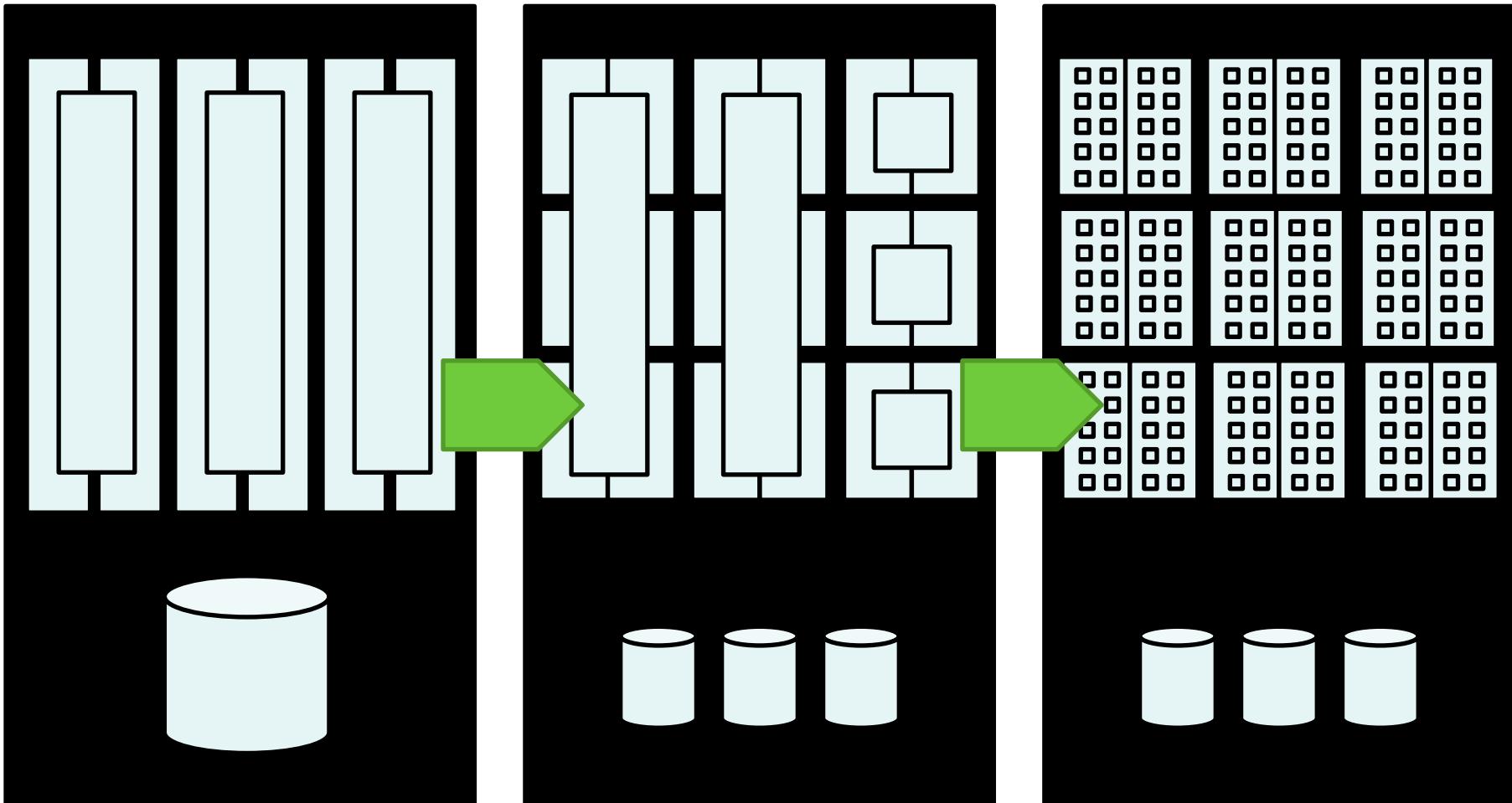


NUMBER OF SERVICES: 1

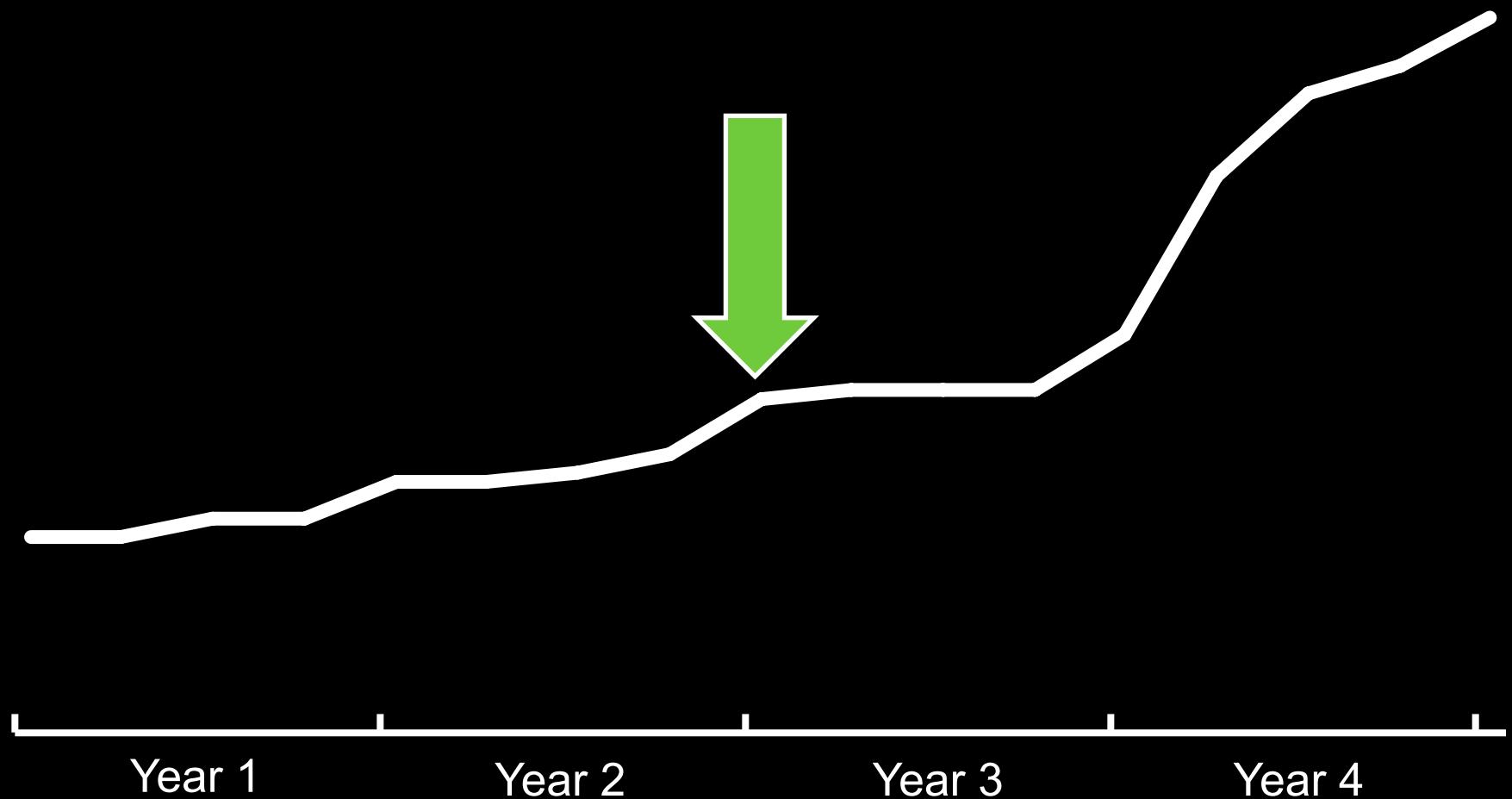
Software Architecture Patterns are changing



System Architecture Patterns are changing to adapt



The # of services are increasing



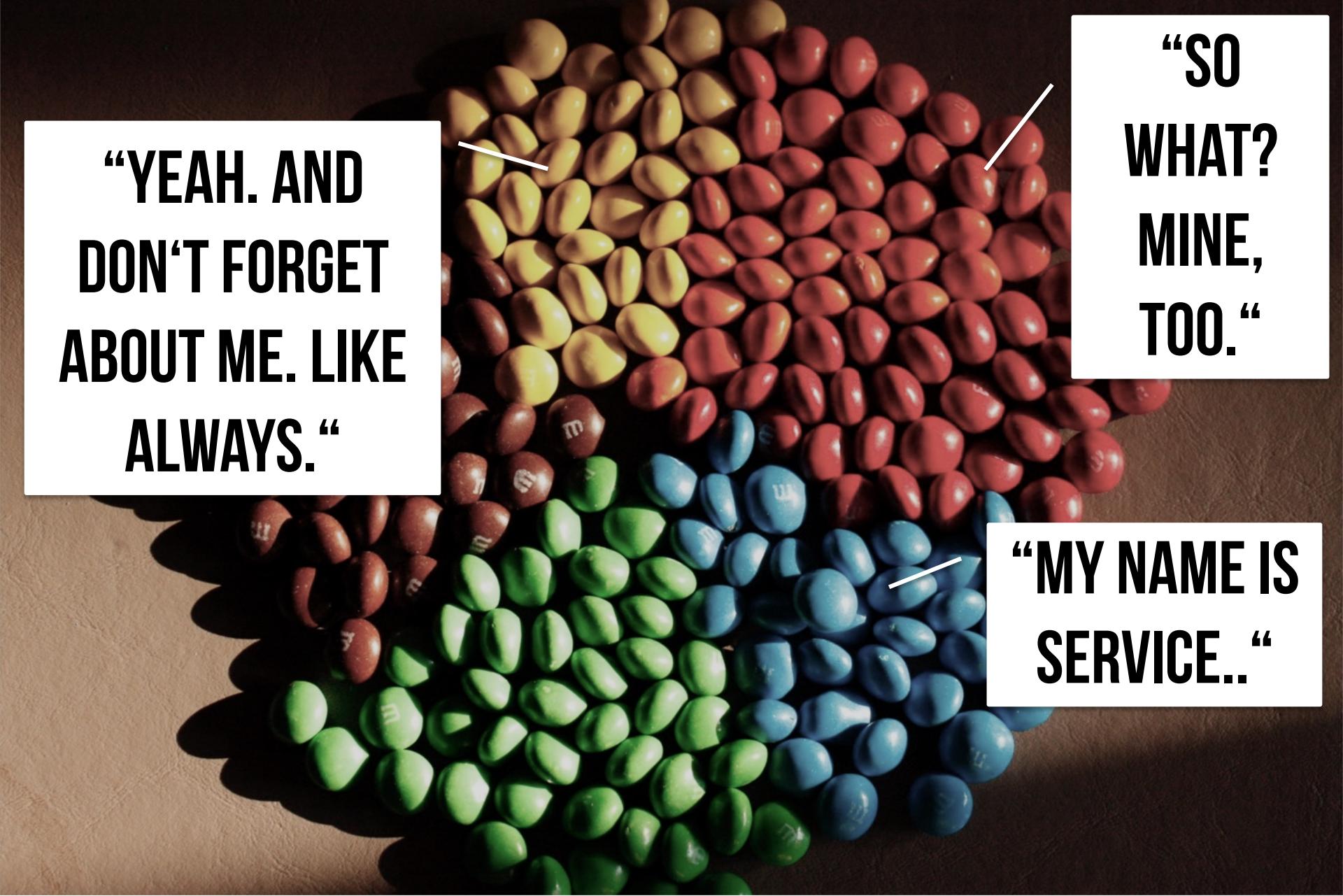


„My name is service,
MICRO SERVICE
micro service.“

© Dave Pearce 2012

microchg²⁰¹⁵

 cassini
GUIDING AHEAD



**“YEAH. AND
DON‘T FORGET
ABOUT ME. LIKE
ALWAYS.”**

**“SO
WHAT?
MINE,
TOO.”**

**“MY NAME IS
SERVICE..”**

microchg²⁰¹⁵

 **cassini**
GUIDING AHEAD



**TEAMS DEPLOY
INDEPENDENTLY
EVERY OTHER
DAY**

**MULTIPLE
STAGES**

**A BAG OF
SERVICES**

microxchg²⁰¹⁵

 **cassini**
GUIDING AHEAD



HOW TO CALL?

SCALING

DEPLOYMENTS

FIREWALLING

LOGGING

SHARING
KNOWLEDGE

MONITORING

DEPENDENCIES

DEBUGGING

microxchg²⁰¹⁵

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GUIDING AHEAD

Logging
Monitoring
Deployments
Debugging

CREATE AND APPLY PATTERNS

Across all Services & Teams

DevOps

KEEP SYSTEM Maintainable

You build it,
You run it

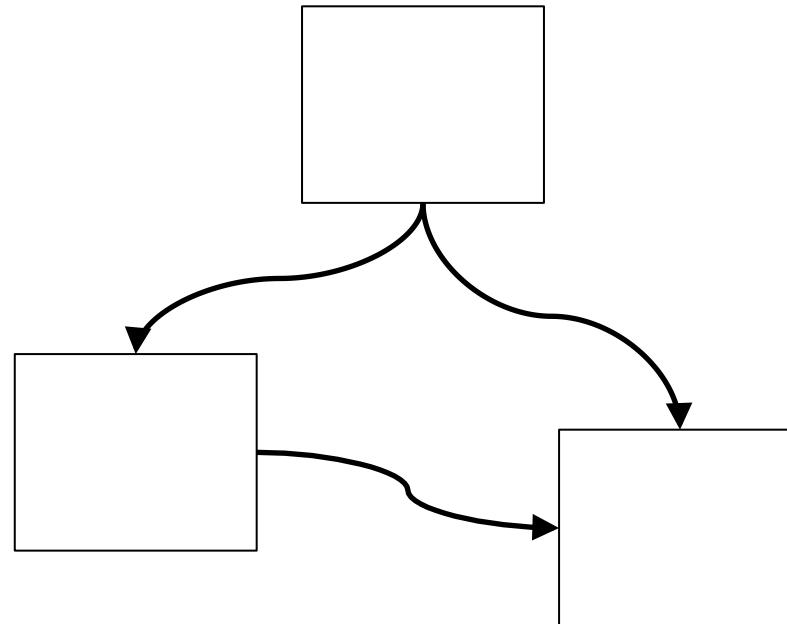
Data

META MODEL

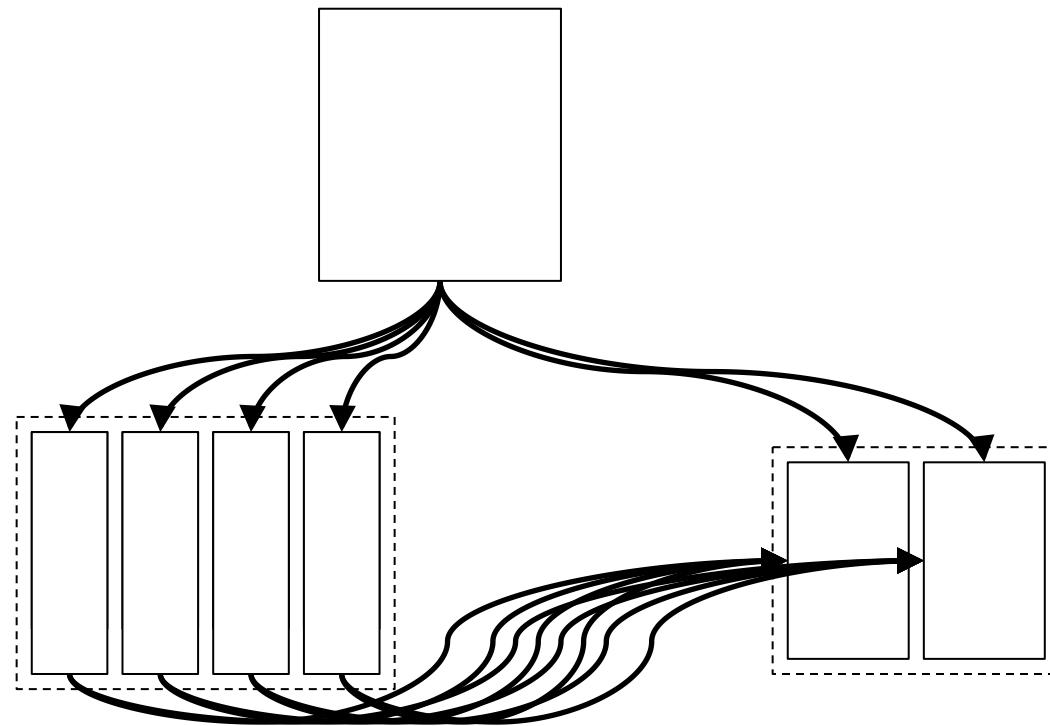
Documentation
Knowledge



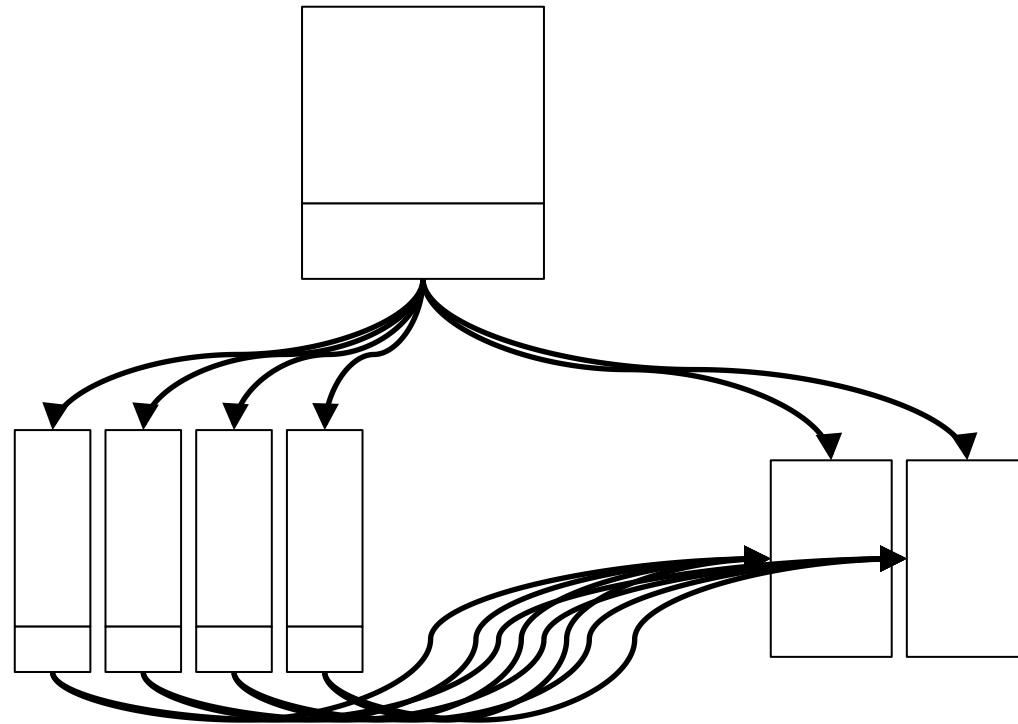
3 SERVICES - HANDCRAFTED



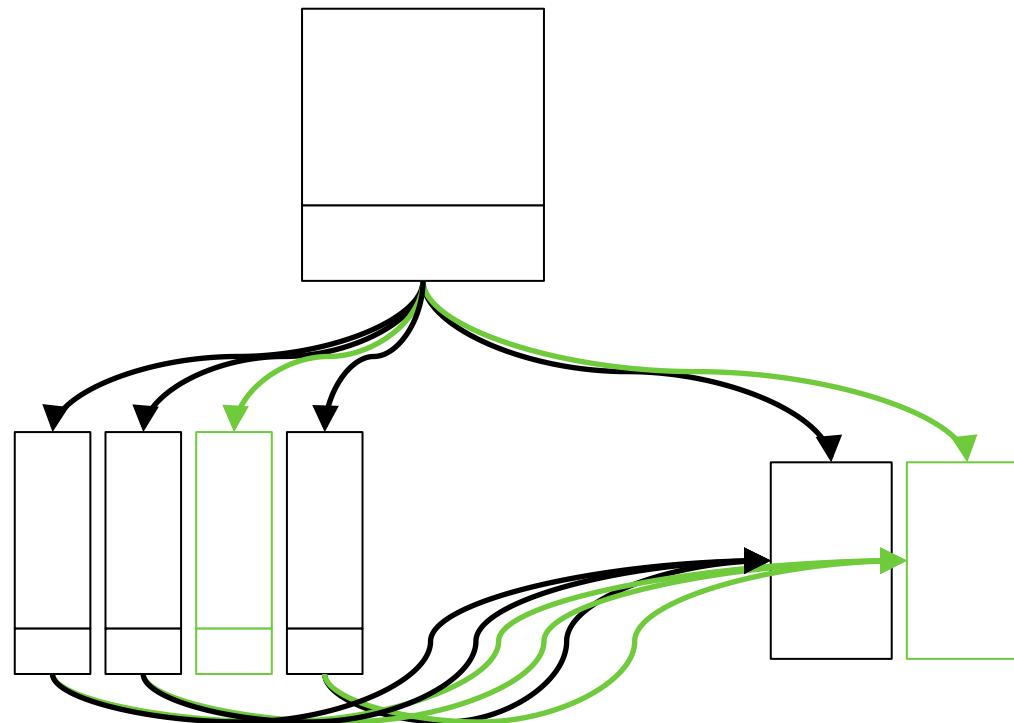
SCALABILITY & FAILOVER



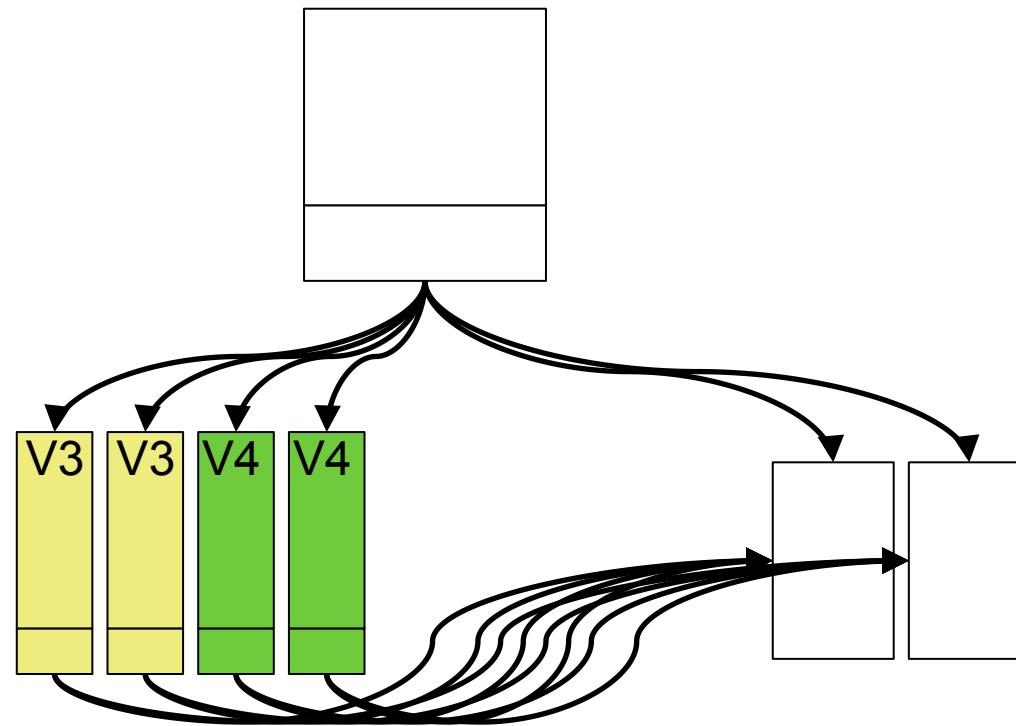
SCALABILITY & FAILOVER



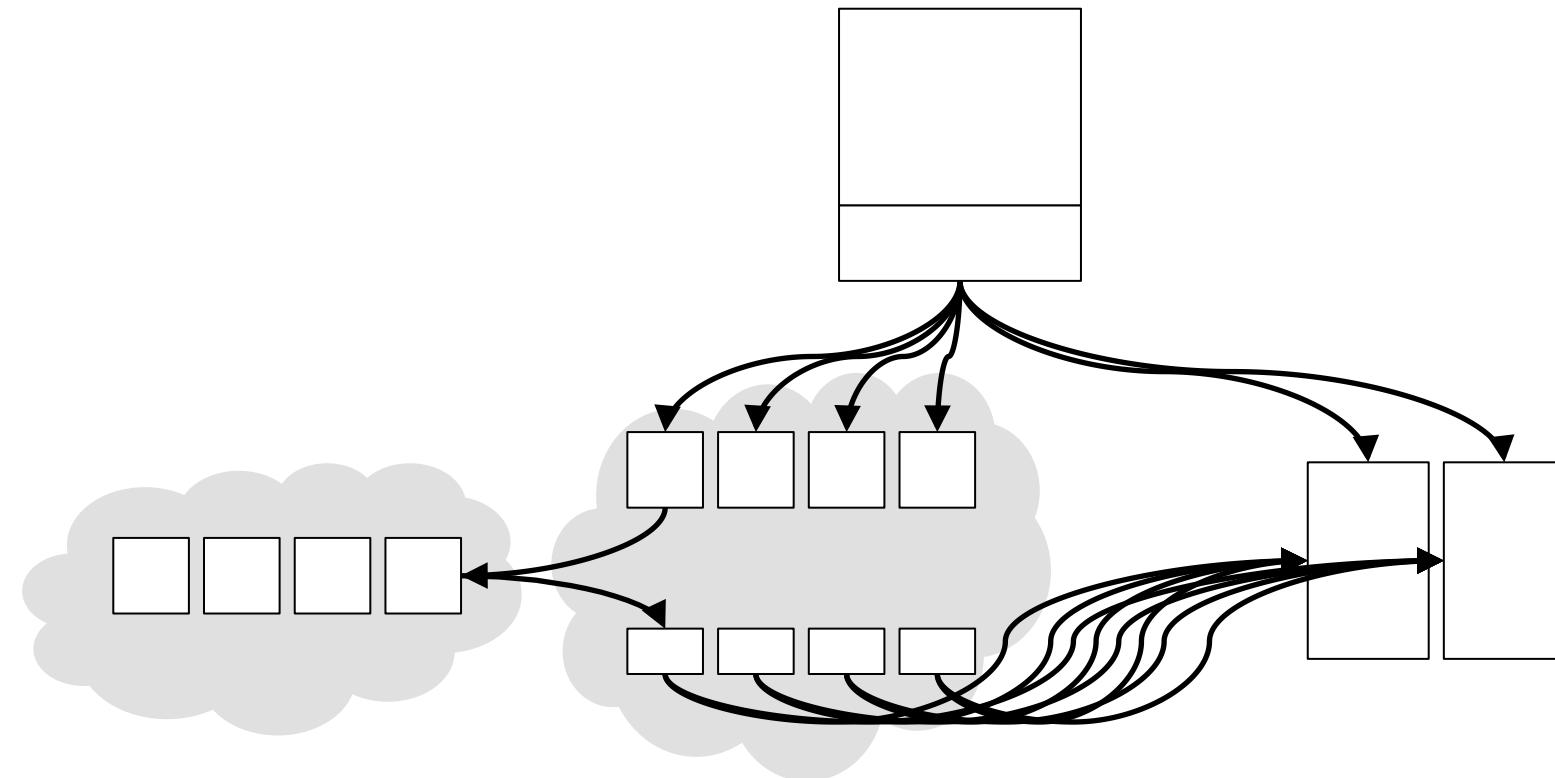
ENDPOINTS DISAPPEAR



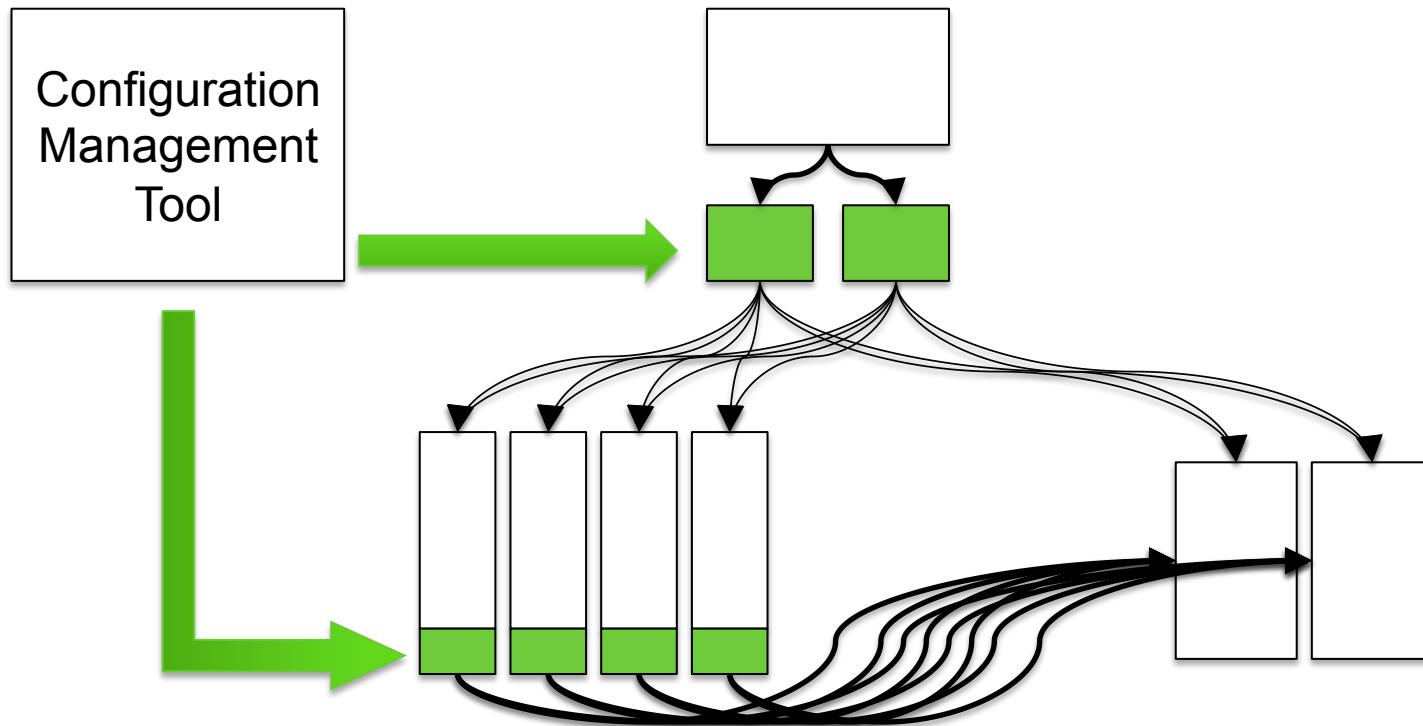
MULTI-VERSION?



REACHABILITY



WIRING BAKED INTO PROXYING/LB



SOLVE **WIRING WITH
APPROPRIATE TOOLS**

APPS

INFRA

i.e.
program/registrator

K/V CLUSTER

i.e. coreos/etcd
consul

TEMPLATE ENGINE

i.e. confd,
consul-template, ..

PROXYING

i.e. haproxy

Dependencies

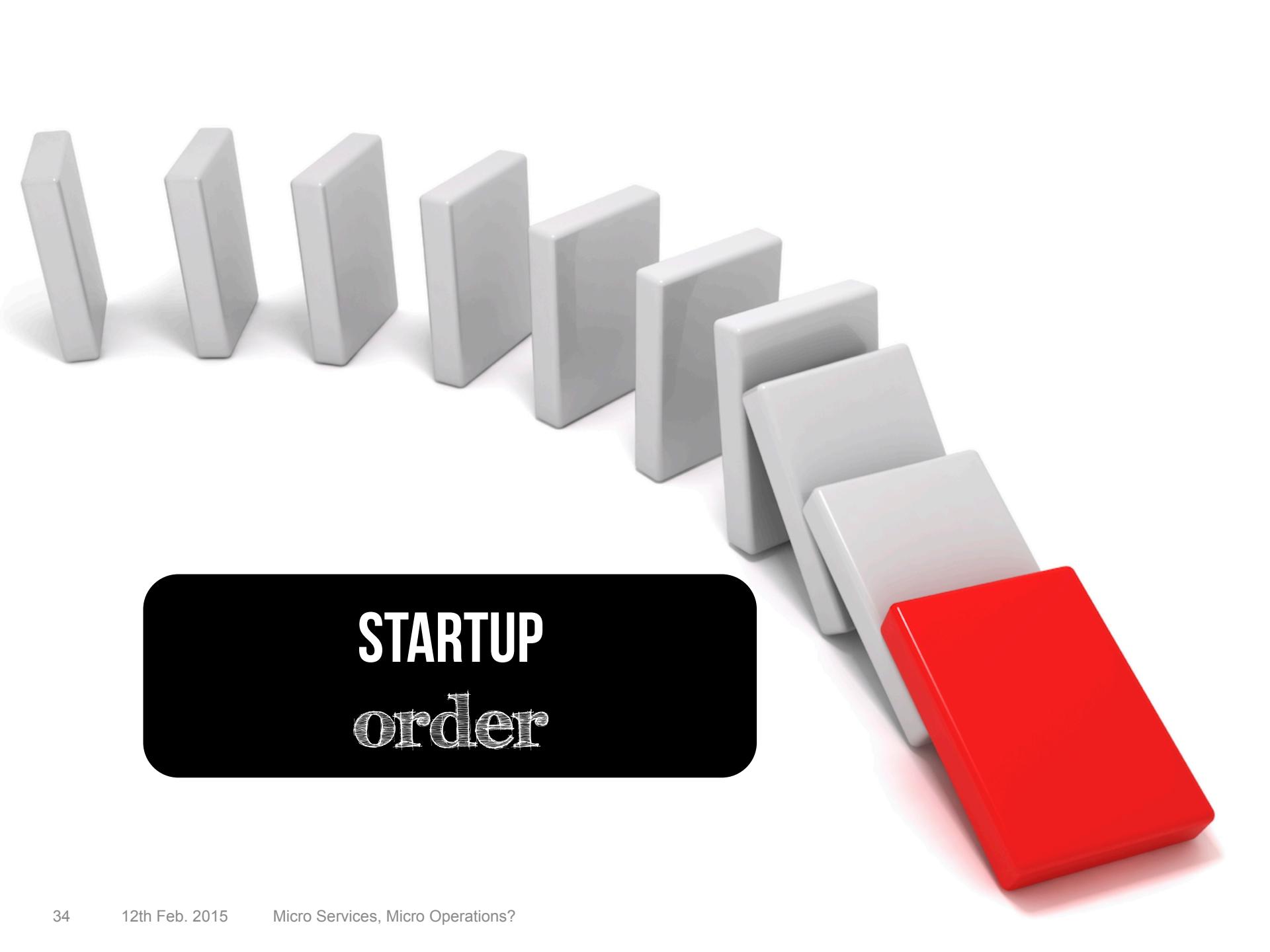
A dense network graph is centered on the word "Dependencies". The graph consists of numerous circular nodes of varying sizes and colors, primarily in shades of teal, green, and white, set against a black background. The nodes are interconnected by a complex web of thin, light-colored lines representing dependencies or relationships between components.

INTERNAL SOFTWARE DEPENDENCIES

@ build time

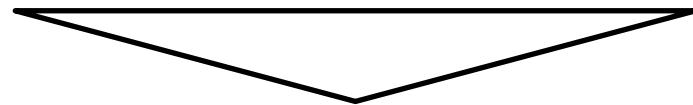
INTER-SERVICE DEPENDENCIES

@ run time

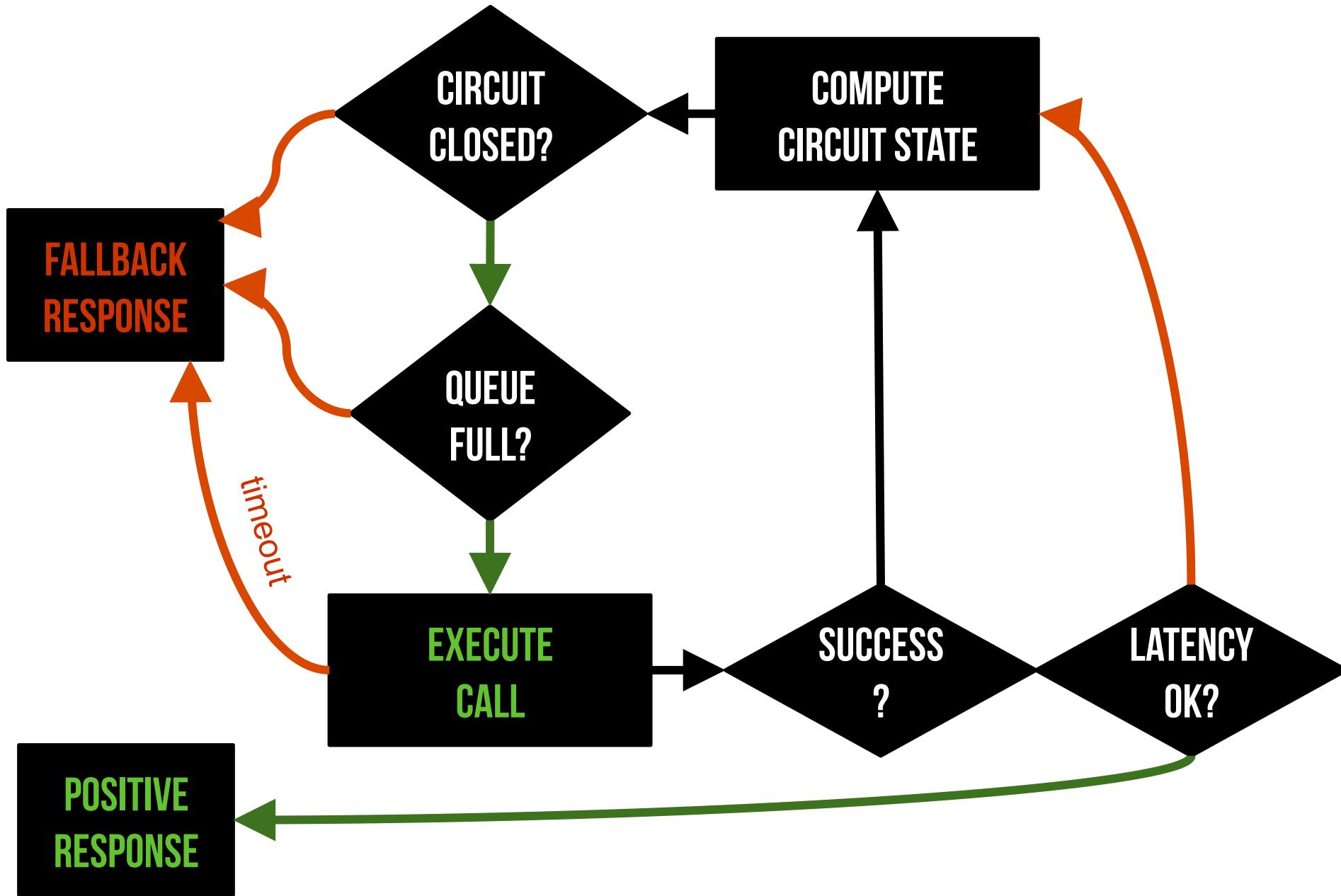


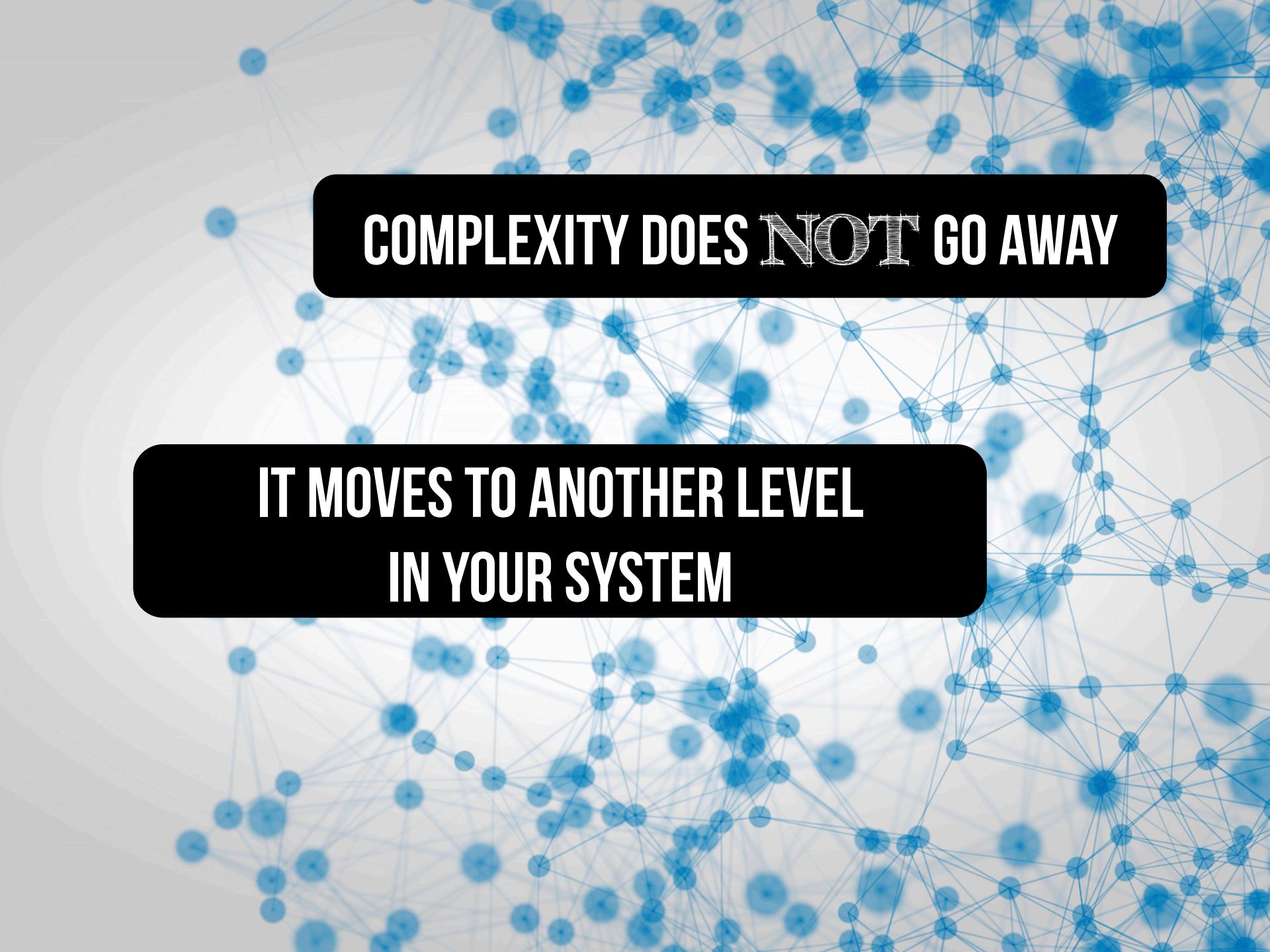
STARTUP
order

RESILIENCE



Circuit Breaker





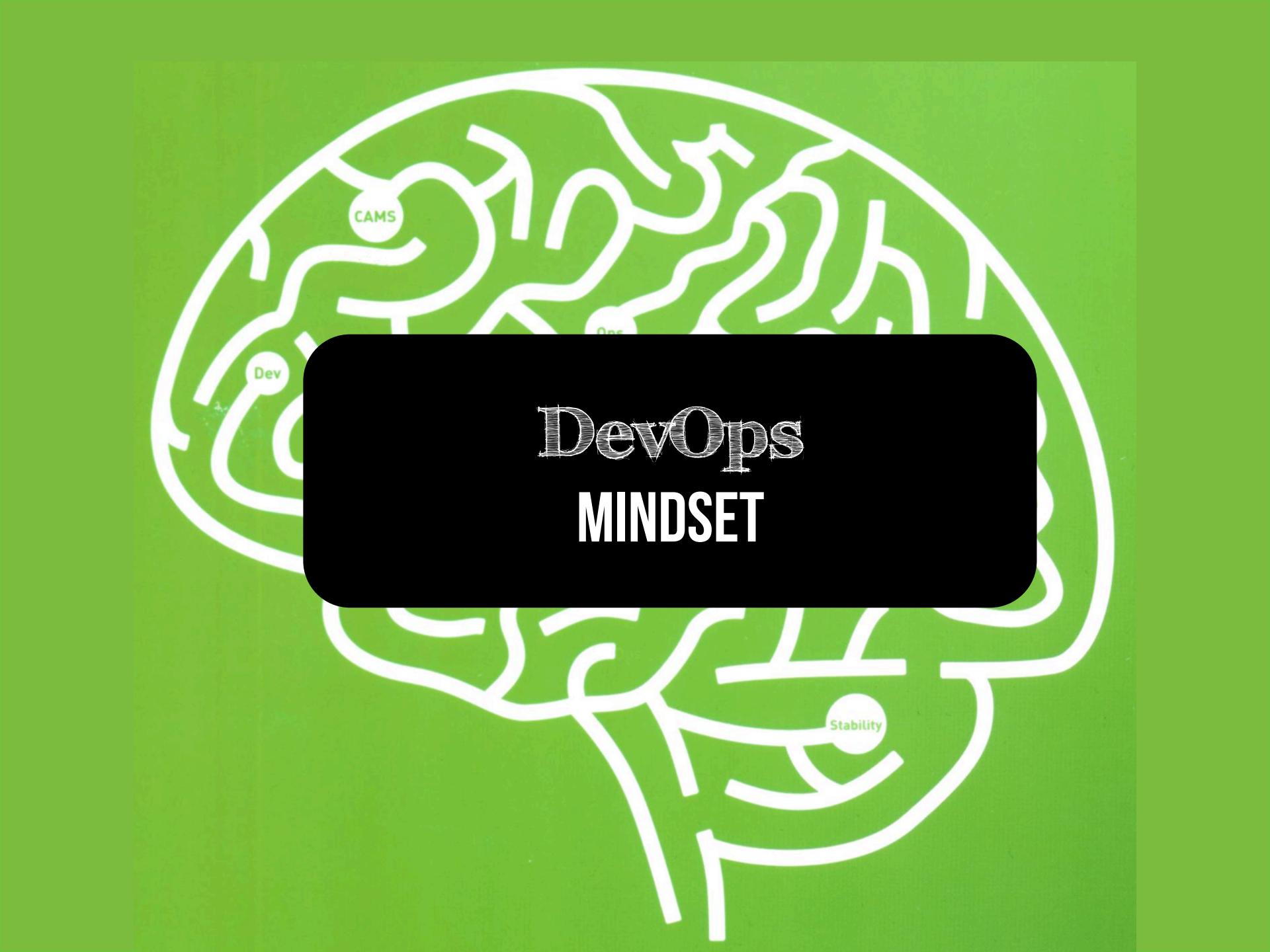
COMPLEXITY DOES NOT GO AWAY

**IT MOVES TO ANOTHER LEVEL
IN YOUR SYSTEM**

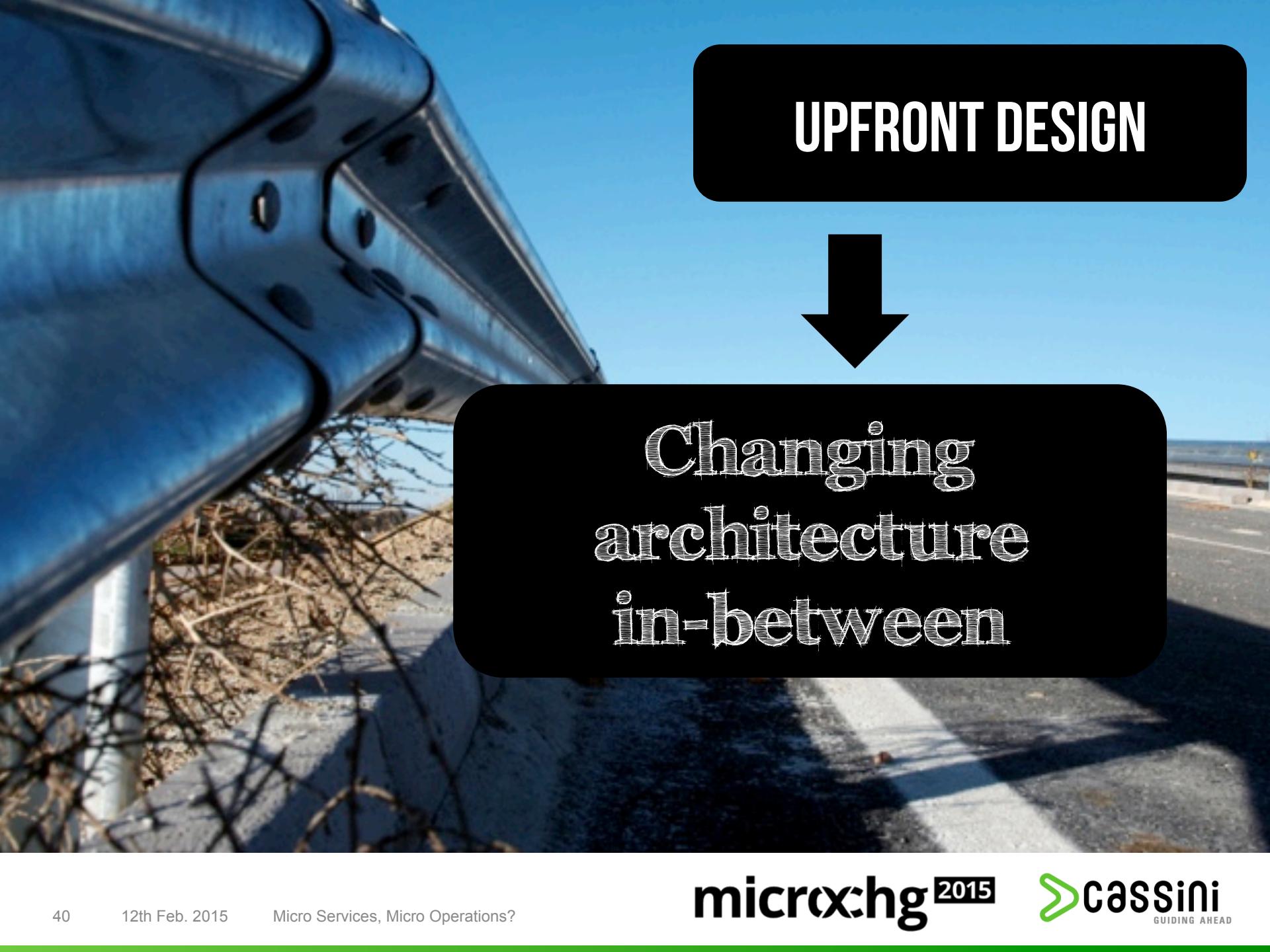


MANIFESTS AS
DEPENDENCIES

USE HELPERS TO DEAL
WITH SHIFTED COMPLEXITY



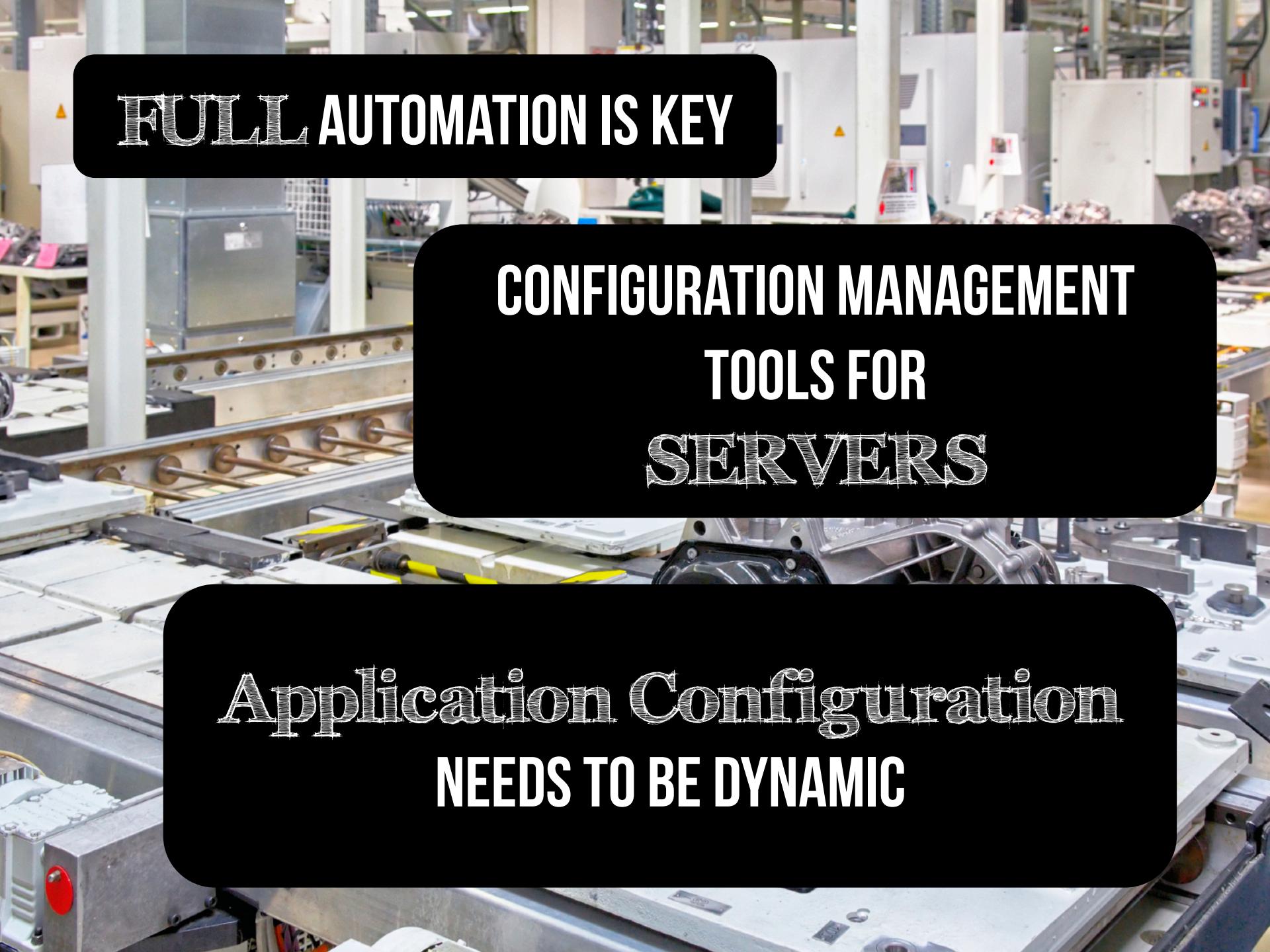
DevOps MINDSET



UPFRONT DESIGN



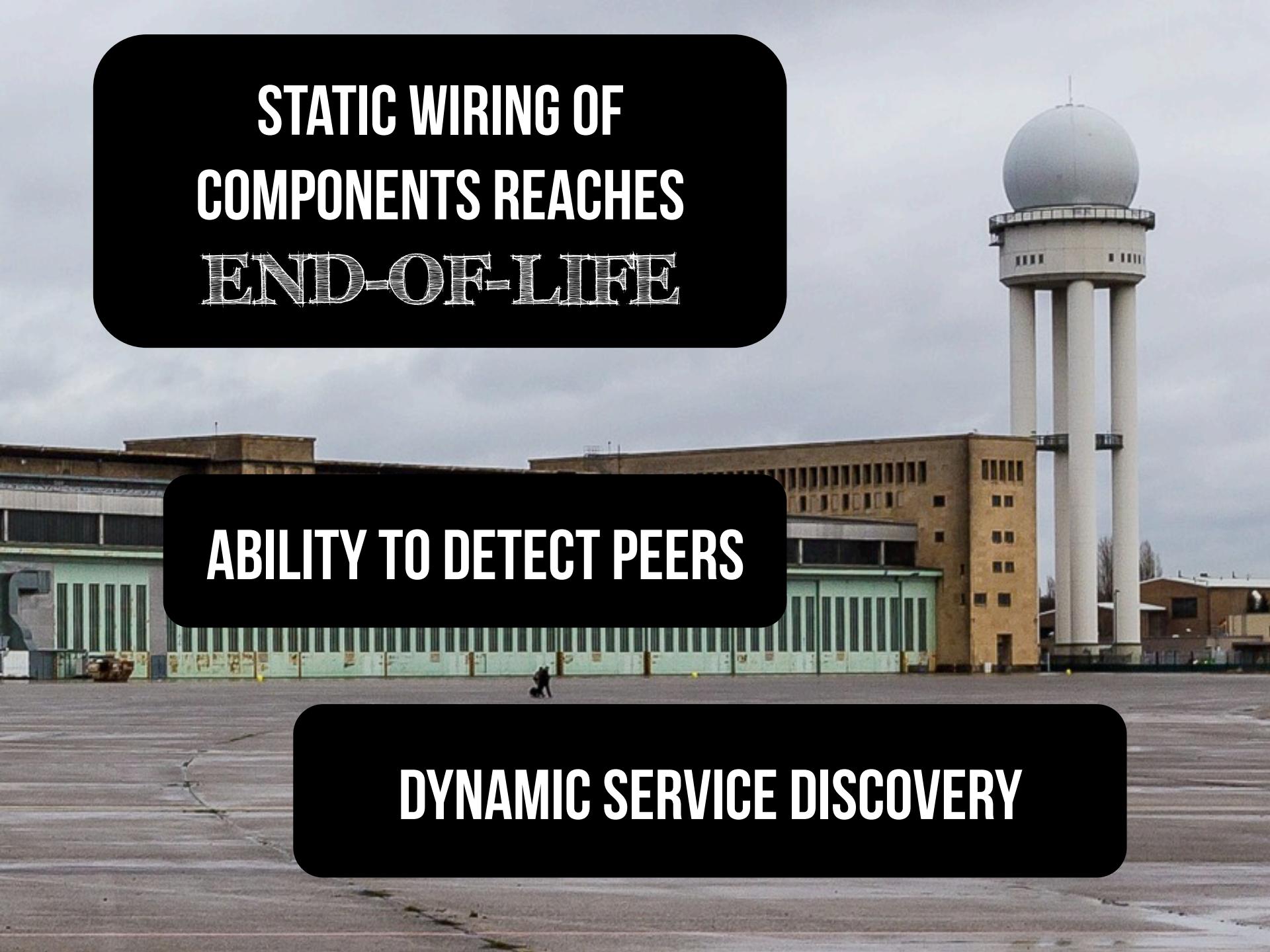
Changing architecture in-between



FULL AUTOMATION IS KEY

**CONFIGURATION MANAGEMENT
TOOLS FOR
SERVERS**

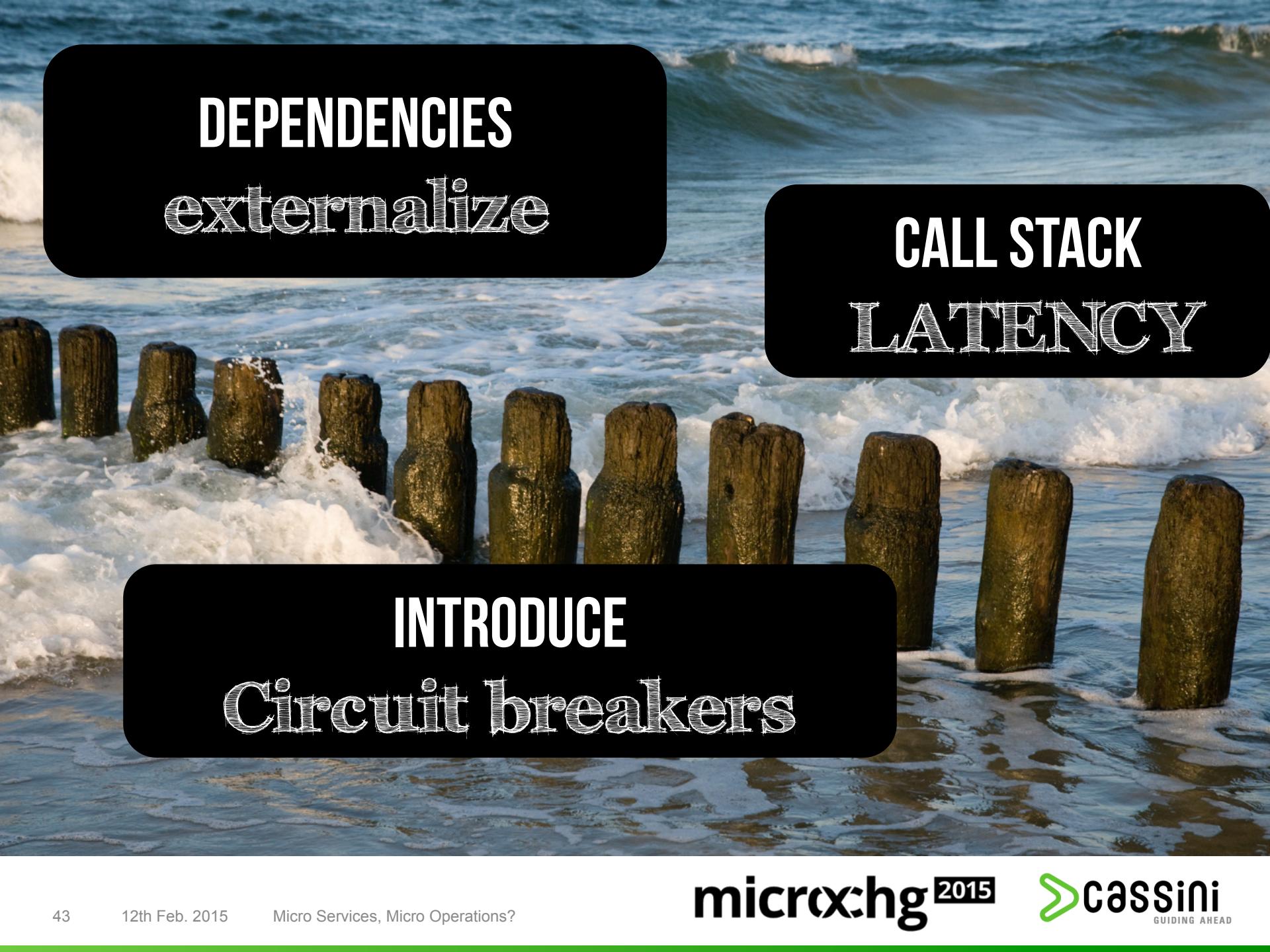
**Application Configuration
NEEDS TO BE DYNAMIC**

The background image shows a large, multi-story industrial building with a prominent green and white striped facade. To its right stands a tall, light-colored control tower with a large spherical radar or communication dome at the top. The sky is overcast and grey.

**STATIC WIRING OF
COMPONENTS REACHES
END-OF-LIFE**

ABILITY TO DETECT PEERS

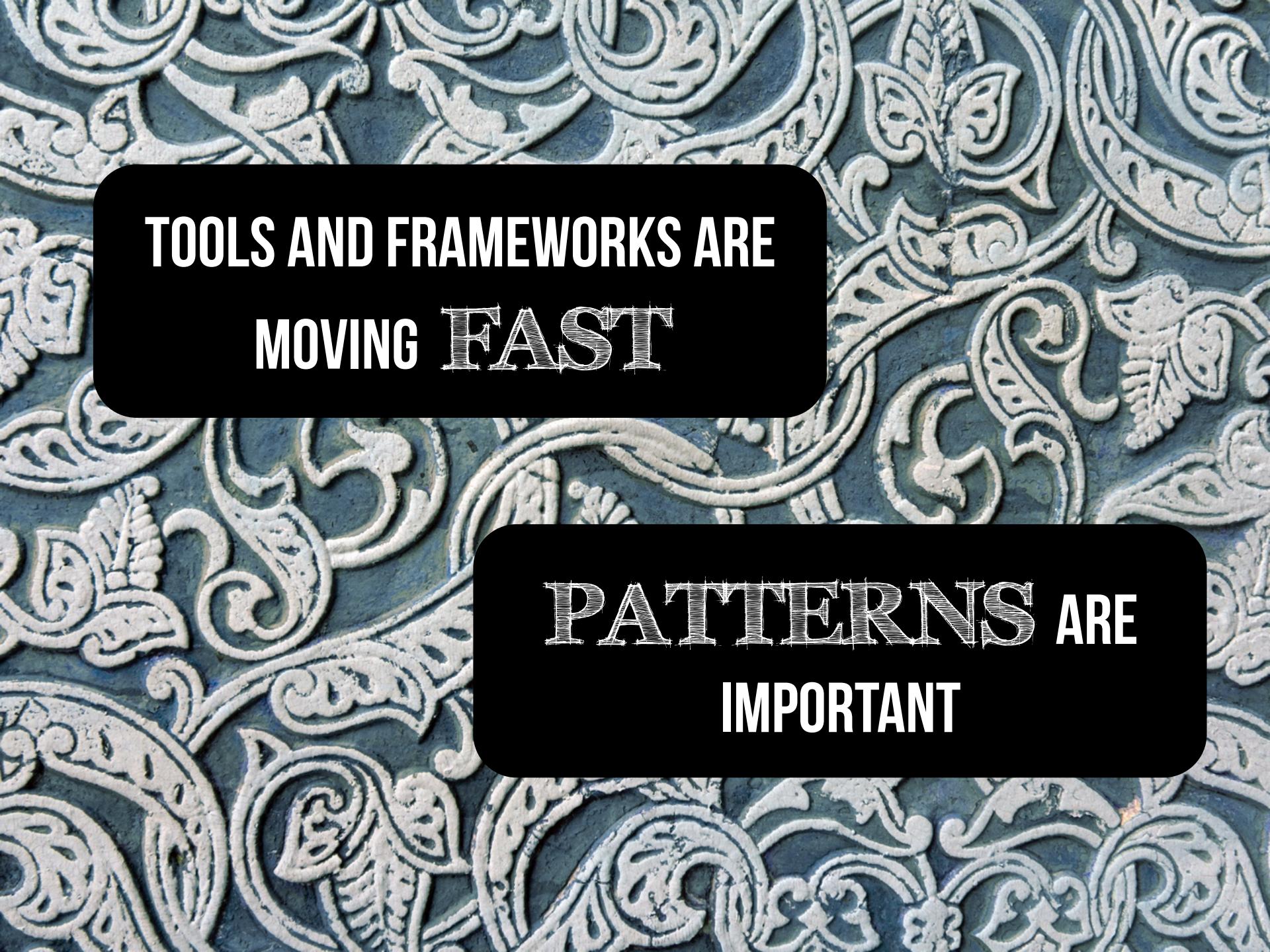
DYNAMIC SERVICE DISCOVERY



DEPENDENCIES
externalize

CALL STACK
LATENCY

INTRODUCE
Circuit breakers



TOOLS AND FRAMEWORKS ARE
MOVING FAST

PATTERNS ARE
IMPORTANT



**SHIFT TO MICRO SERVICES INTRODUCES
CHANGES AT multiple levels**

**Operational behaviour
CHANGES**

MICROSERVICES, MICRO OPERATIONS?

MAKE SERVICES SMARTER

EMPLOY SUITABLE PATTERNS

META OPS
FOR THE SERVICE LANDSCAPE

QdA



Recommended reading

- » <http://www.simplicityitself.com/microservices-reactive/the-role-of-data-in-microservices/>
- » <http://highscalability.com/blog/2014/4/8/microservices-not-a-free-lunch.html>
- » <https://rclayton.silvrback.com/failing-at-microservices>
- » <http://www.simplicityitself.com/learning/getting-started-microservices/service-discovery-overview/>
- » <http://thenewstack.io/new-stack-mitchell-hashimoto-containers-no-containers-one-question-2015/>
- » <http://blogs.gartner.com/gary-olliffe/2015/01/30/microservices-guts-on-the-outside/>
- » <http://jaxenter.de/artikel/entwicklung-betrieb-skalierbarer-architektur-178014> (DE)

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