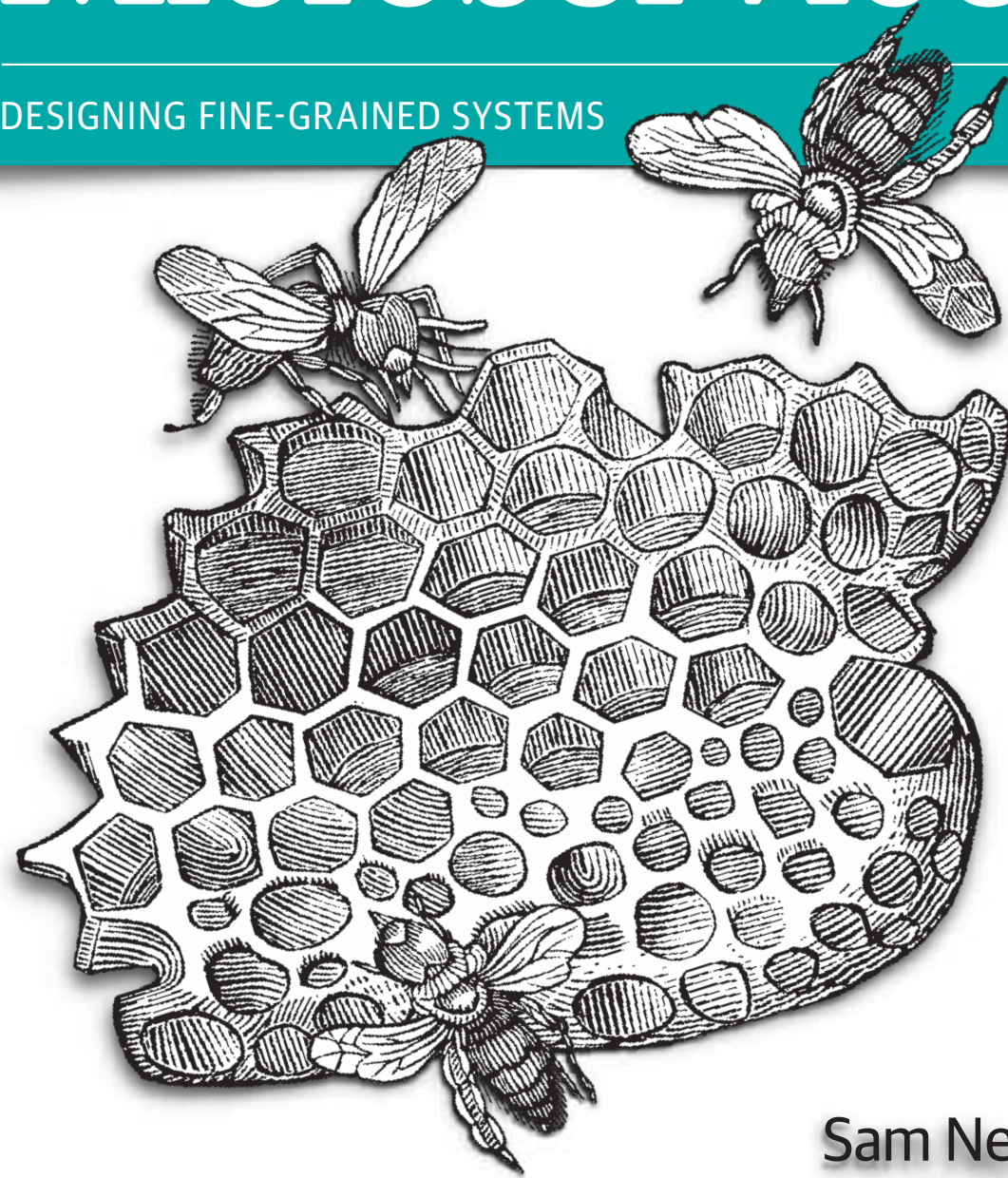


O'REILLY®

Building Microservices

DESIGNING FINE-GRAINED SYSTEMS



Sam Newman

**Sam
Newman**
& Associates

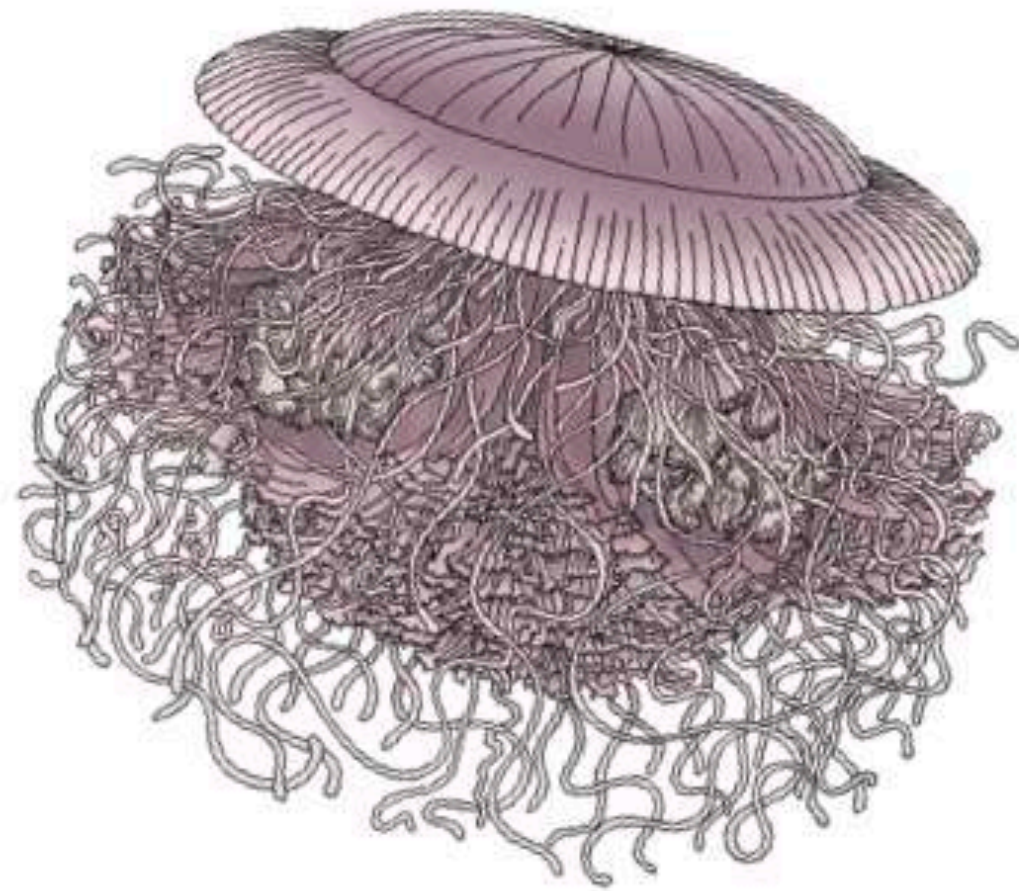


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Monolith to Microservices

Evolutionary Patterns to Transform
Your Monolith



Sam Newman

**Sam
Newman**
& Associates



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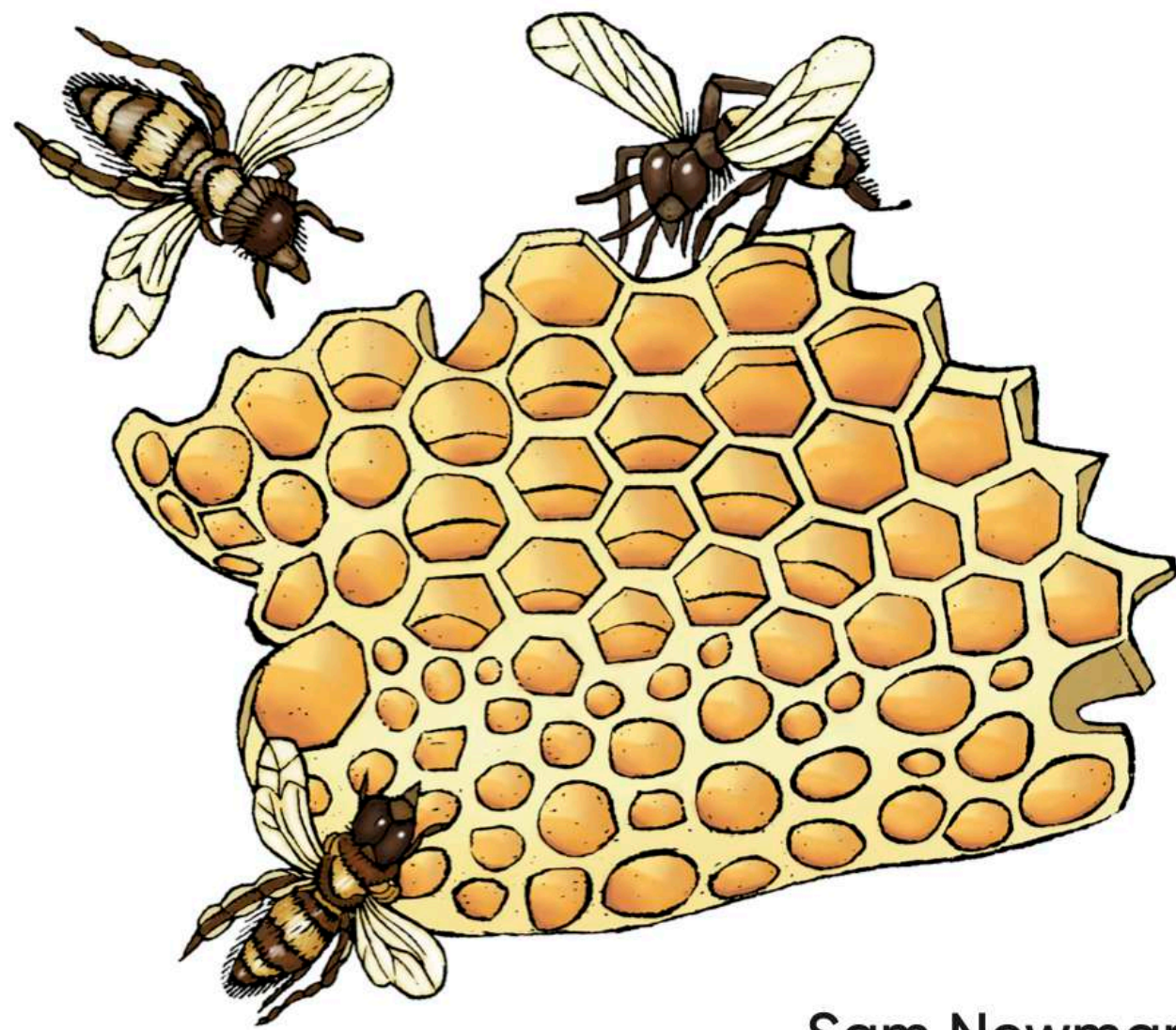
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Building Microservices

Designing Fine-Grained Systems

Second
Edition



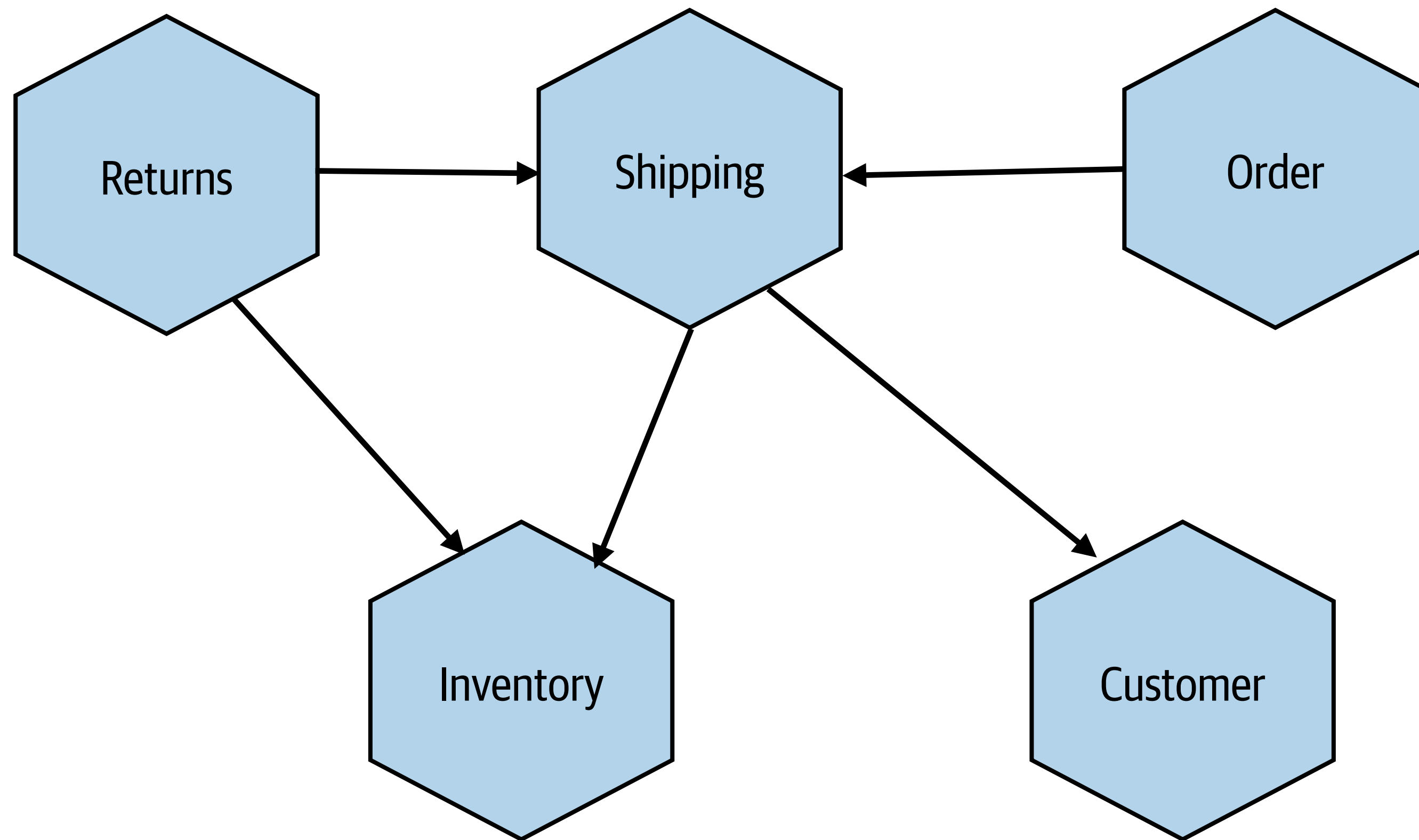
Sam Newman

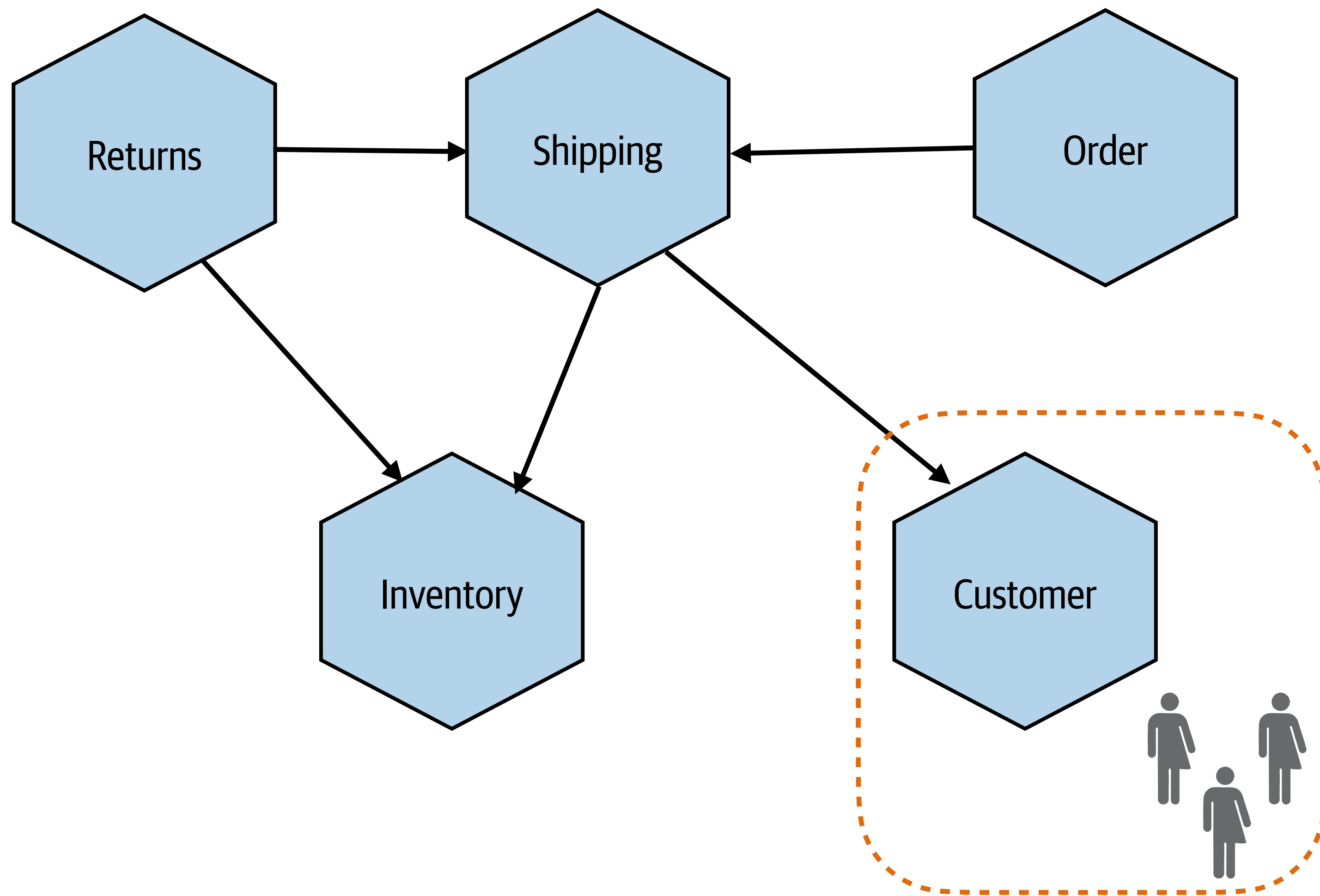
Sam
Newman
& Associates

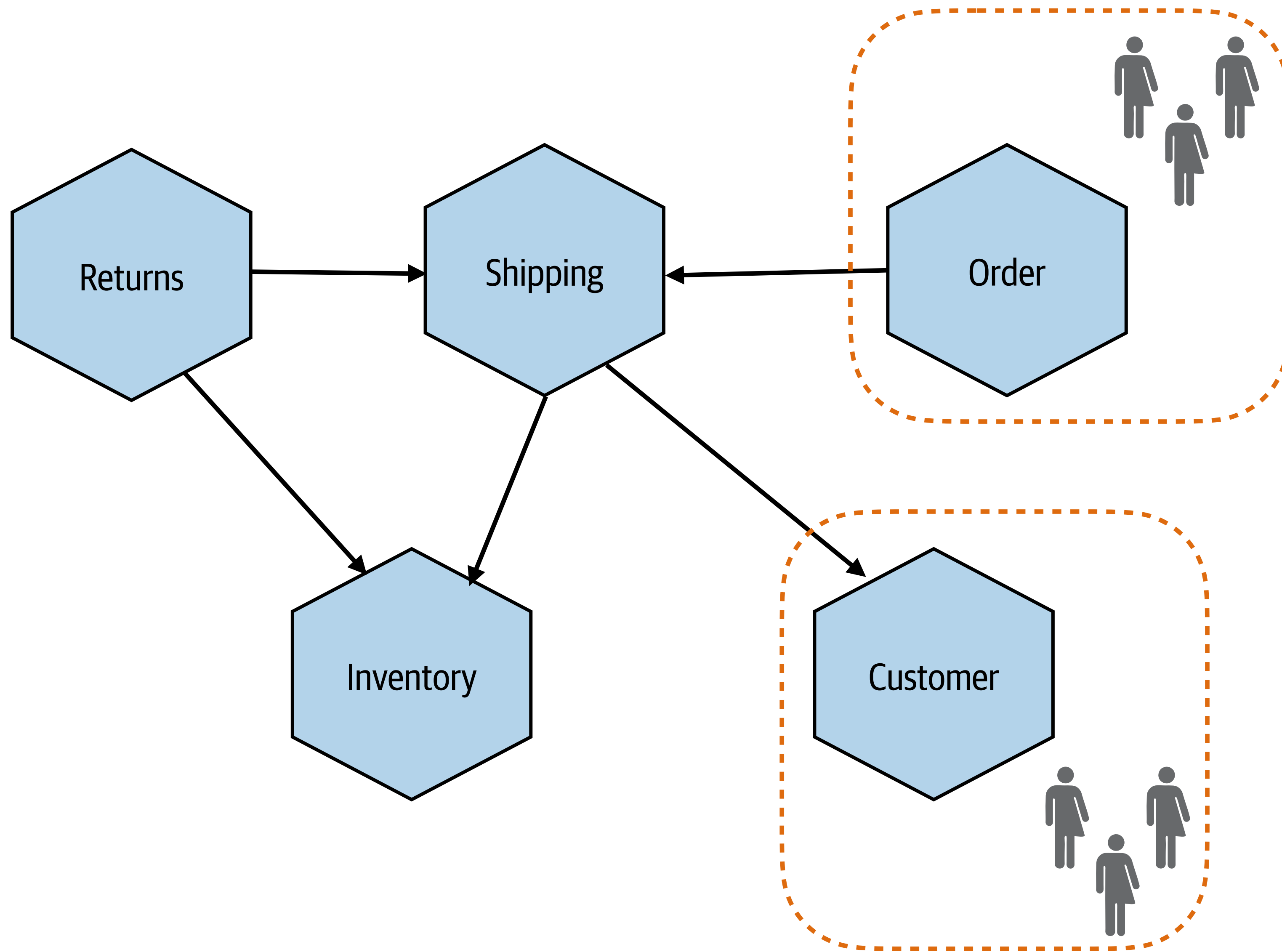


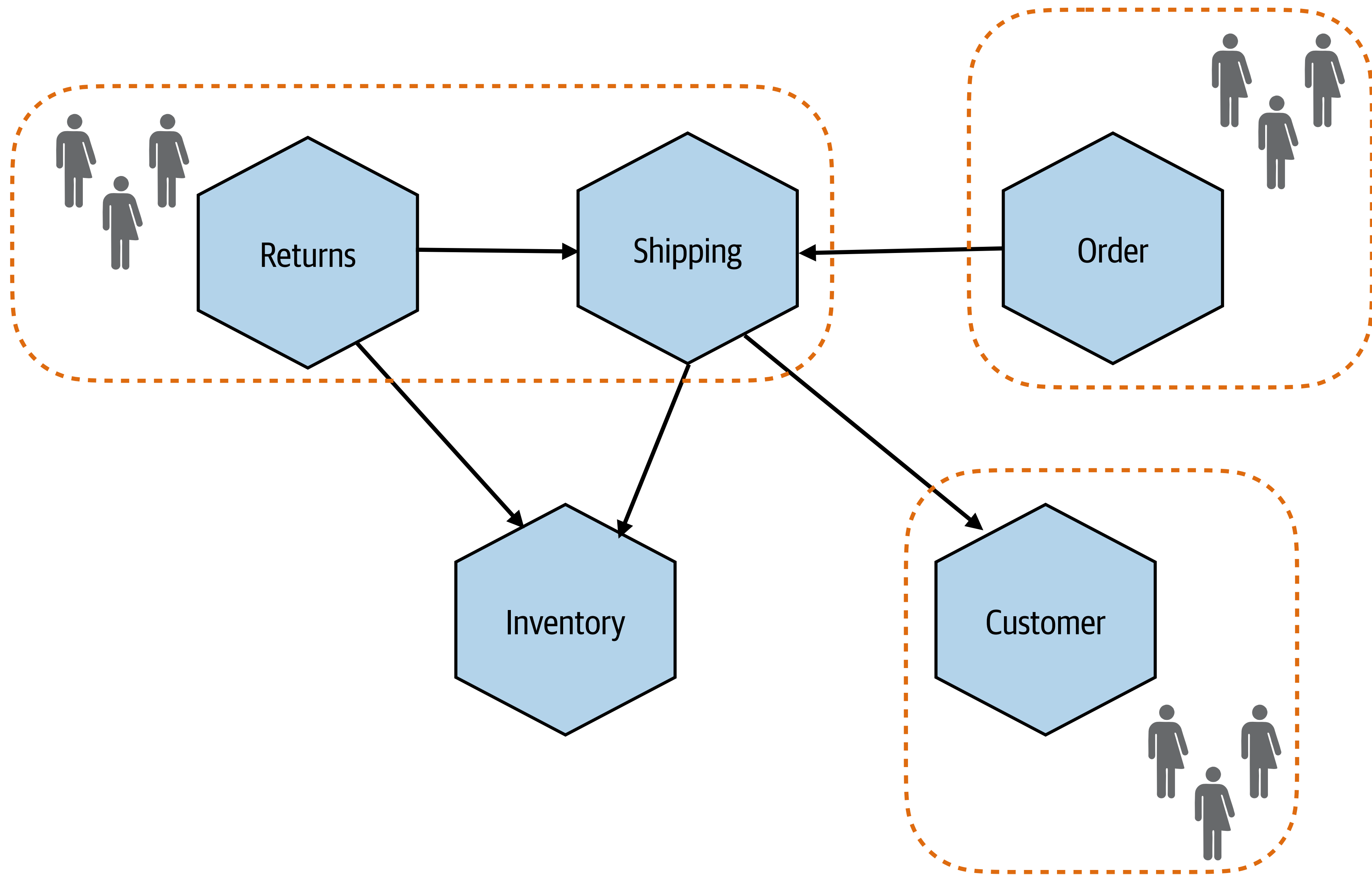
Pitfalls and Tips

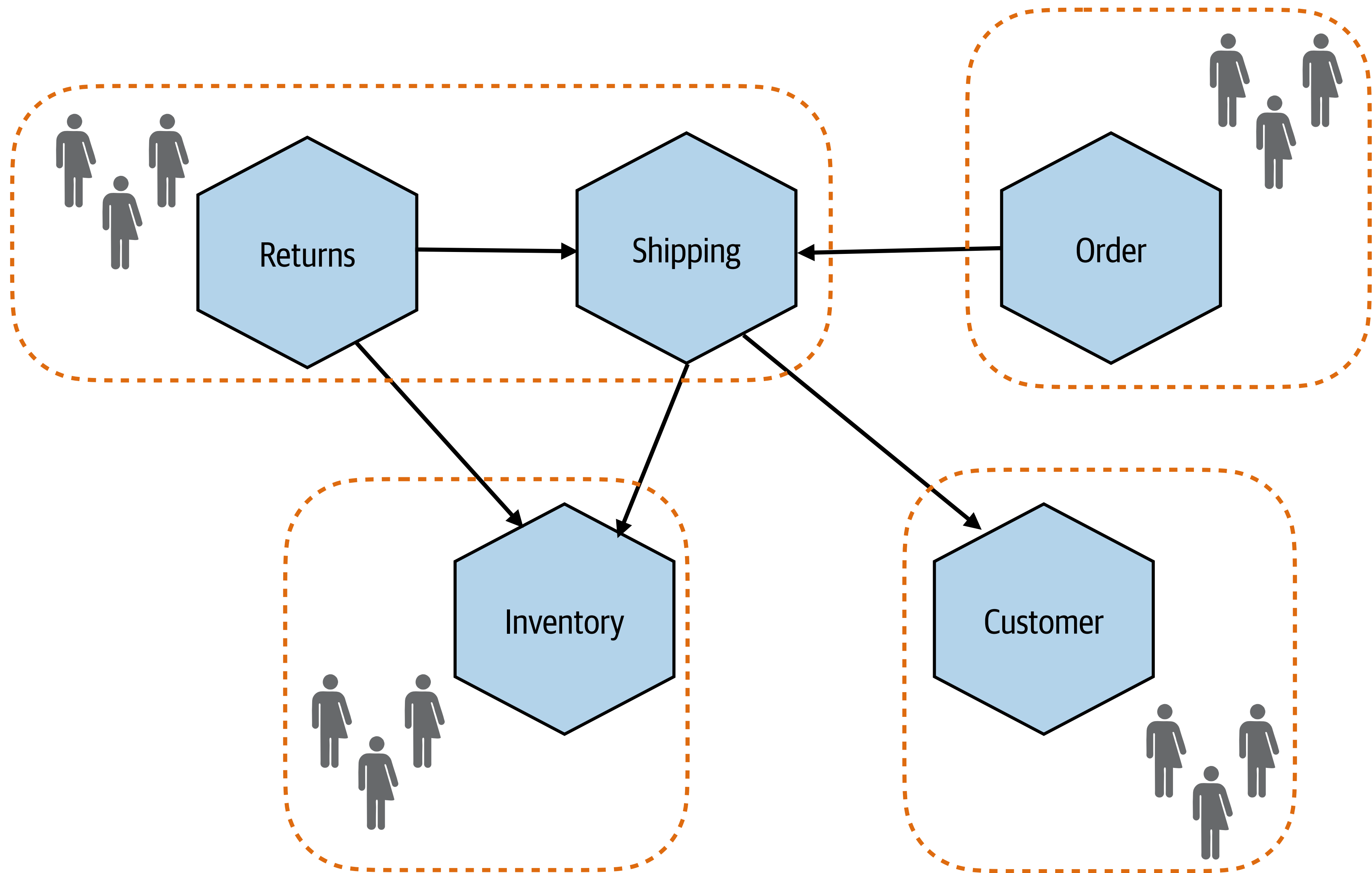
Cloud Native Microservices

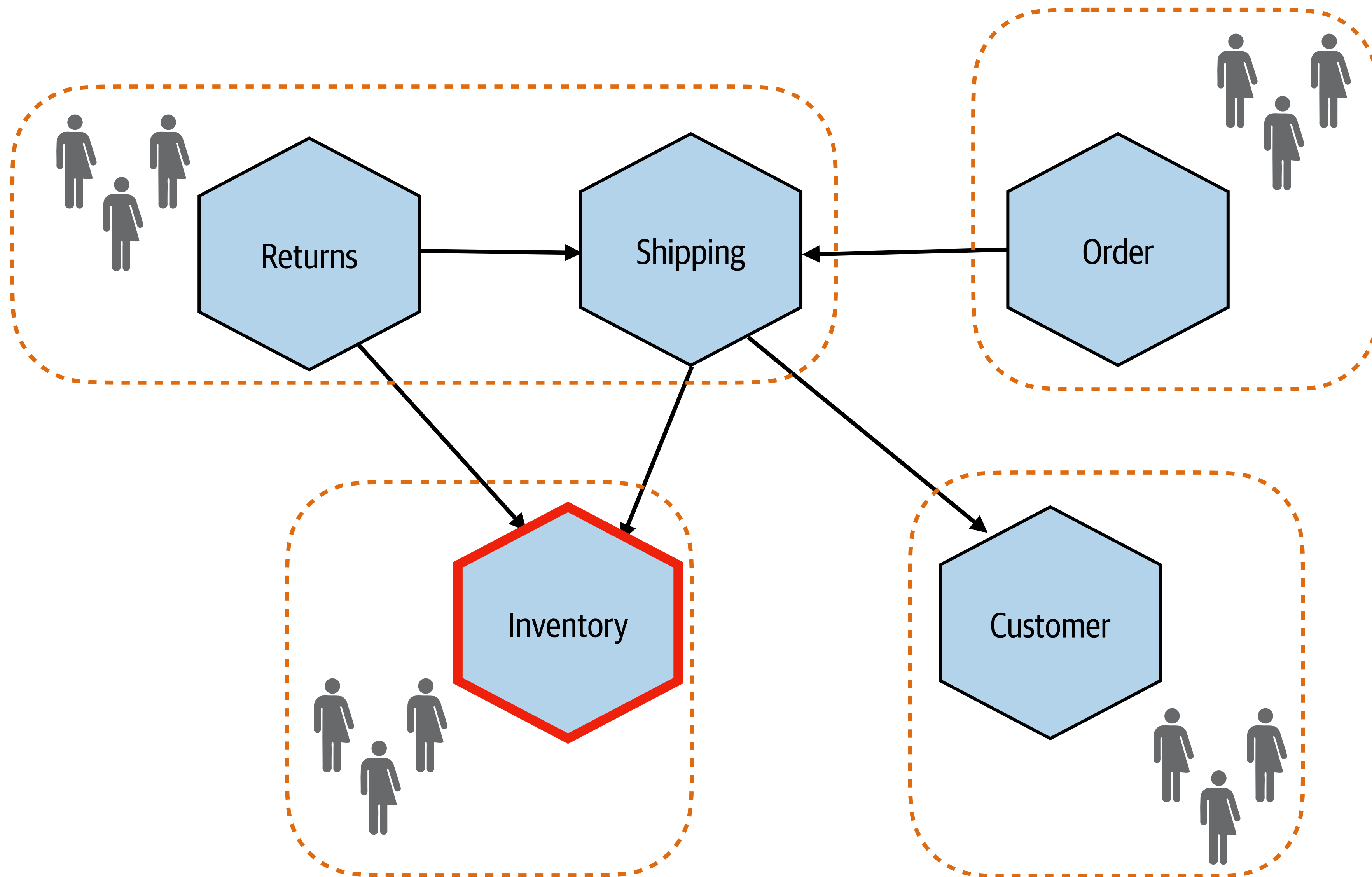


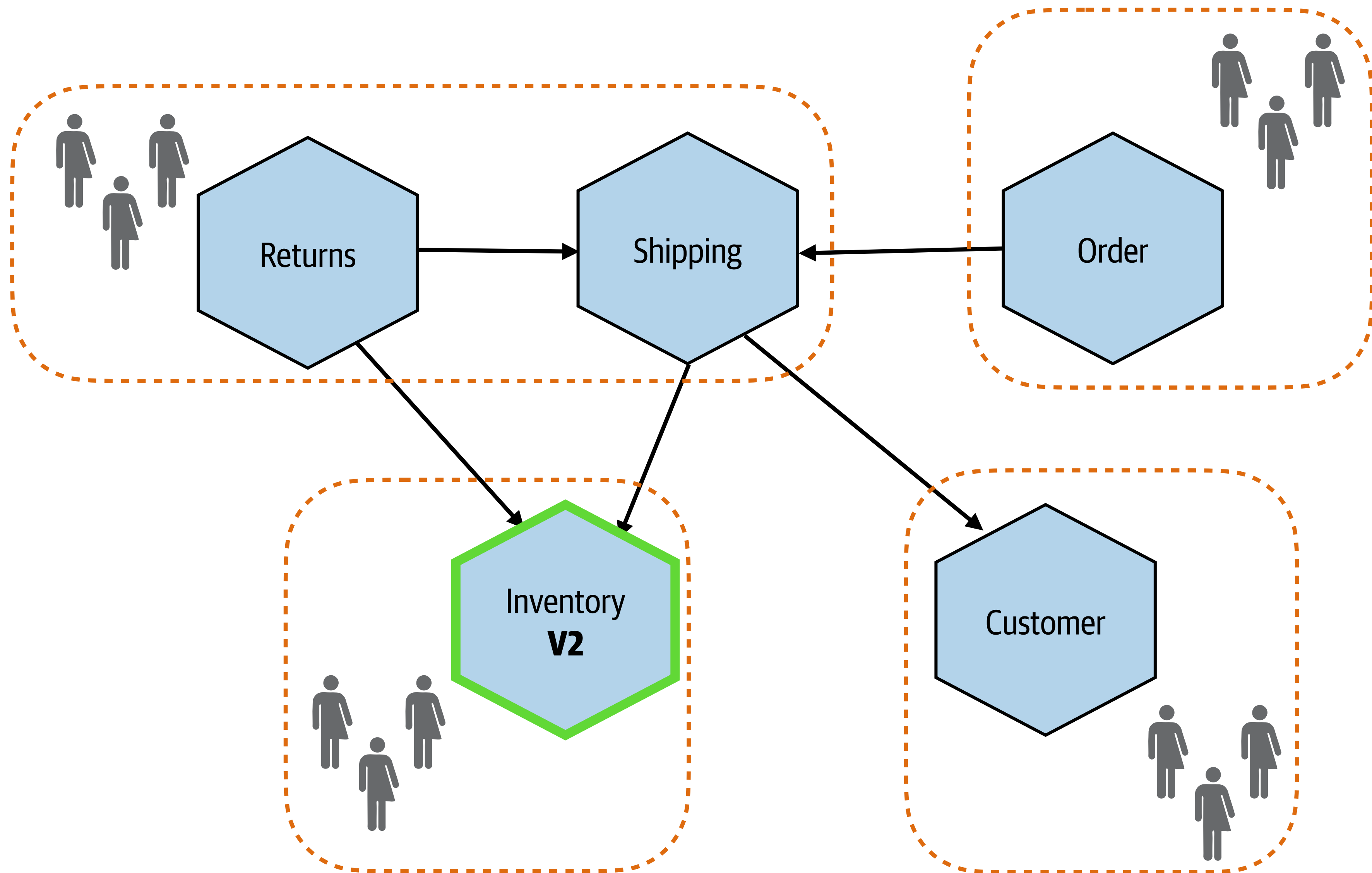


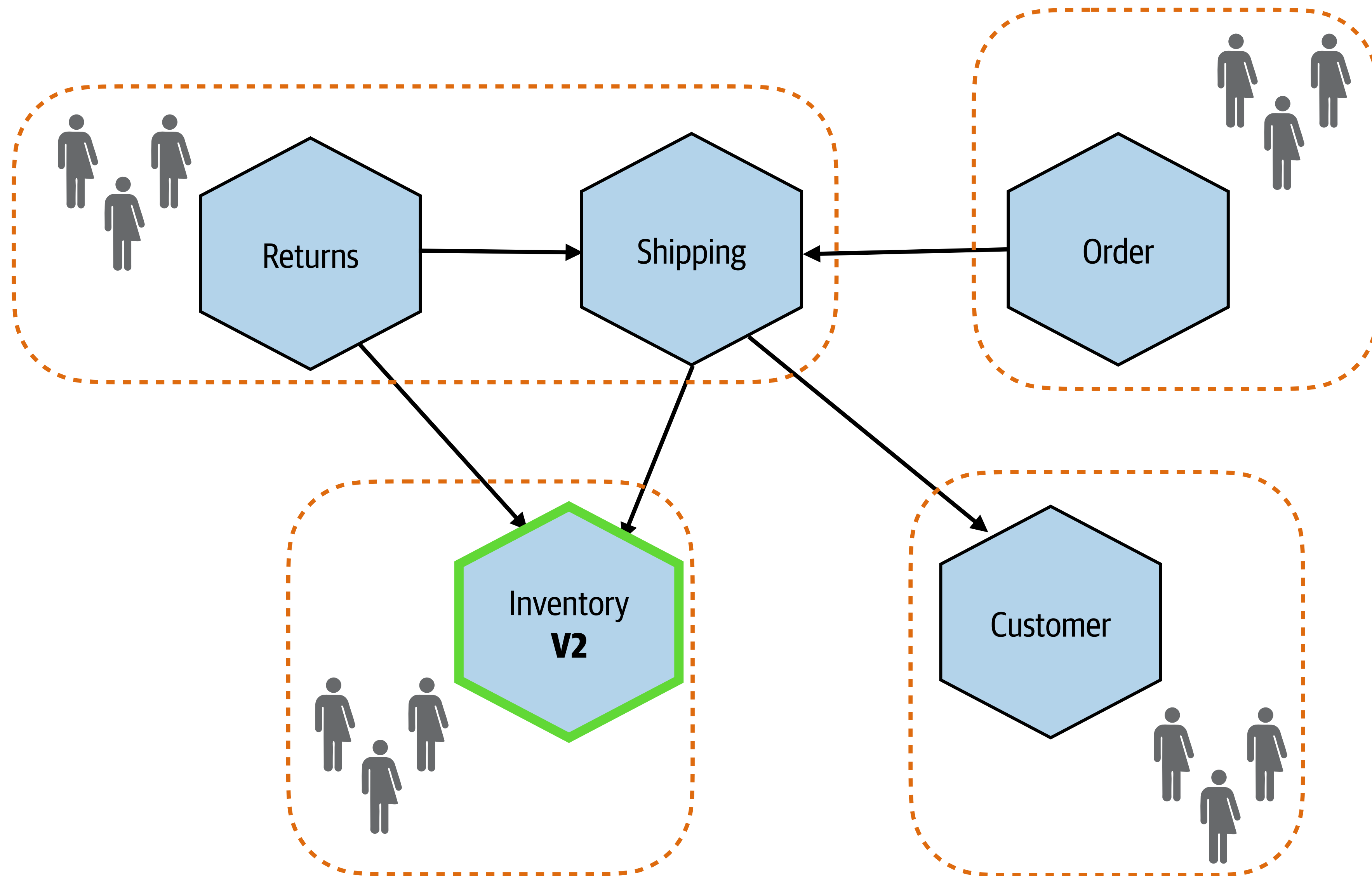




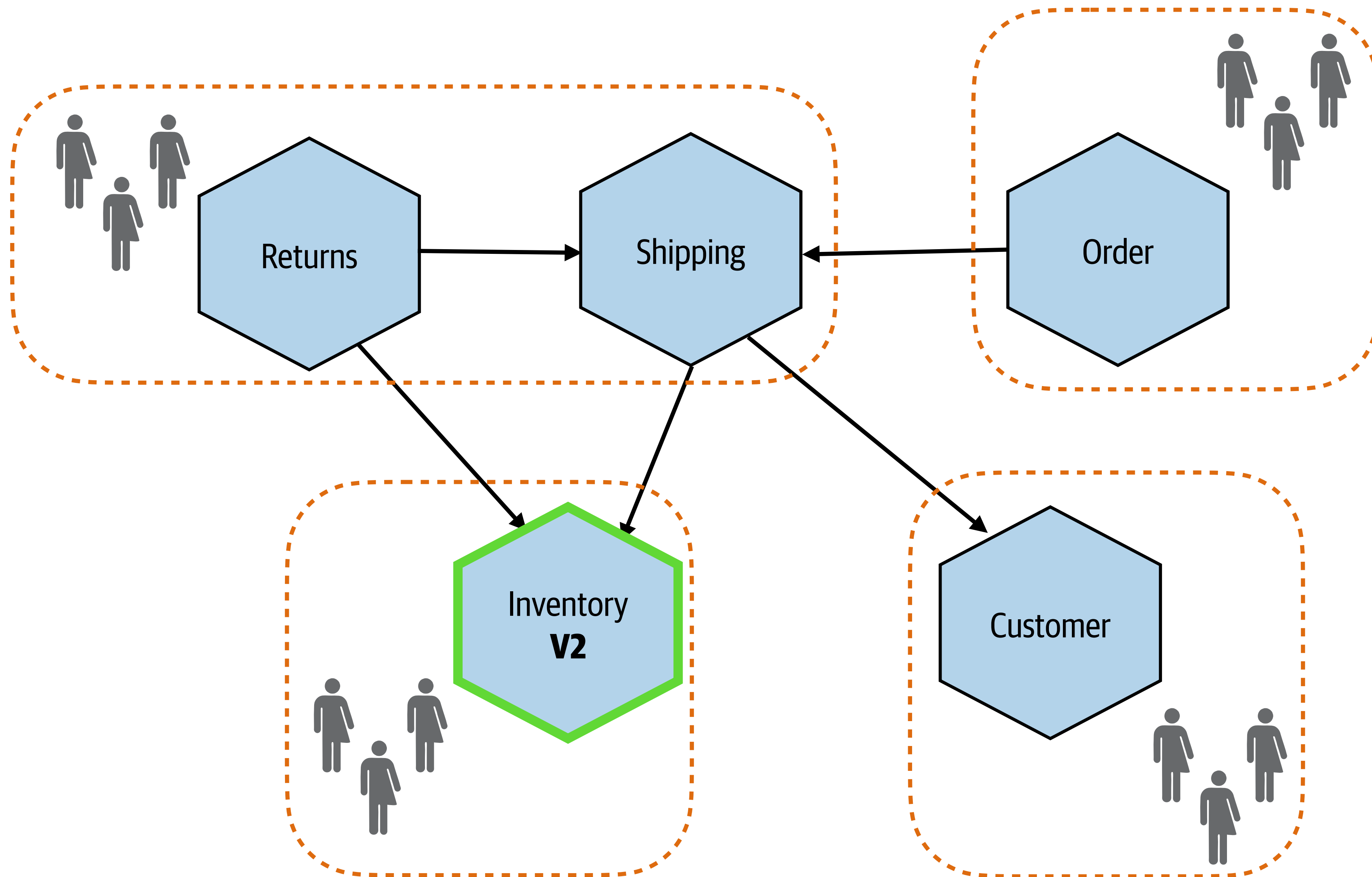






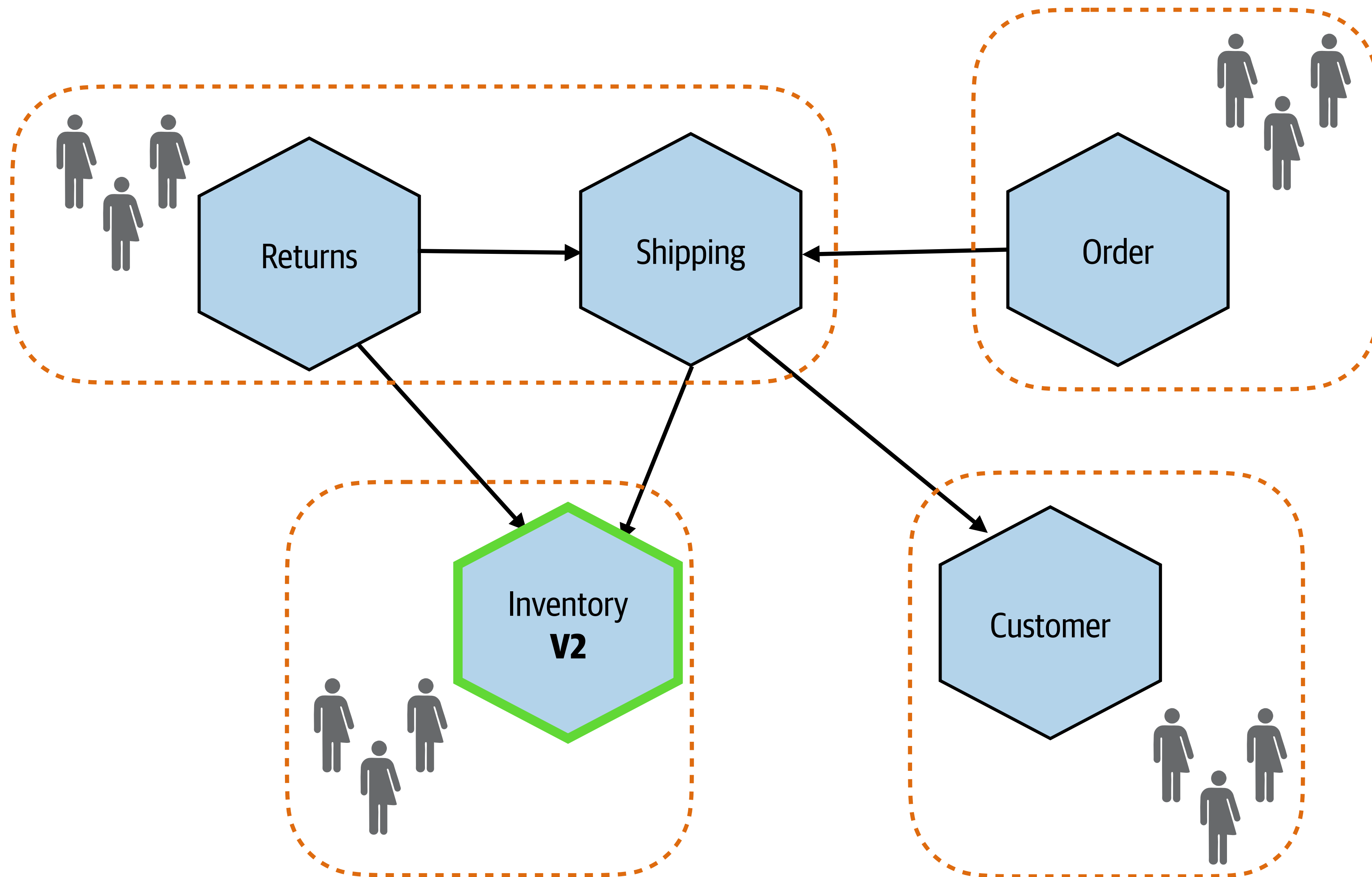


Reduce release co-ordination



Reduce release co-ordination

Improve release frequency



Reduce release co-ordination

Improve release frequency

Enables full lifecycle ownership

Cloud Native

It should have been wonderful









<https://wrongalot.substack.com/p/crypto-fashion-boys-to-men?s=w>



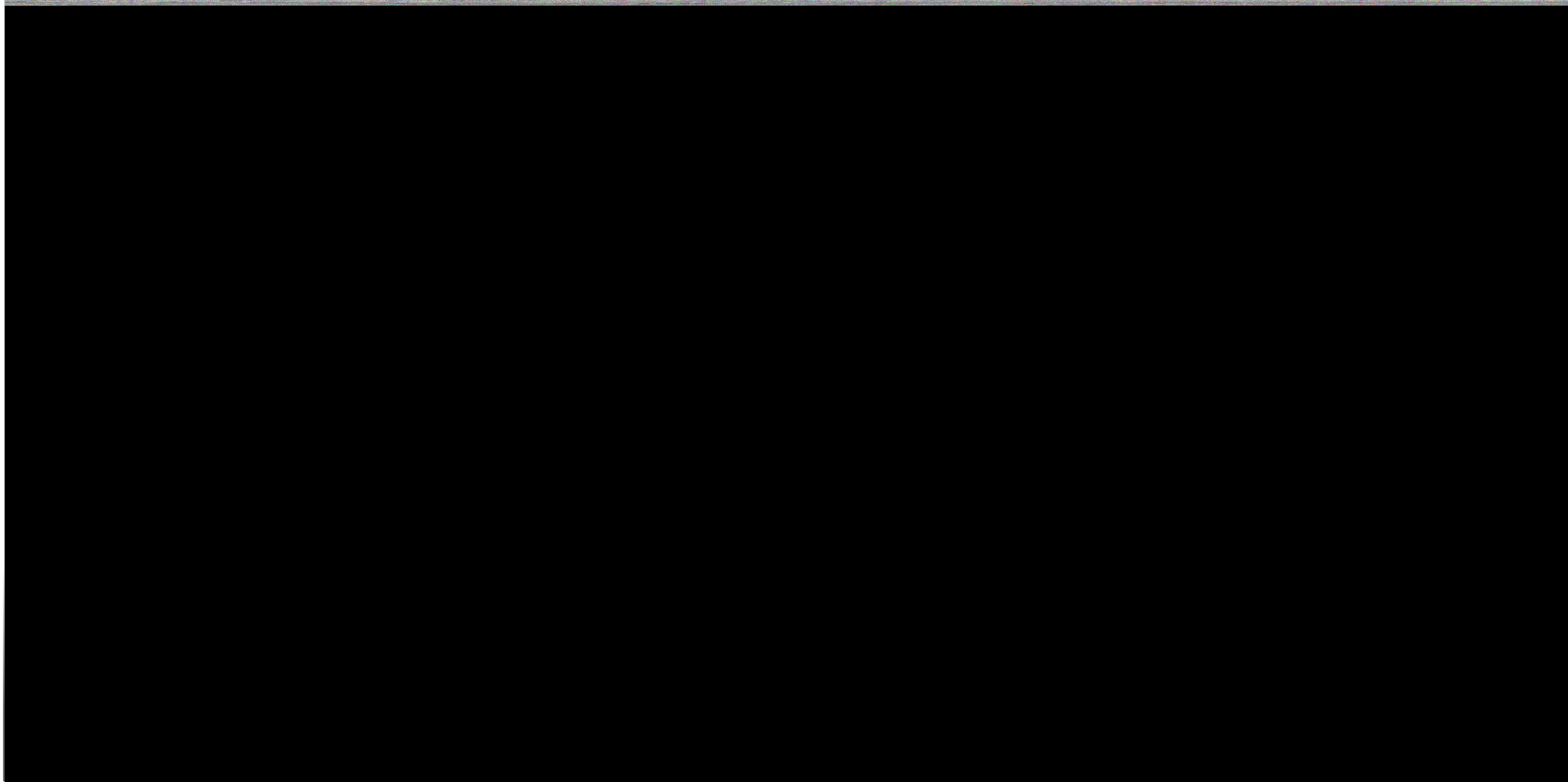


<https://www.politico.eu/article/brexit-is-going-badly-say-brits-in-new-poll/>

Why?

Database Streaming & Messaging Application Definition & Image Build Continuous Integration & Delivery Platform Observability and Analysis

ipment KV V Vitess CartoDB Databricks Ignite ArangoDB BIGCHAM cloudevents NATS Amazon ElastiCache Heron HELM OPERATOR FRAMEWORK Blackstone binami argo agola Appveyor Jenkins Azure Pipelines Bamboo Certified Kubernetes - Distribution Monitoring



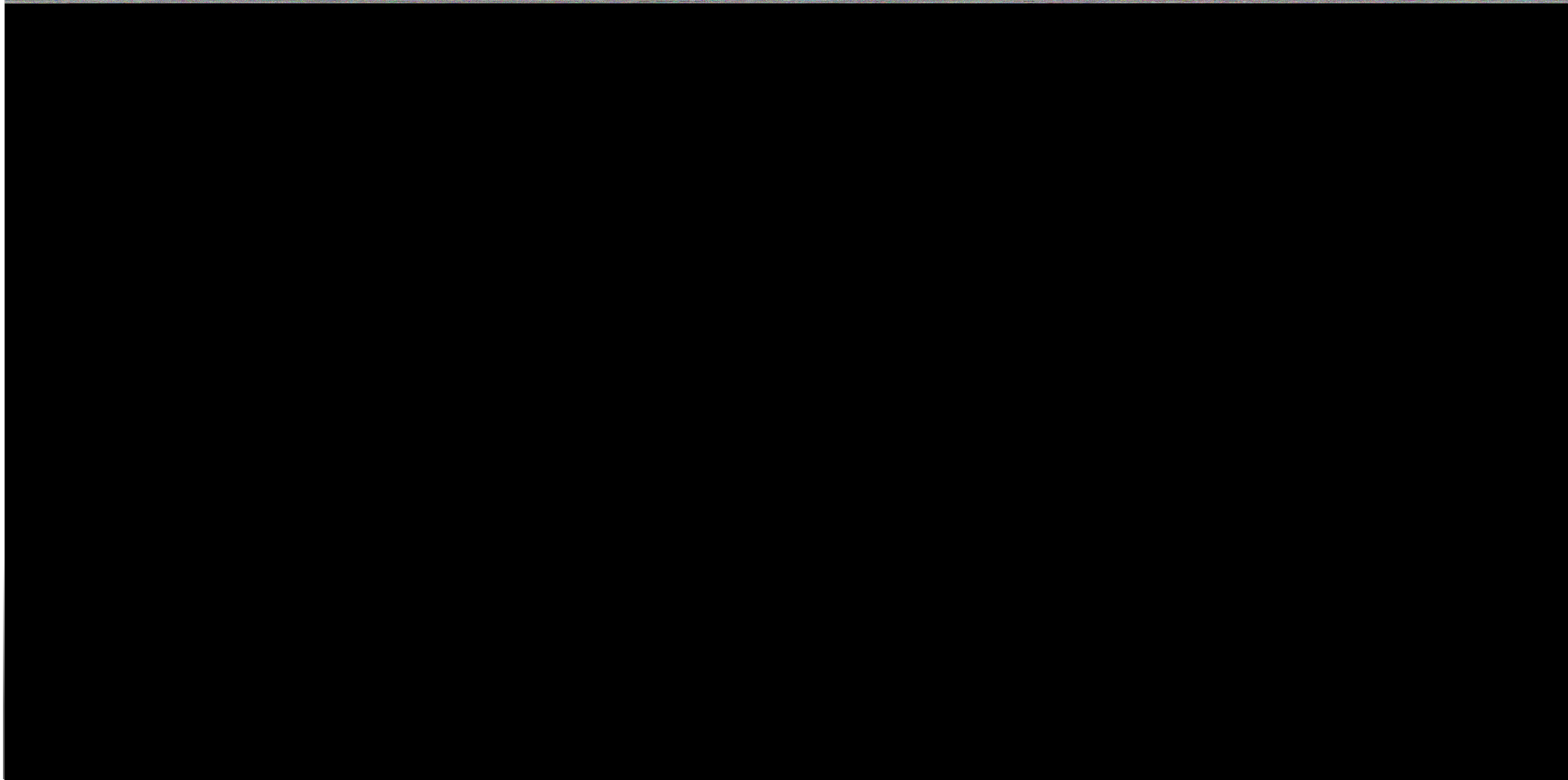
<https://landscape.cncf.io/images/landscape.png>

Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io

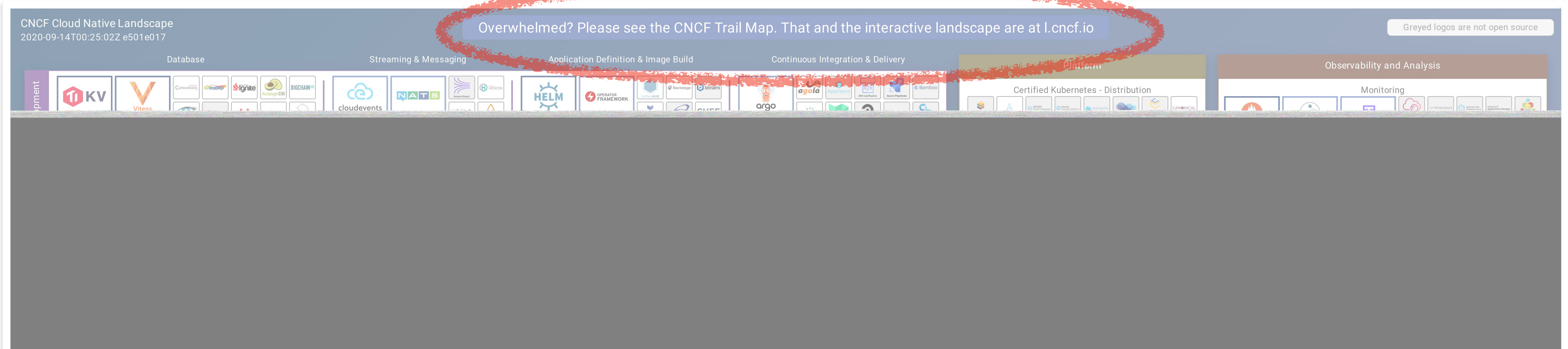
Greyed logos are not open source

Database Streaming & Messaging Application Definition & Image Build Continuous Integration & Delivery **Platform** Observability and Analysis

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aging

Application Definition & Image Build

Continuous Integration & Delivery

Platform

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ssaging

Application Definition & Image Build

Continuous Integration & Delivery

Platform

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ssaging

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Continuous Integration & Delivery

Platform

Overwhelmed? Please contact your closest expensive consultants.
Or your therapist.

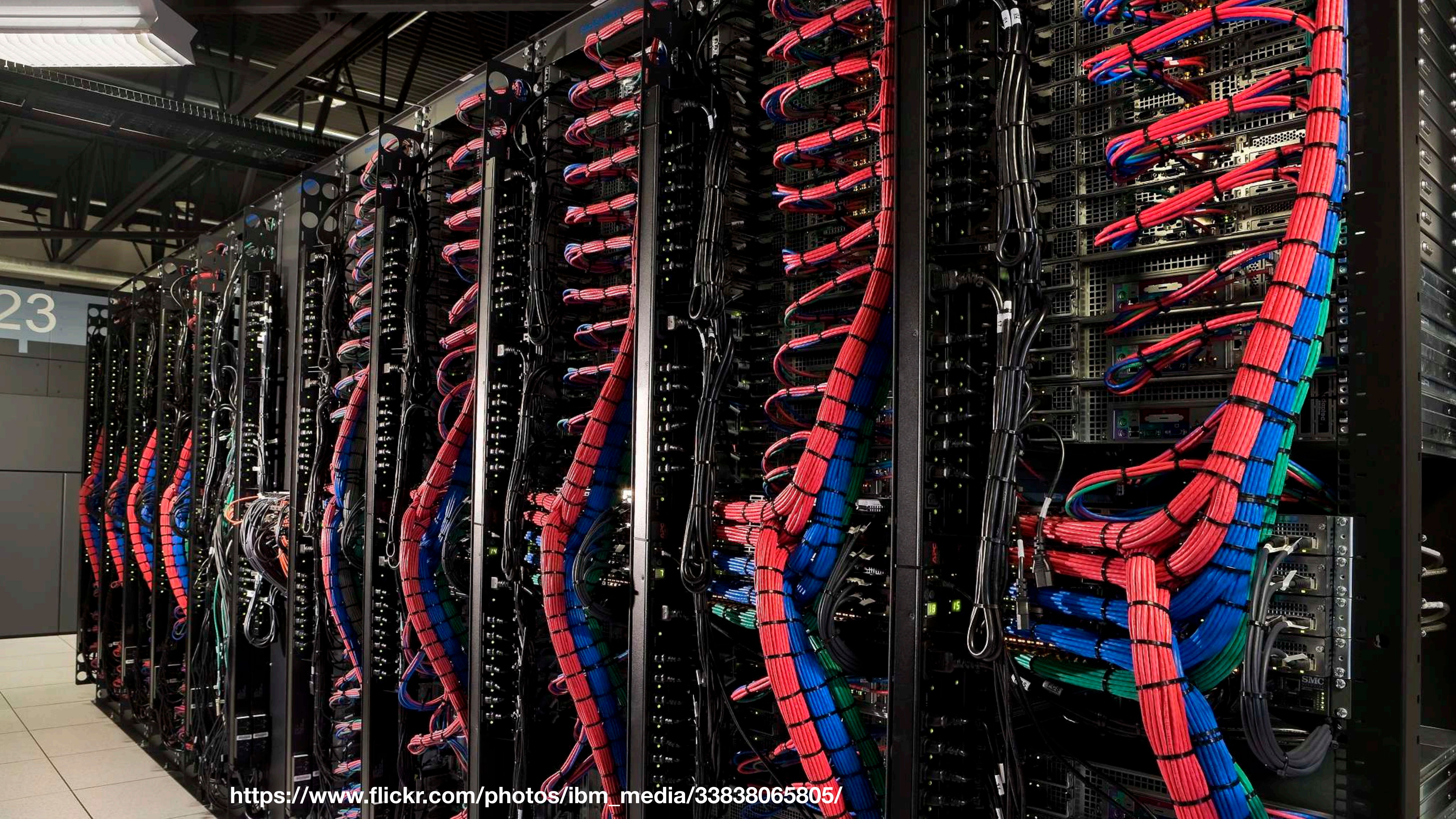
“You are viewing 990 cards with a total of 2,868,708 stars, market cap of **\$16.6T and funding of **\$26.5B.**”**

<https://landscape.cncf.io/>





2006

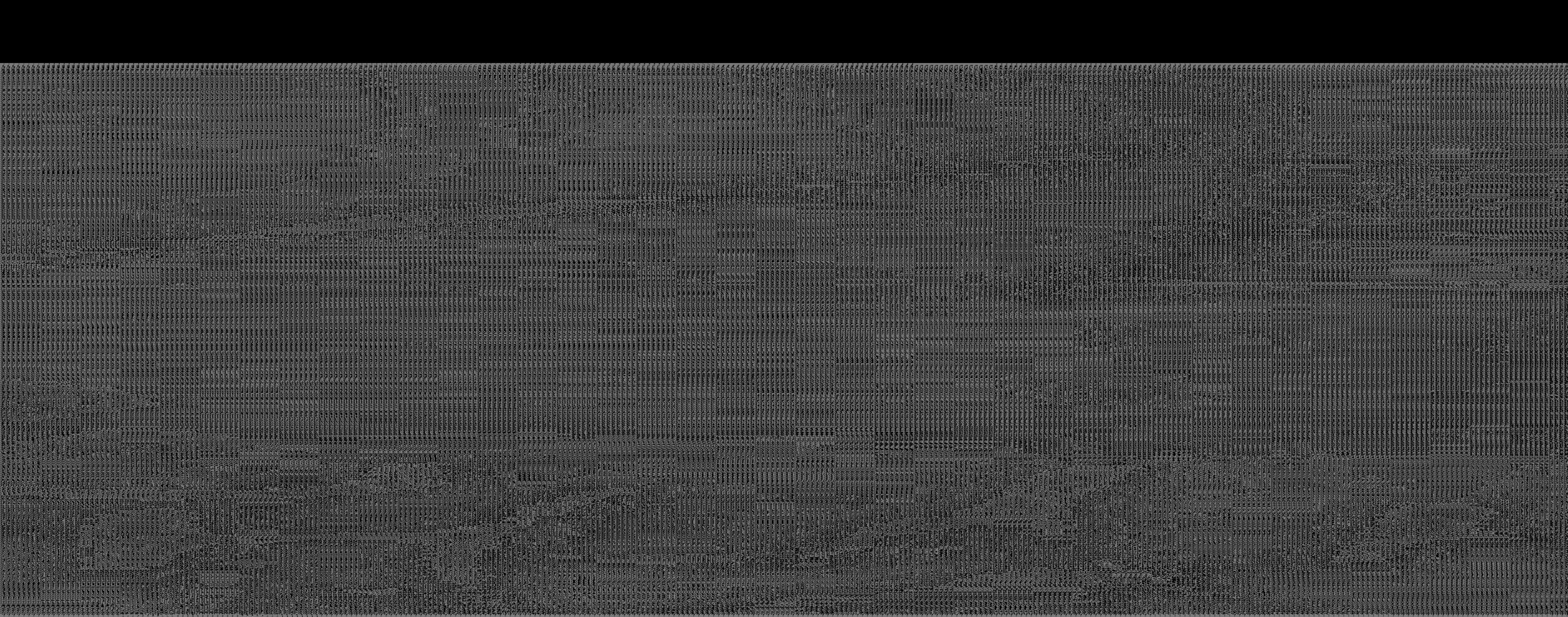


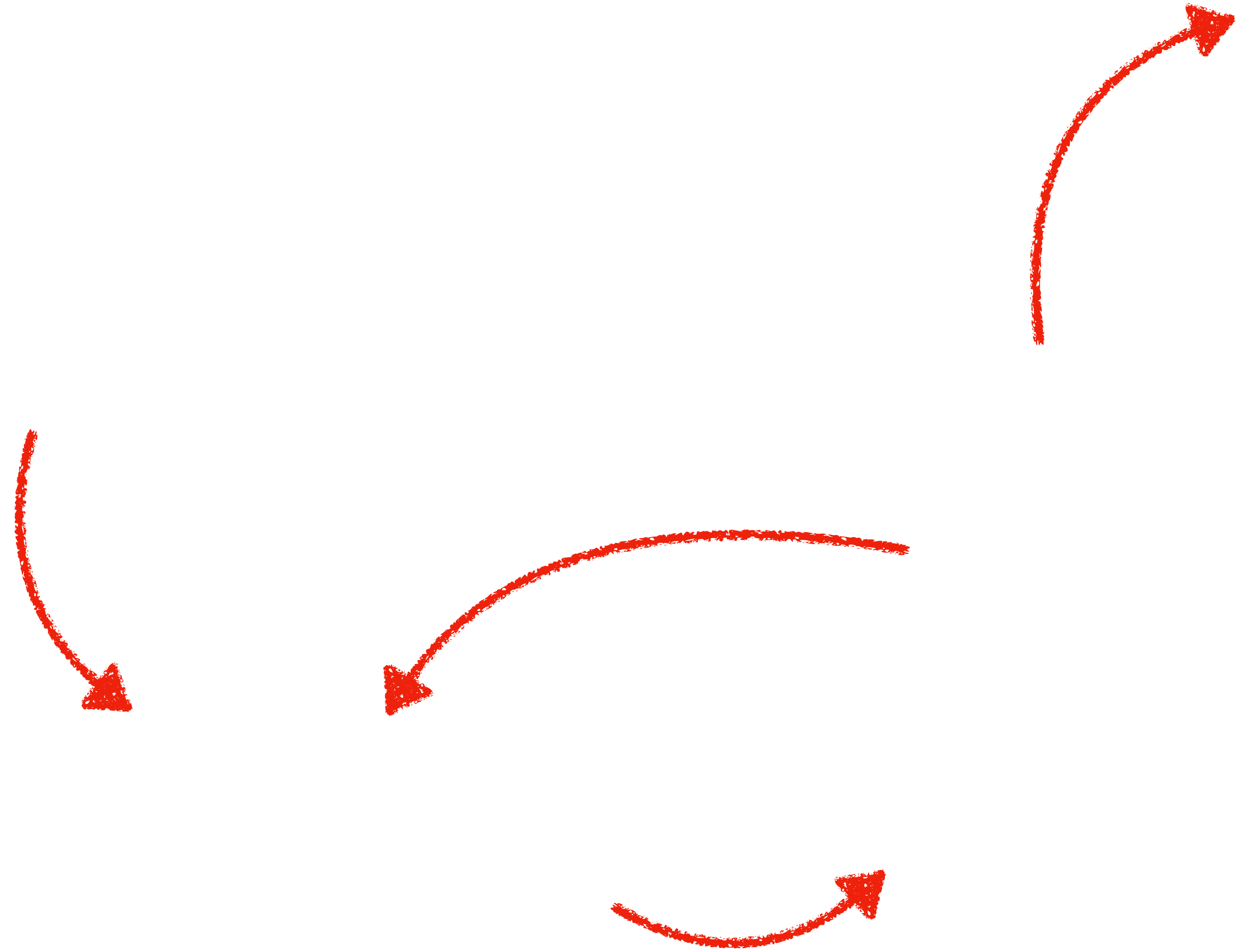


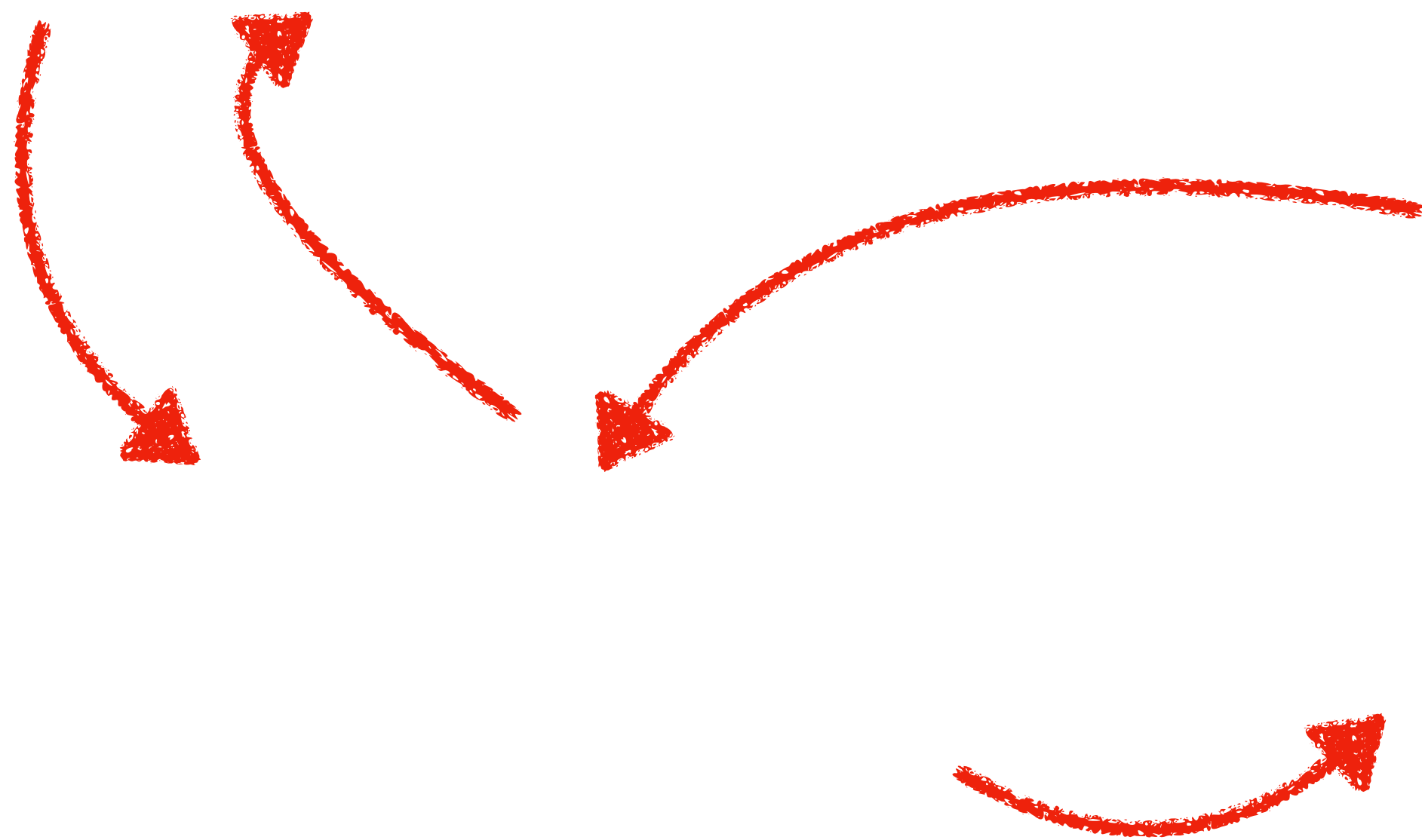
Undifferentiated Heavy Lifting

API











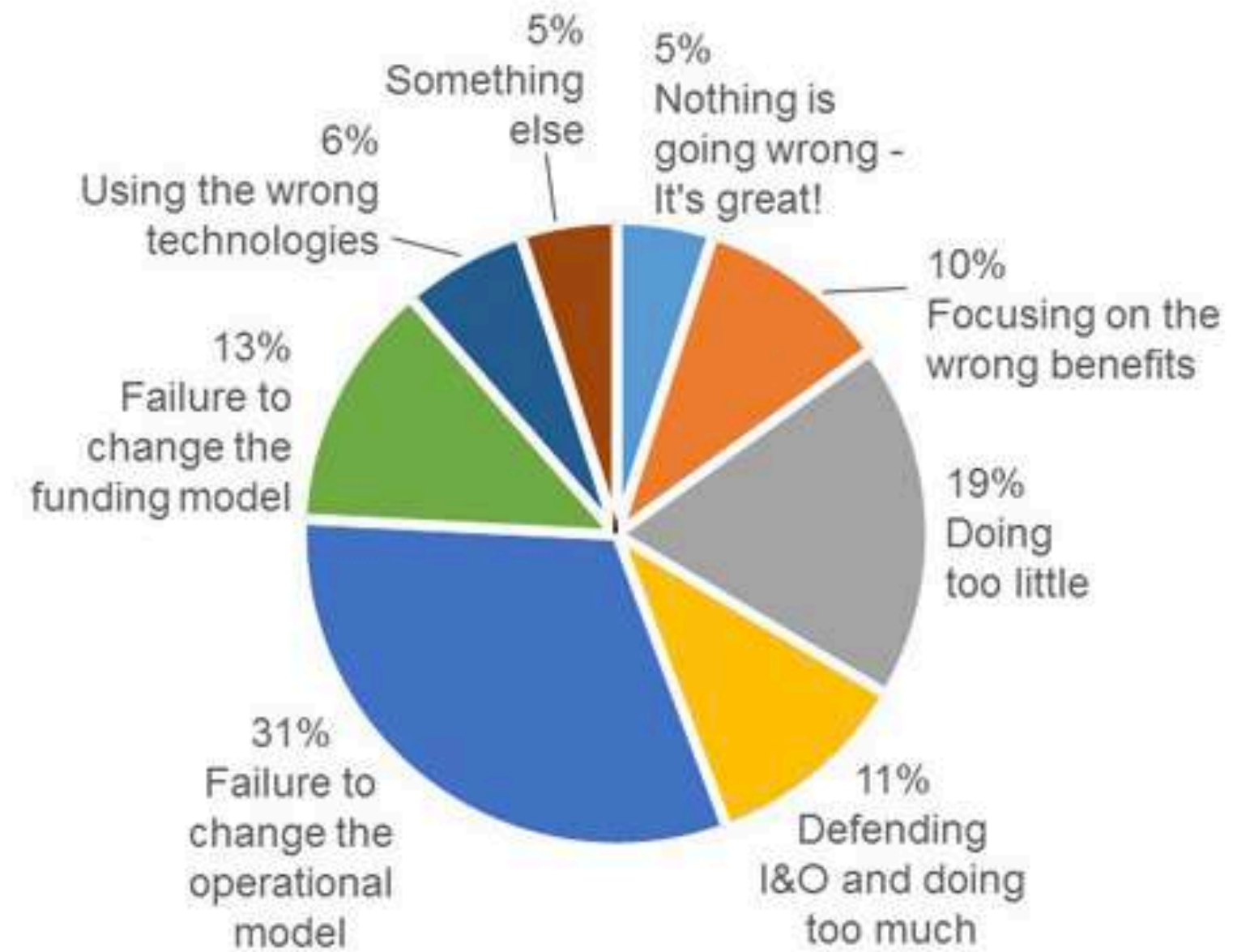
<https://www.team-bhp.com/forum/international-automotive-scene/87351-worlds-most-expensive-clamping-koenigsegg-ccxr-lamborghini-murcielago-superveloce.html>

WHY DO PRIVATE CLOUDS FAIL?

Problems Encountered by 95% of Private Clouds

by Tom Bittman | February 5, 2015 | 52 Comments

In my last blog post, I identified ten reasons private clouds were failing. I consolidated that list to six items (below), and polled attendees at Gartner's Datacenter Conference in Las Vegas in December. I asked the question "What is going wrong with your private cloud?" I was a little surprised that **95%** of the 140 respondents (who had private clouds in place) said something was wrong with their private cloud.



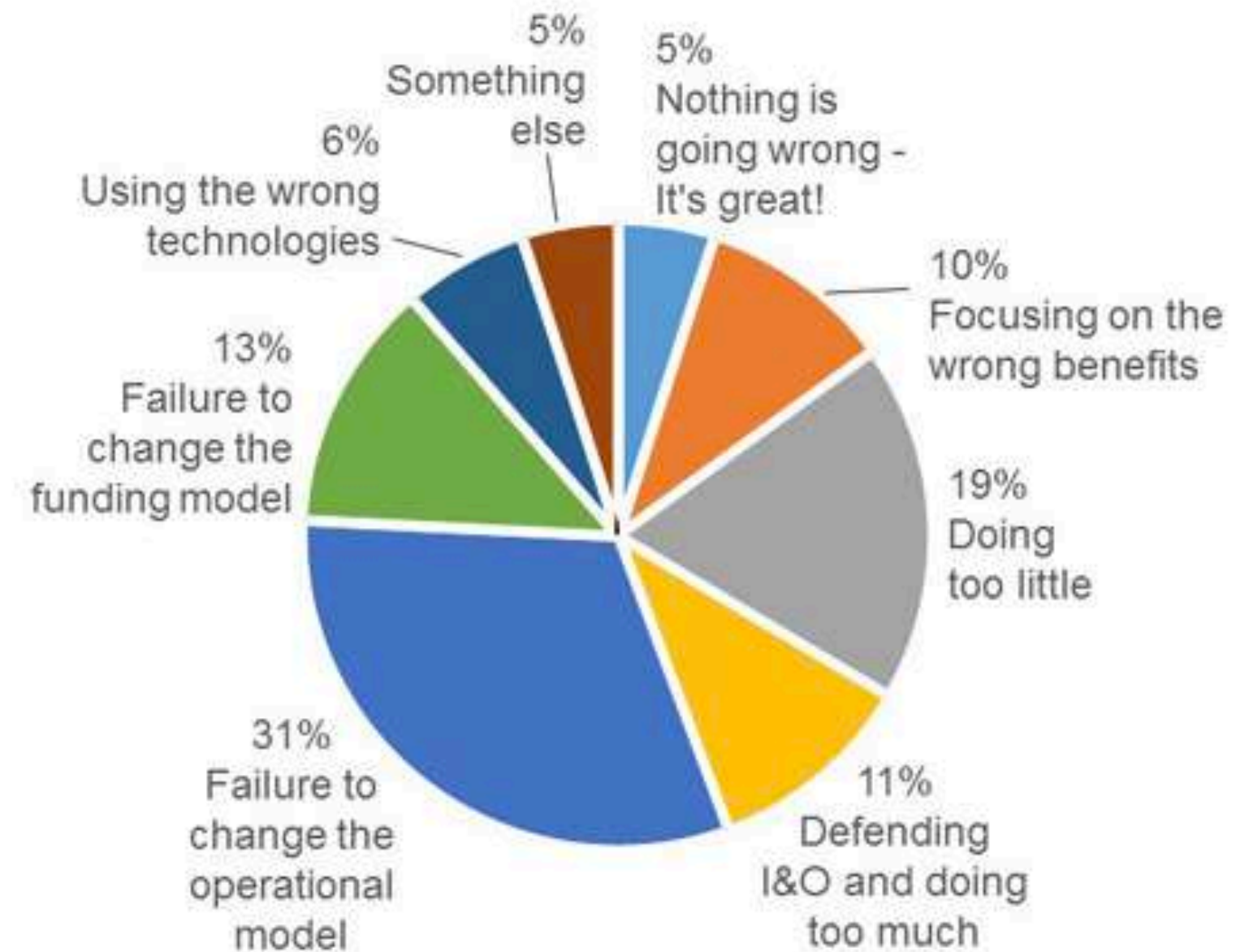
https://blogs.gartner.com/thomas_bittman/2015/02/05/why-are-95-of-private-clouds-failing/

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Focusing on the wrong thing - cost-savings, not “agility”

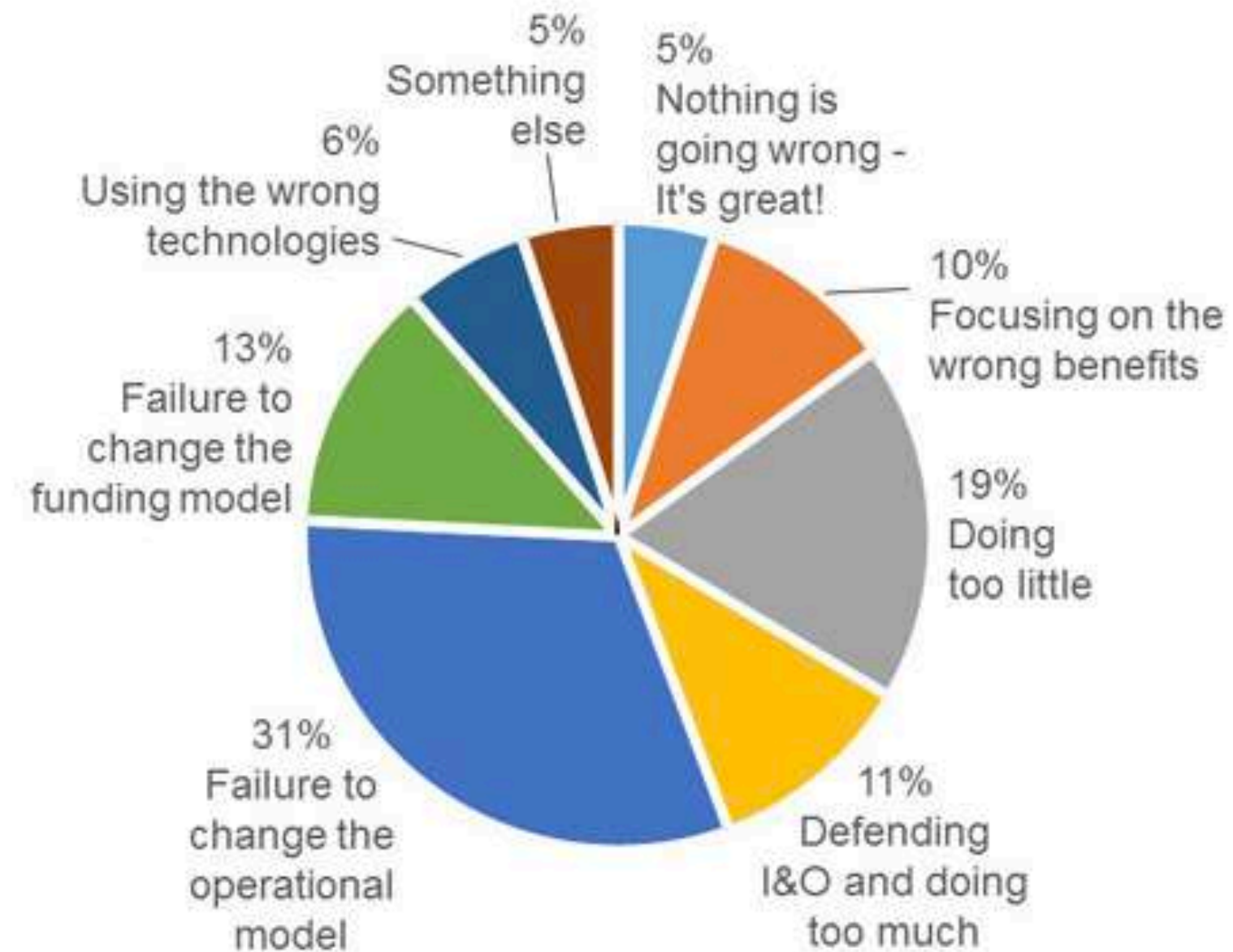
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Focusing on the wrong thing - cost-savings, not “agility”

Not changing the operational or funding models

https://blogs.gartner.com/thomas_bittman/2015/02/05/why-are-95-of-private-clouds-failing/

Pitfall 1: Not enabling self-service

**Teams empowered to make
decisions and get thing done**

**AWS's killer feature is
supporting self service**

**The power of the cloud wasn't
about rental, it was about
empowerment**

Top Tip: Trust your people

TRADITIONAL IT STRUCTURES

Devs



QAs



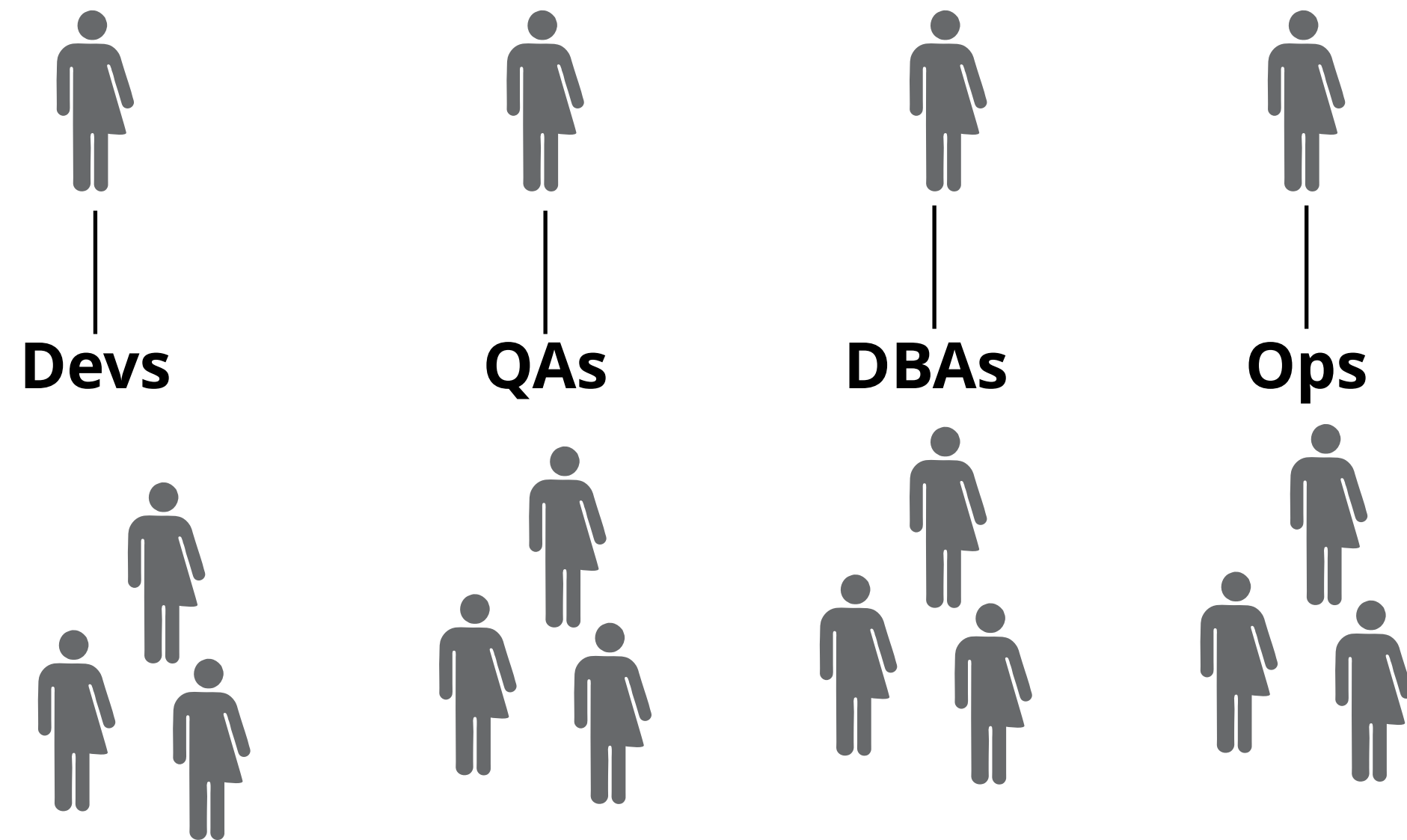
DBAs



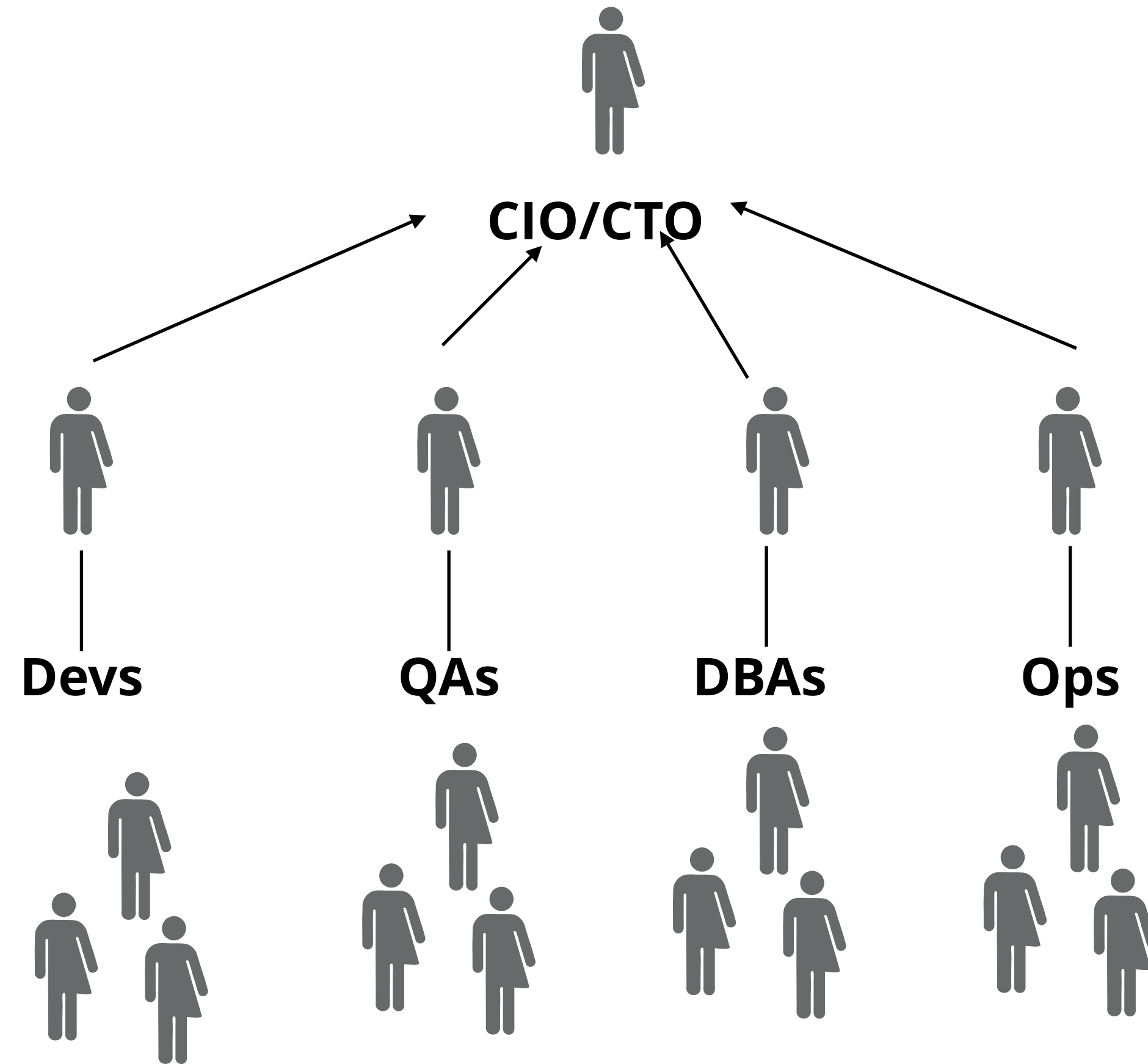
Ops



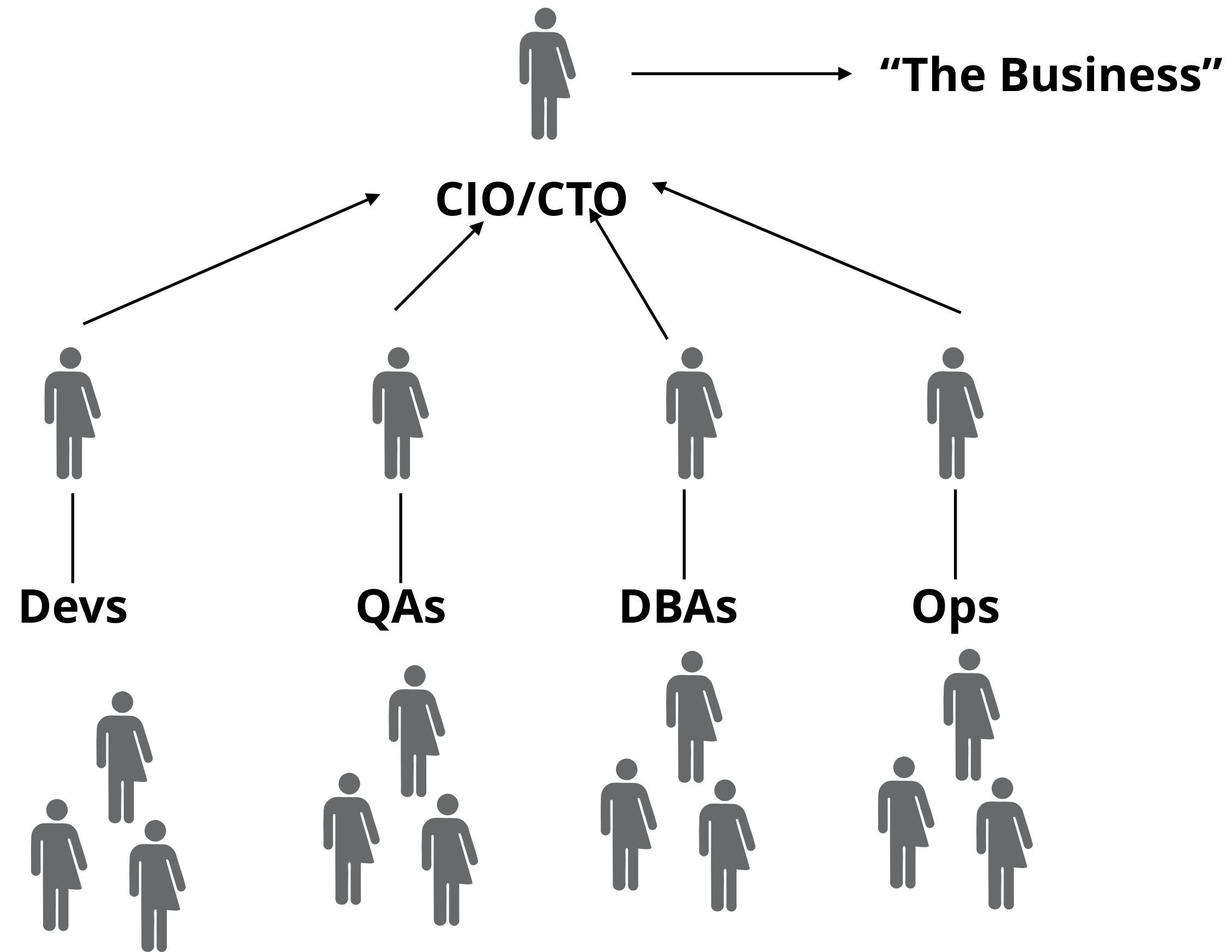
TRADITIONAL IT STRUCTURES



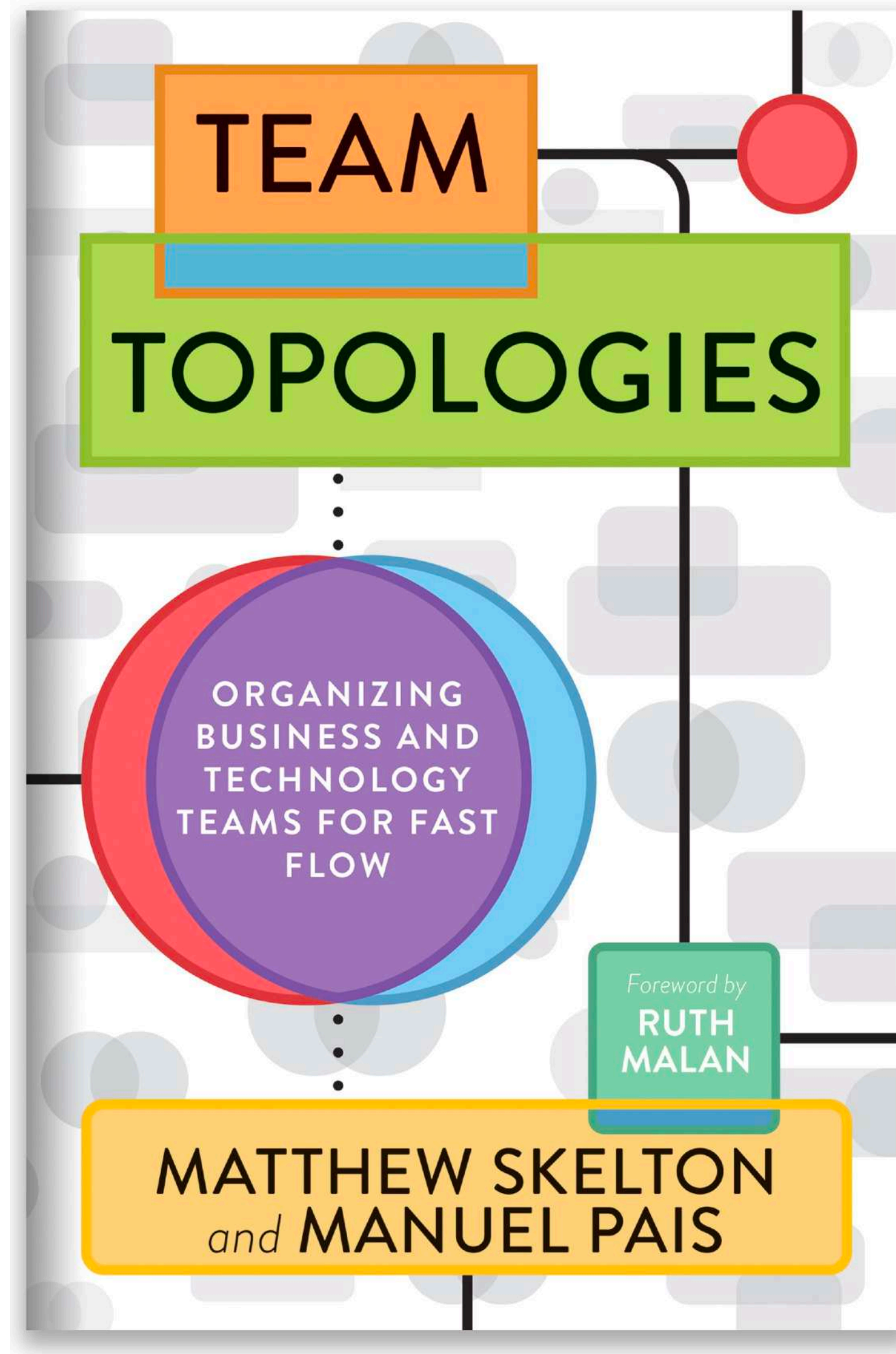
TRADITIONAL IT STRUCTURES



TRADITIONAL IT STRUCTURES



TEAM TOPOLOGIES

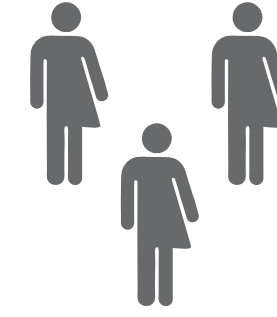


STREAM ALIGNED TEAMS

STREAM ALIGNED TEAMS



**Stock
Management**



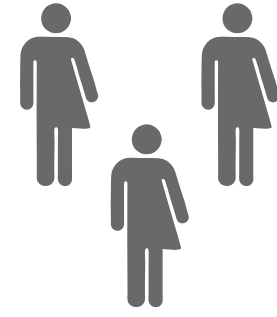
Purchase



Promotions

STREAM ALIGNED TEAMS

**Focused on a valuable
stream of work**



**Stock
Management**



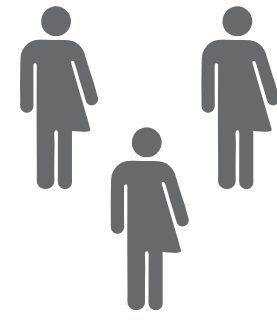
Purchase



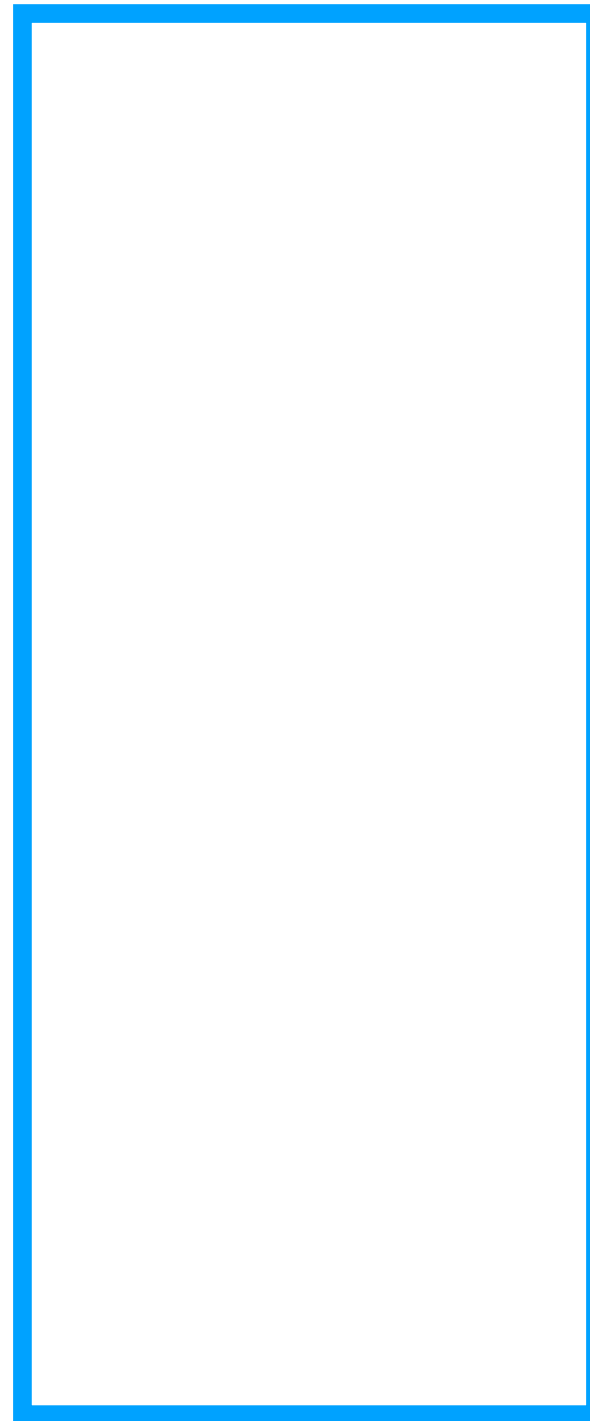
Promotions

STREAM ALIGNED TEAMS

Focused on a valuable stream of work



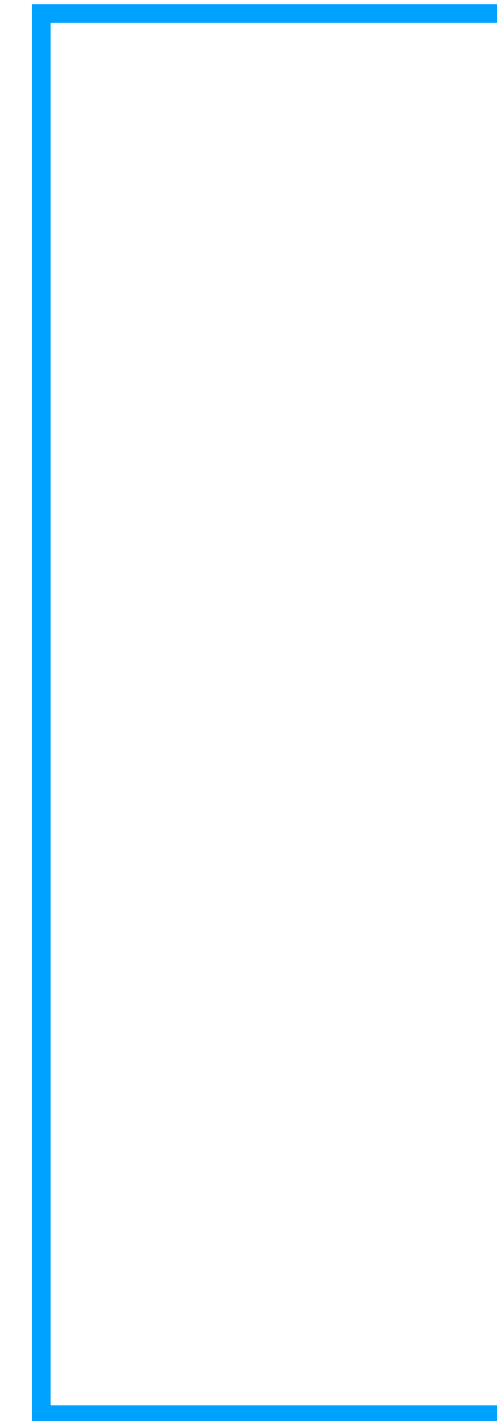
Stock Management



Purchase

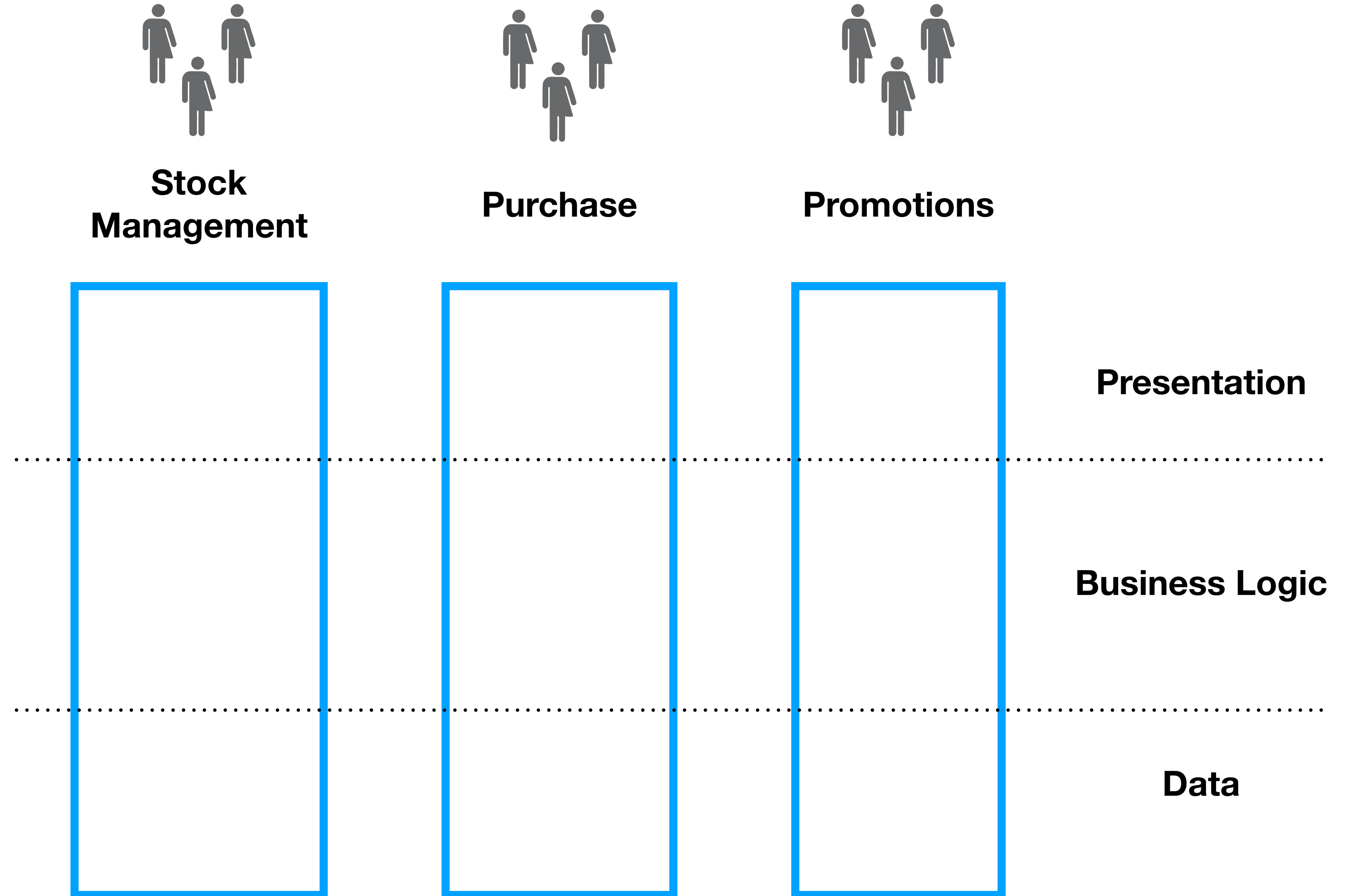


Promotions



STREAM ALIGNED TEAMS

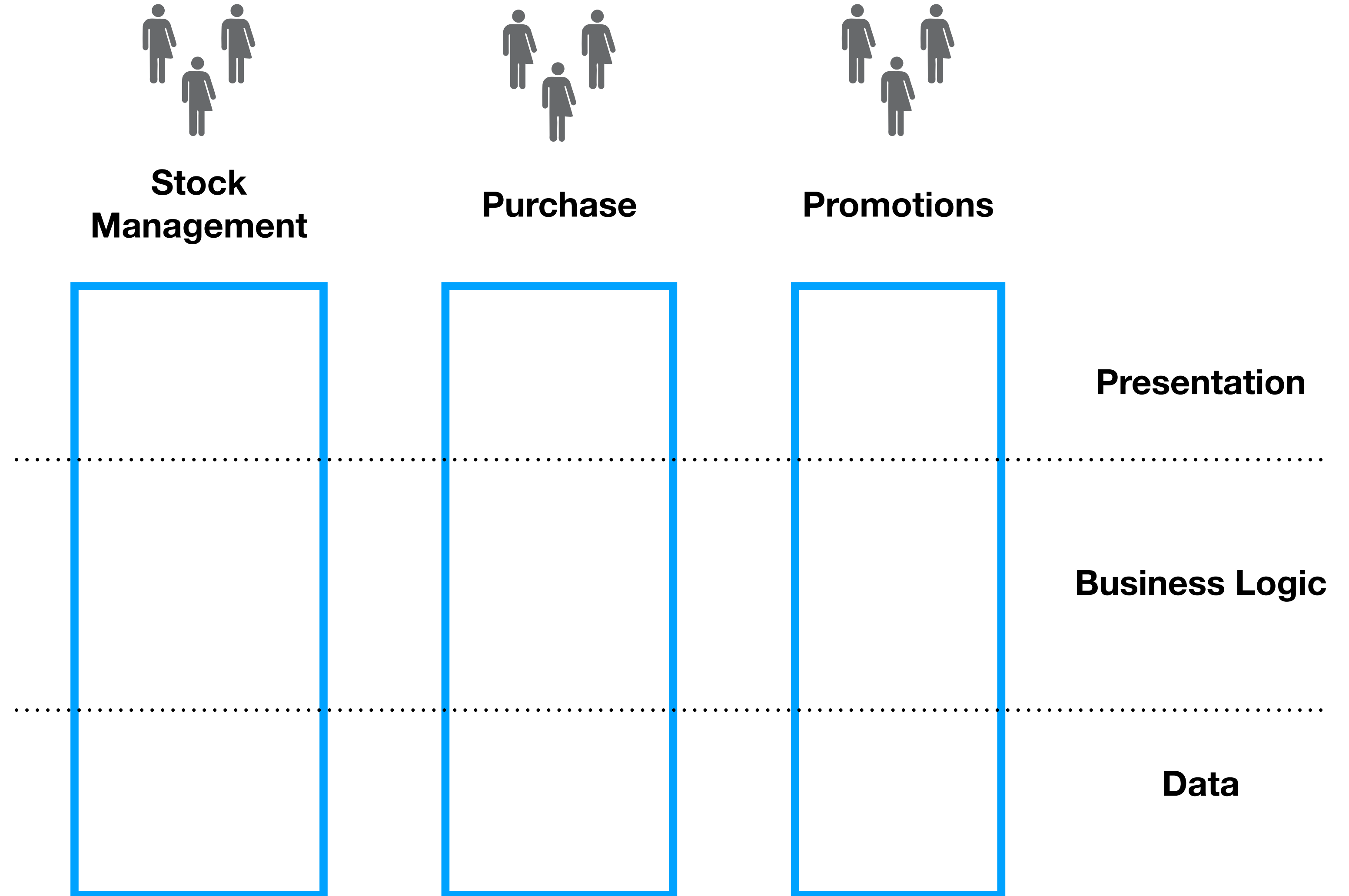
Focused on a valuable stream of work



STREAM ALIGNED TEAMS

Focused on a valuable stream of work

Long-lived “product” oriented rather than project oriented

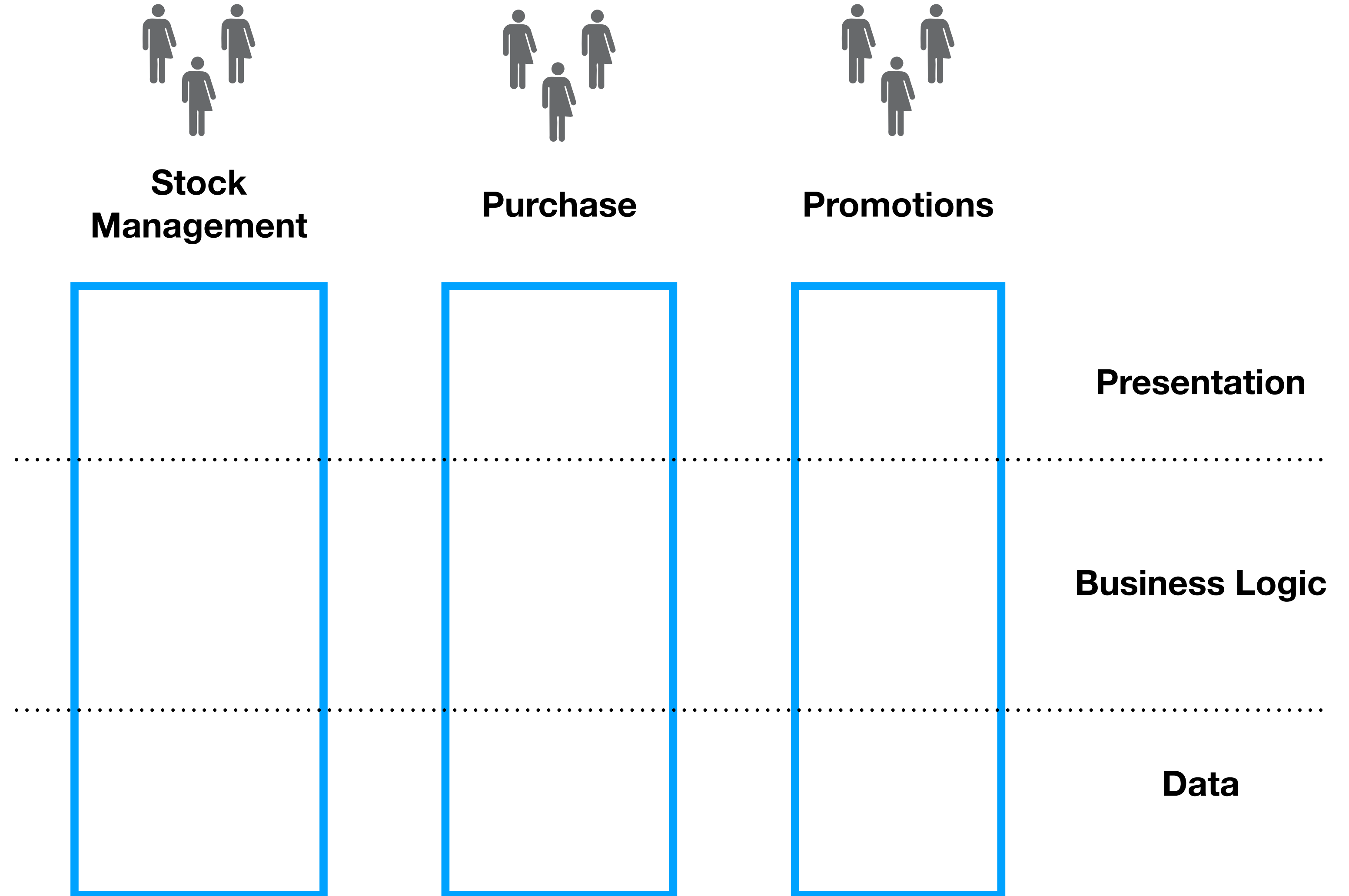


STREAM ALIGNED TEAMS

Focused on a valuable stream of work

Long-lived “product” oriented rather than project oriented

Has ownership of their assets

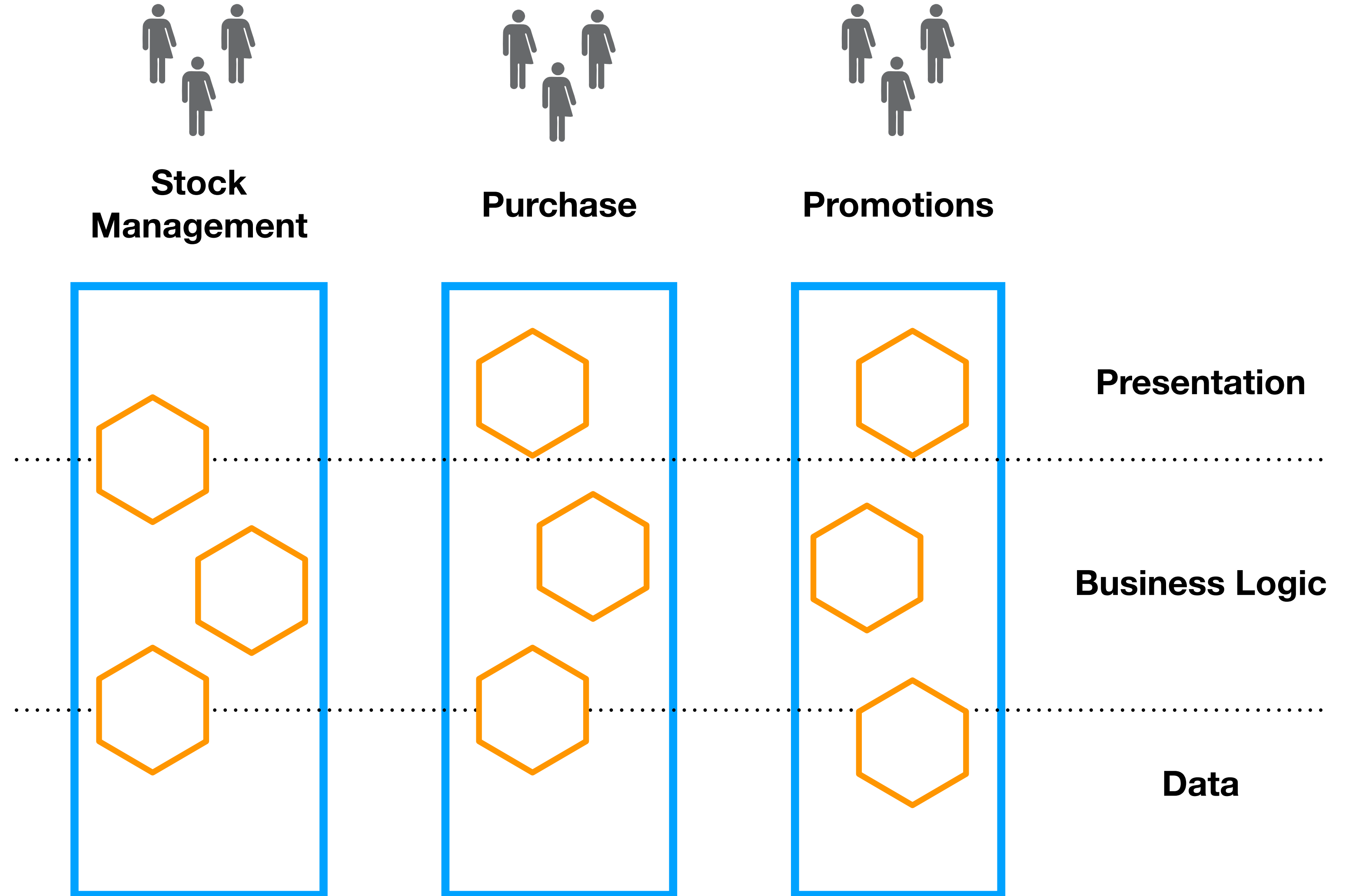


STREAM ALIGNED TEAMS

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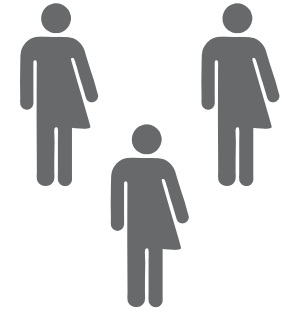
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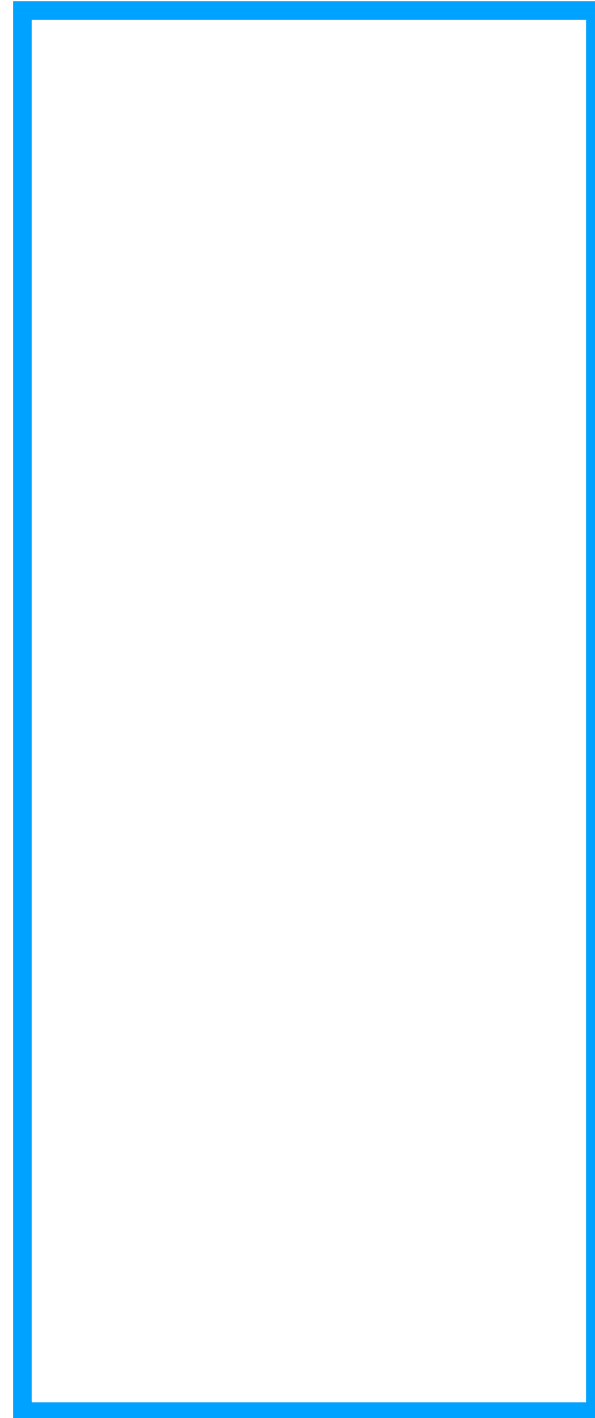


**But what about all that
extra work?**

ENABLING TEAMS



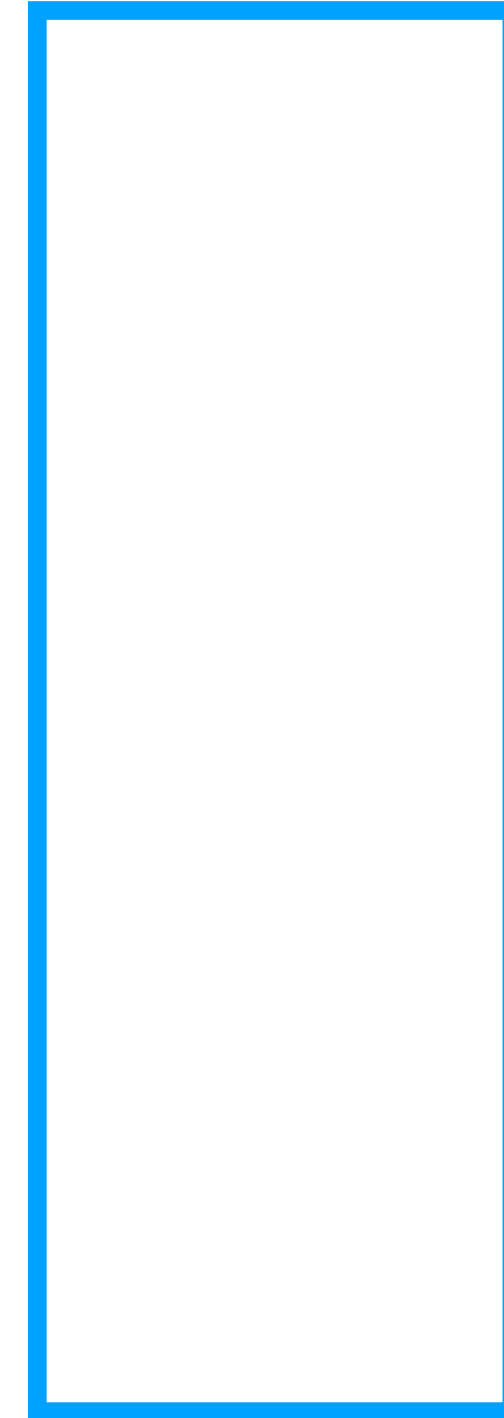
**Stock
Management**



Purchase



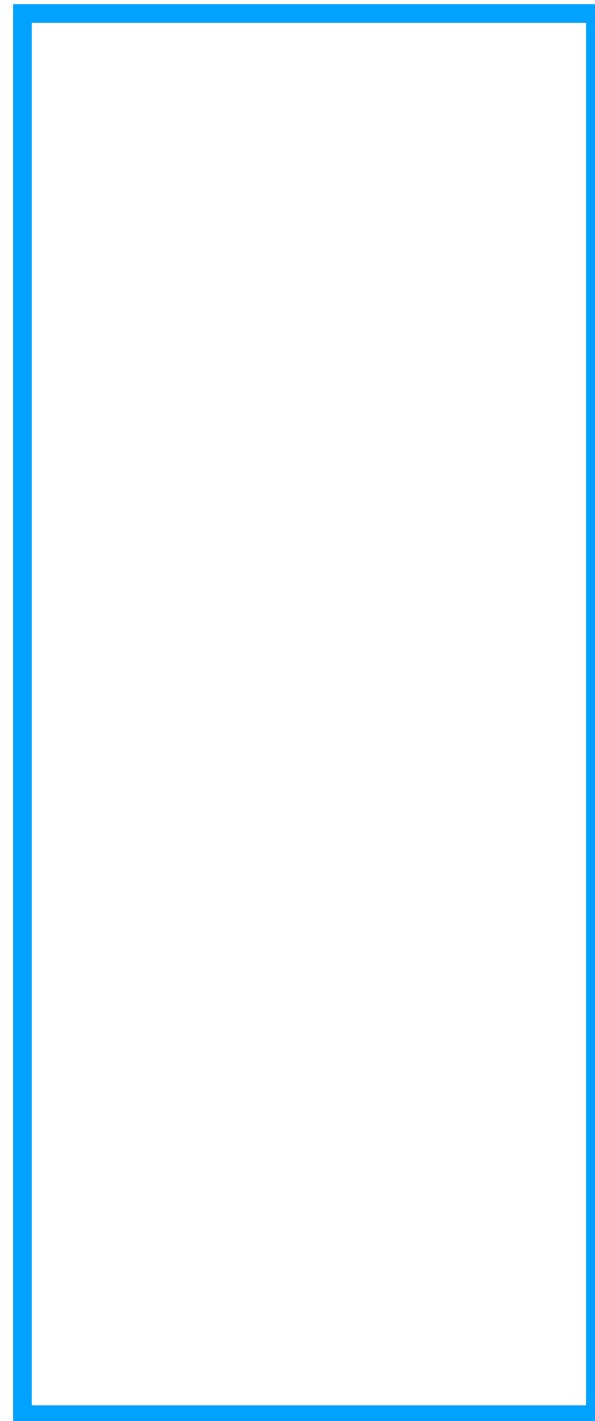
Promotions



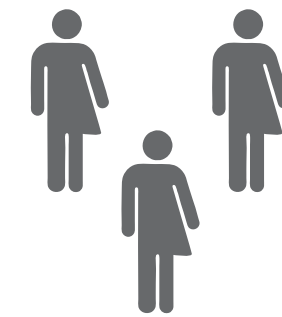
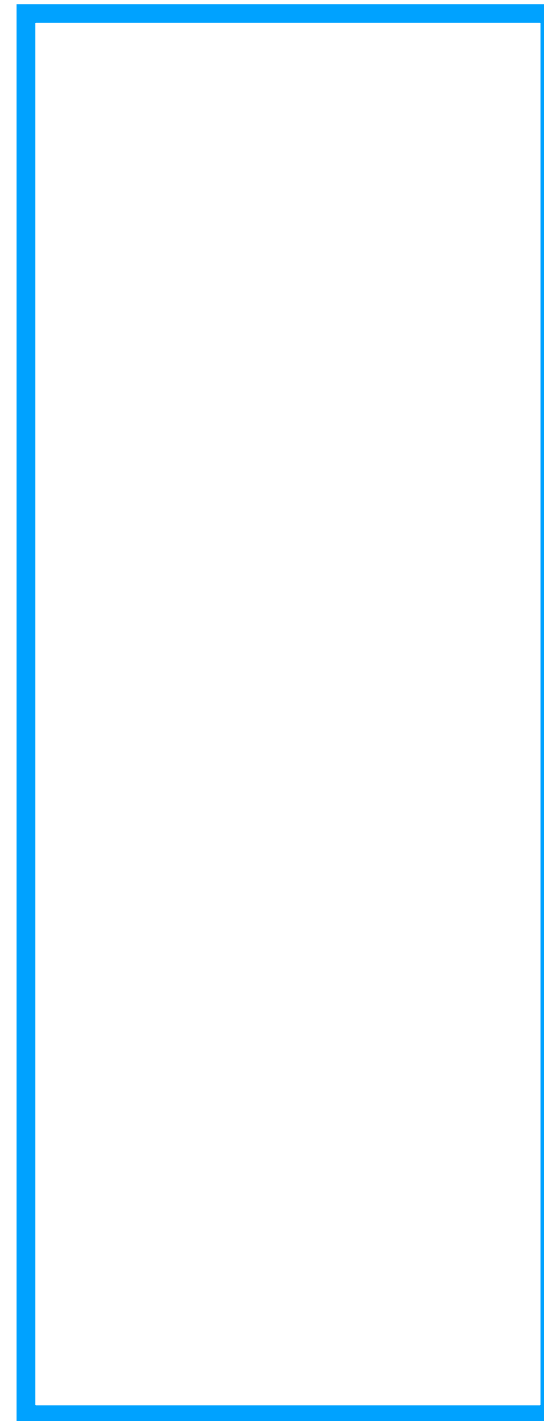
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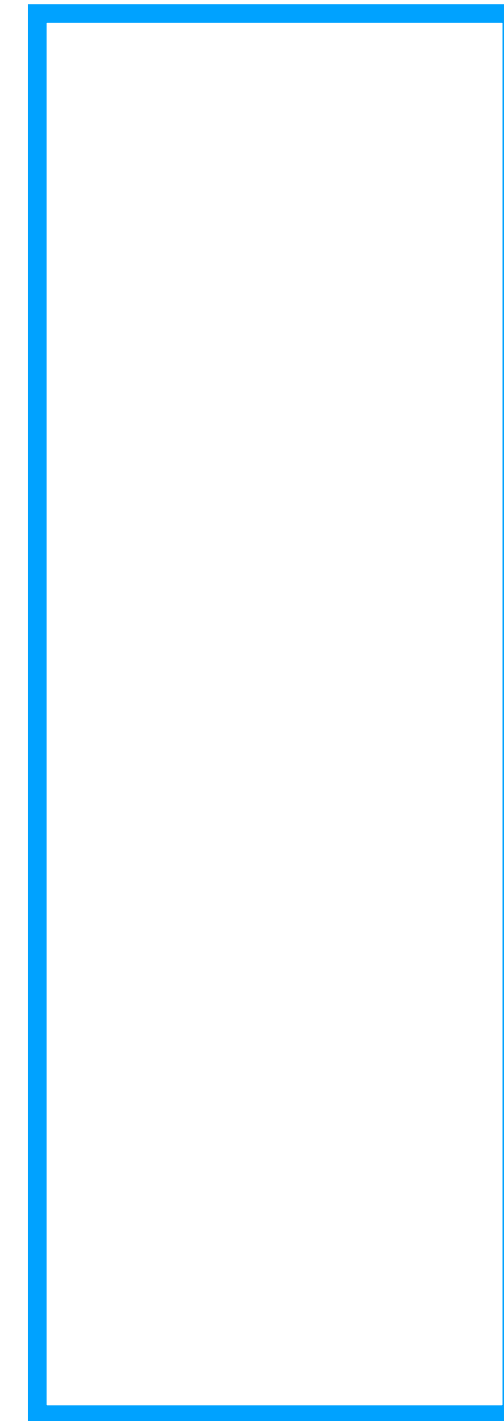
**Stock
Management**



Purchase



Promotions

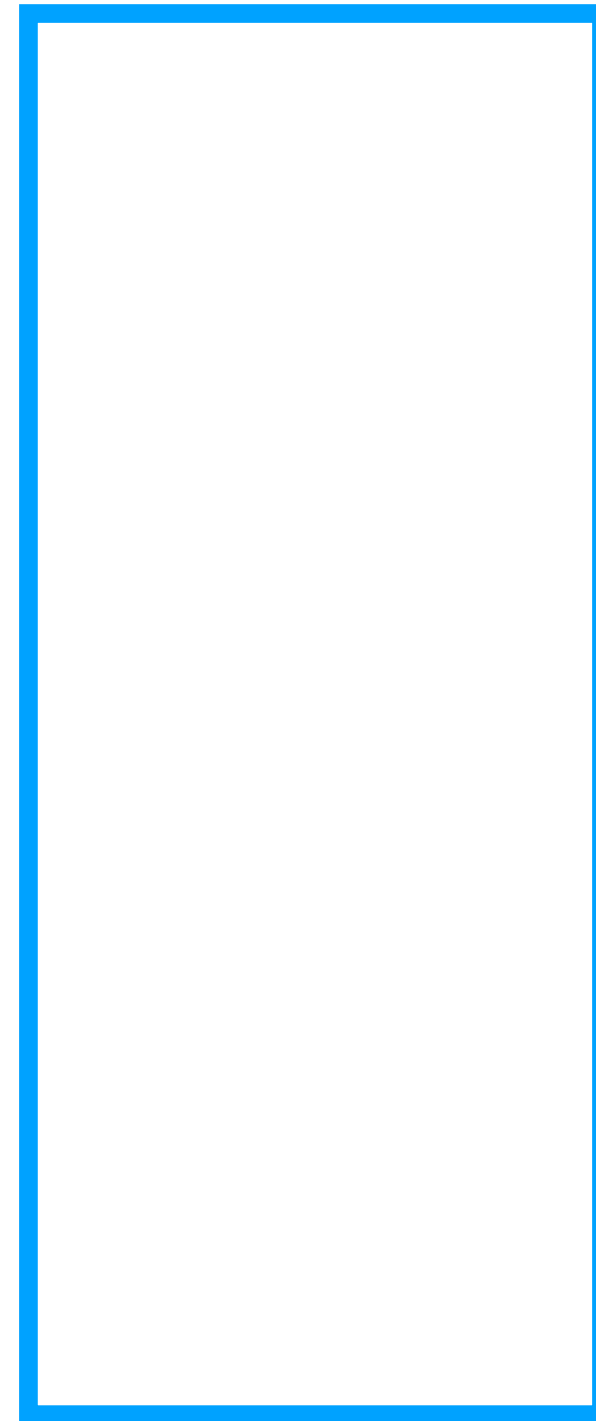


Supports the stream-aligned teams in doing their job

ENABLING TEAMS



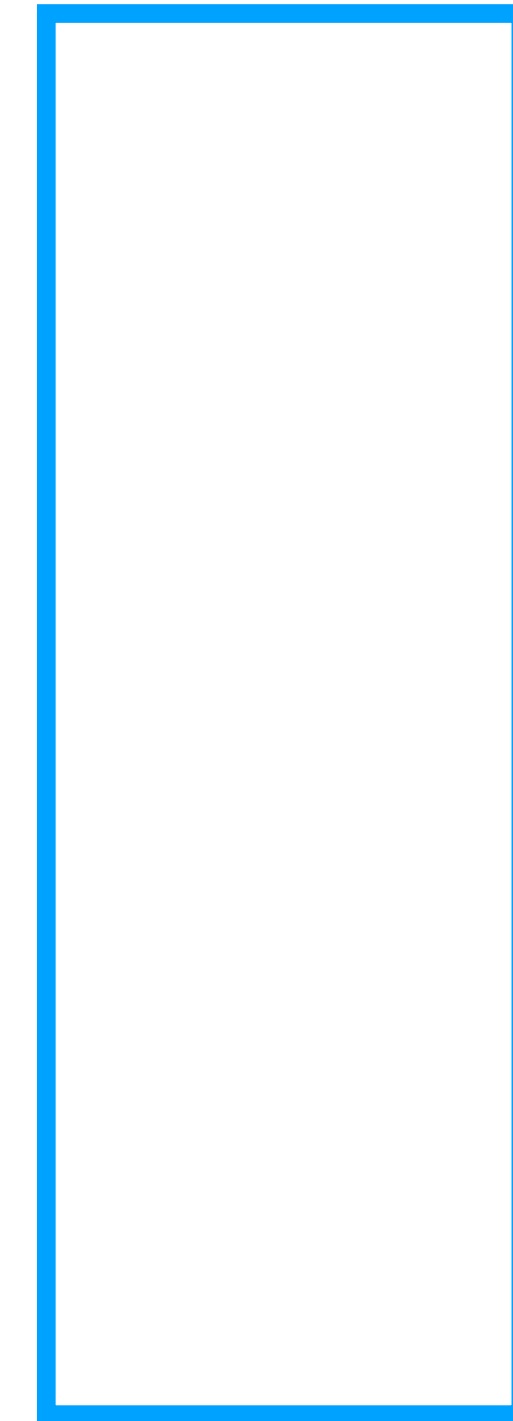
**Stock
Management**



Purchase



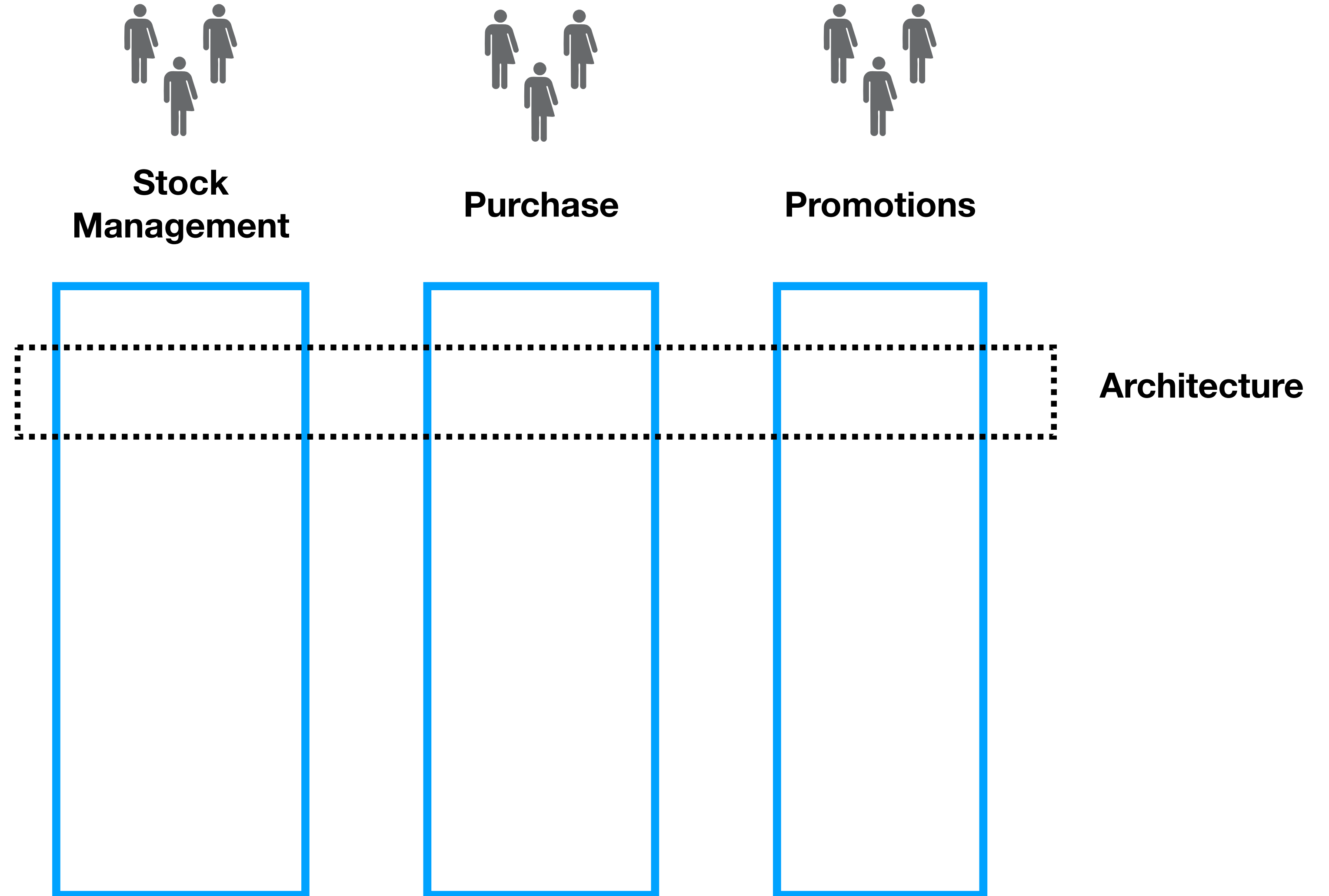
Promotions



Supports the stream-aligned teams in doing their job

Different models - could be a group of experts, could create supporting tools

ENABLING TEAMS



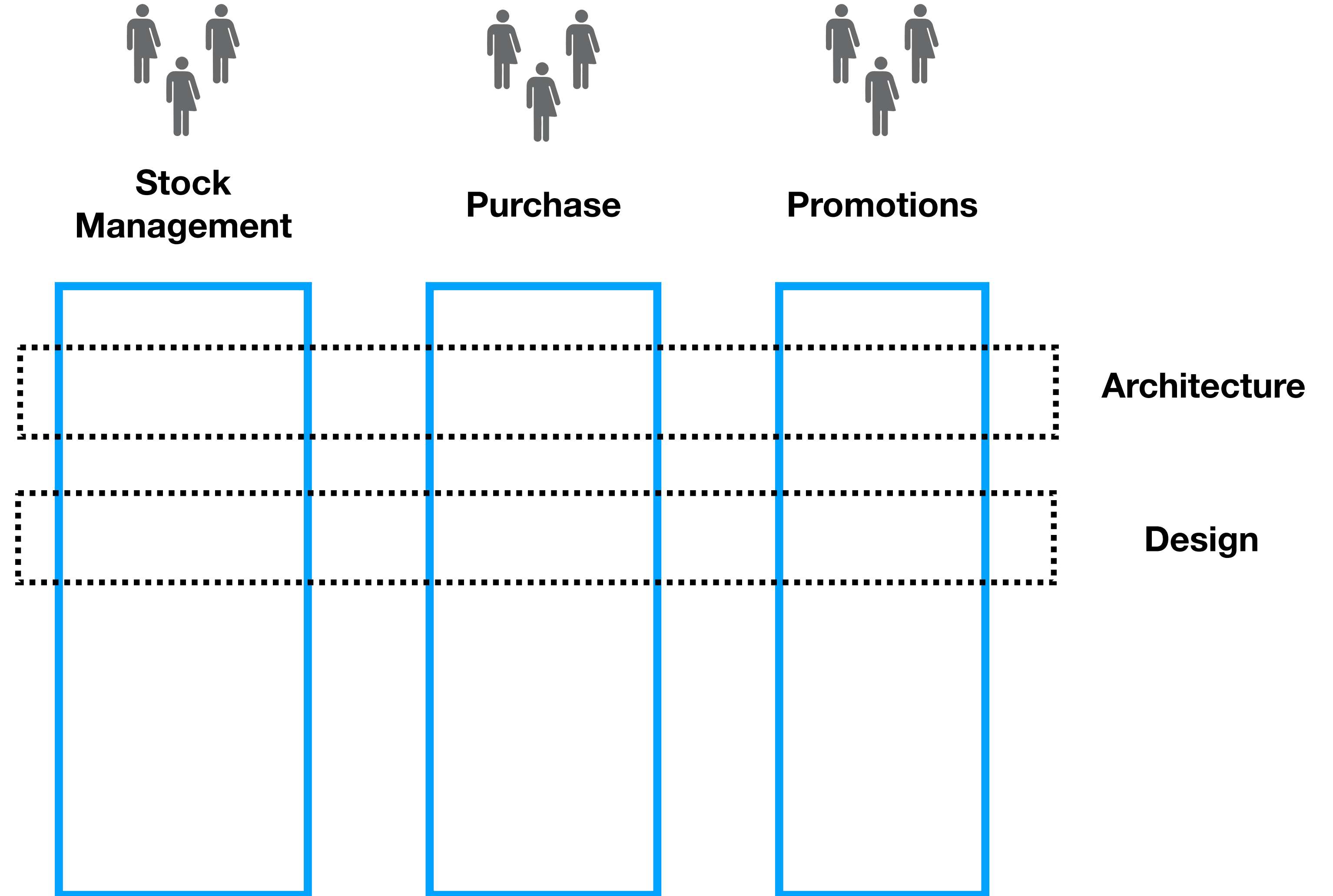
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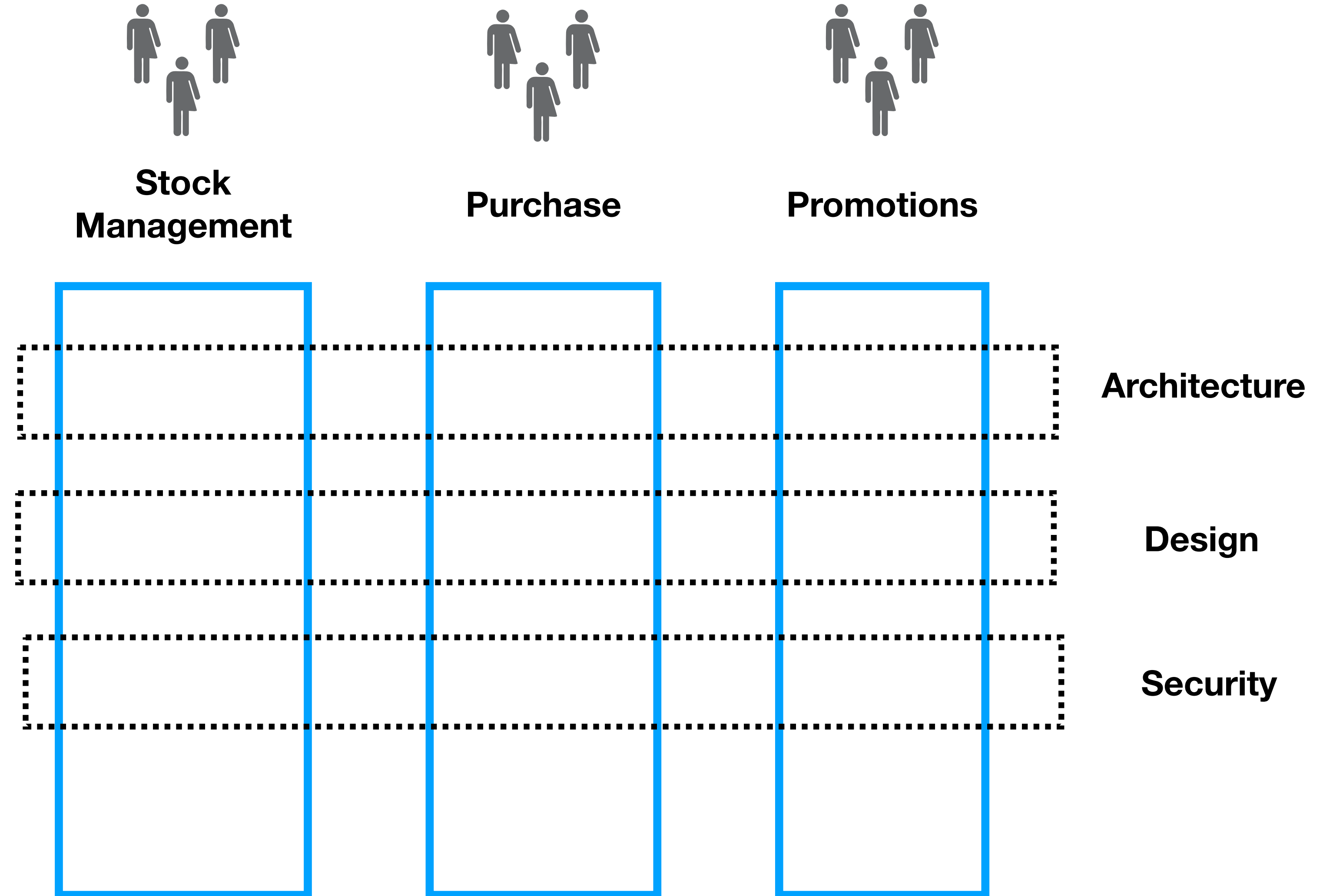
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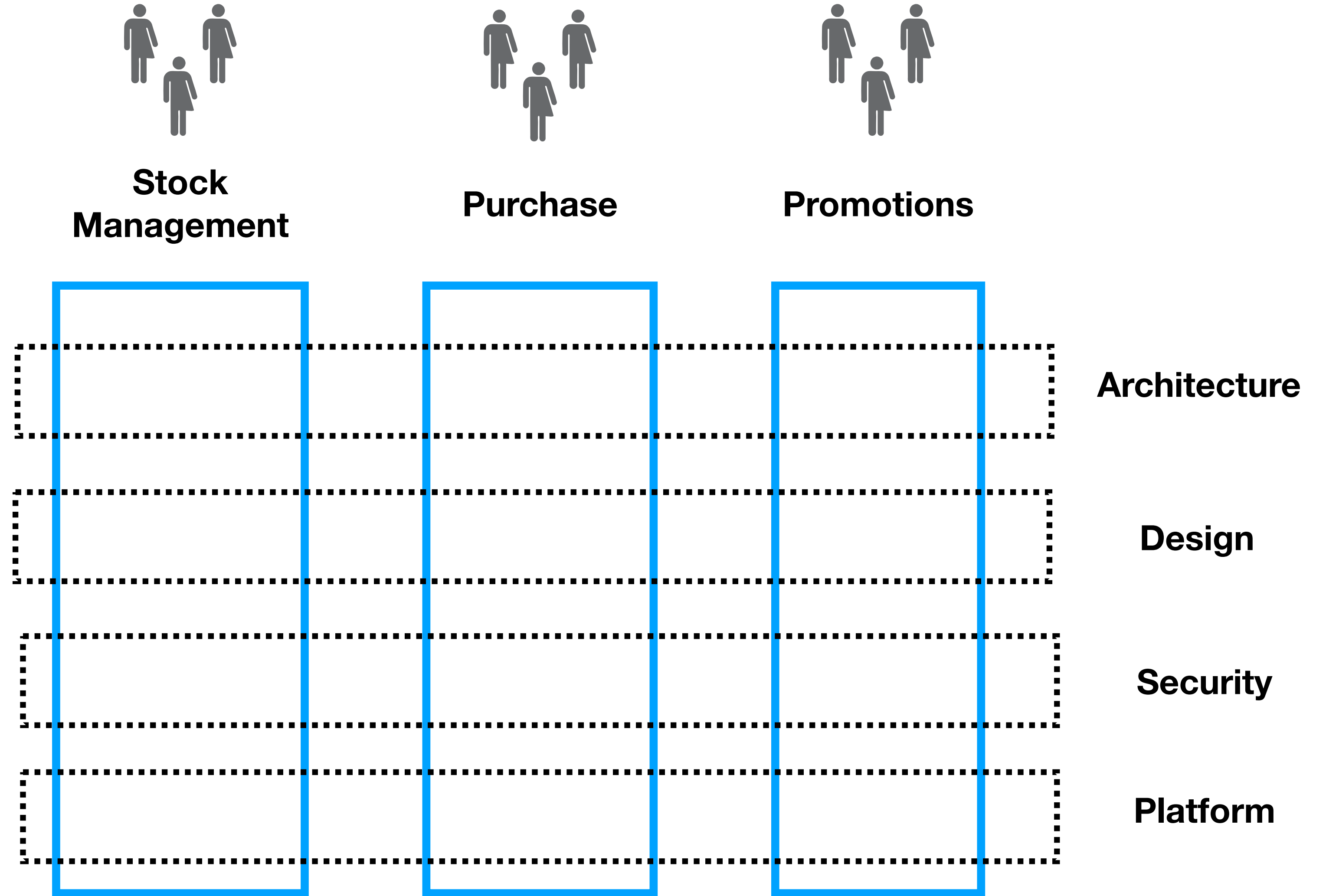
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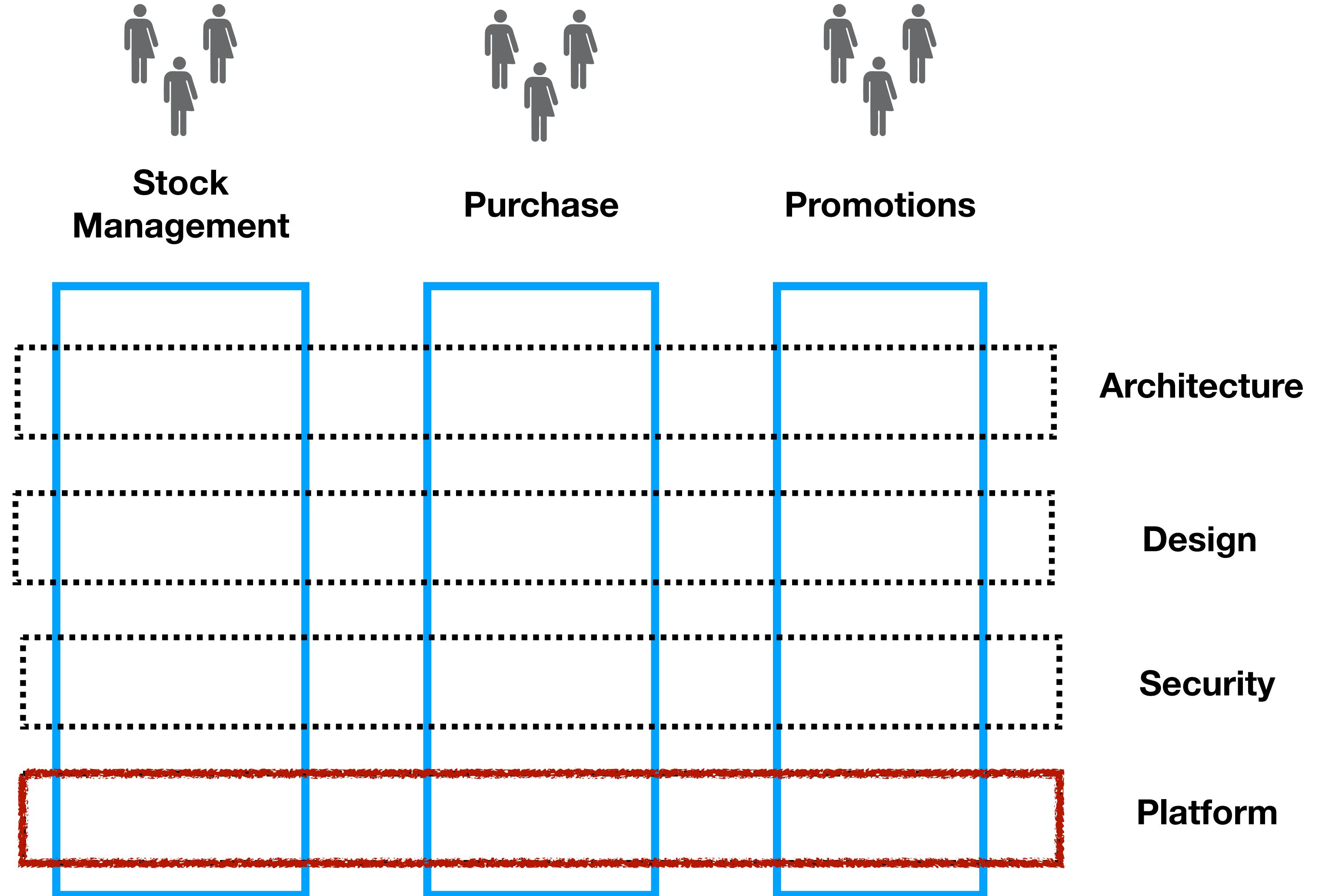
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ENABLING TEAMS

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Different models - could be a group of experts, could create supporting tools



It's ok, I've got a platform!



2009

**“We’re like a utility - we just
sell electricity”**



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Explore digital training

Explore classroom training

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Organizations need individuals with cloud skills to help transform their business. AWS Training and Certification helps you build and validate your skills so you can get more out of the cloud. Our content is created by experts at AWS and updated regularly so you can keep your cloud skills fresh.

We offer both digital and classroom training. Digital training allows you to learn online at your own pace. With classroom training, you can learn best practices from an expert instructor. In addition to in-person classes, virtual training lets you take courses from anywhere. Whether you are just starting out, building on existing IT skills, or sharpening your cloud knowledge, AWS Training and Certification can help you be more effective and do more in the cloud.

Learn what **AWS customers and partners are saying** about AWS Training and Certification, and what it means to their business and careers.

<https://aws.amazon.com/training/>

**Having cool tools isn't
enough - you have to help
people use them**

**Pitfall 2: Not helping people
use the tools well**

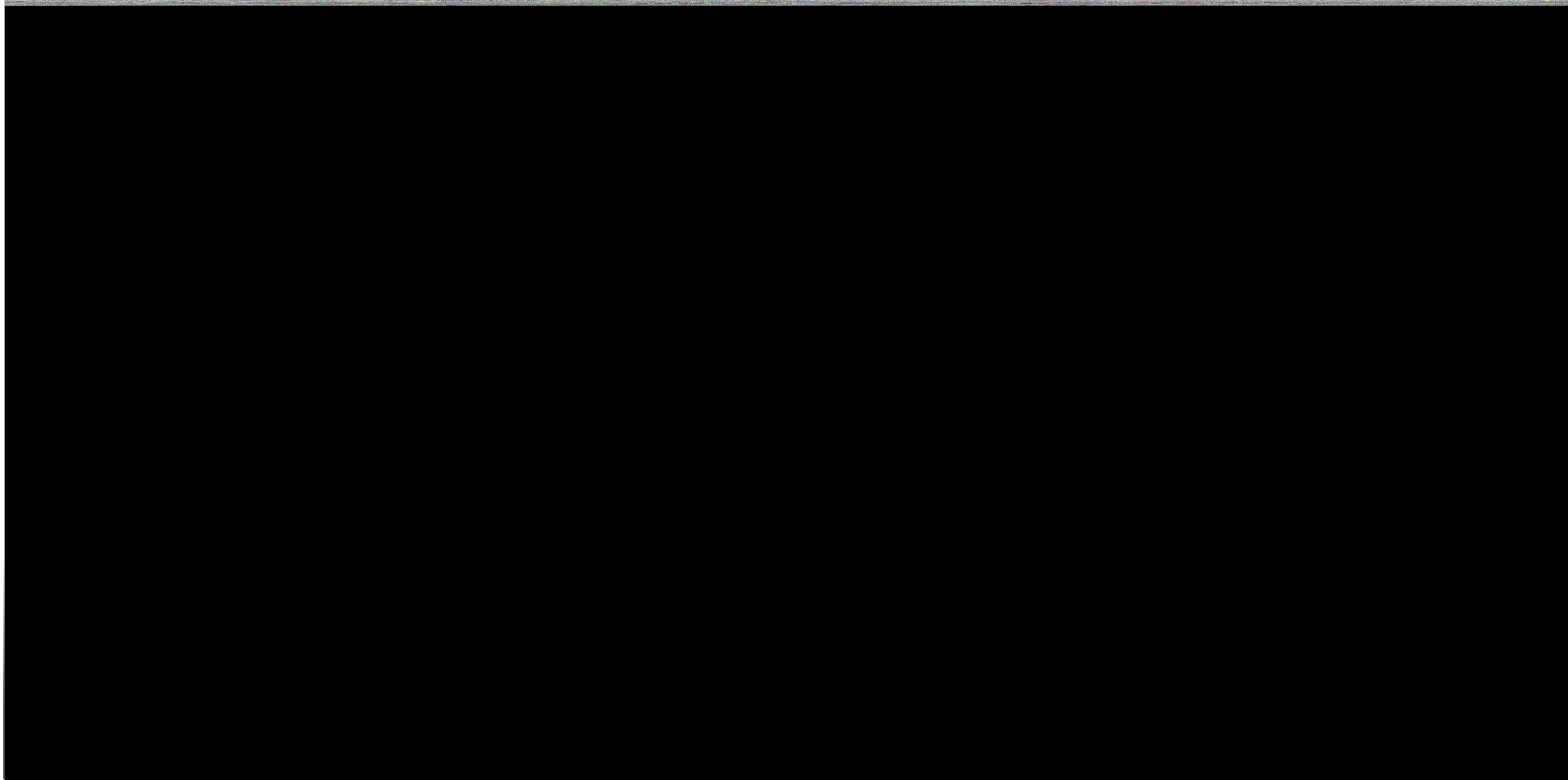
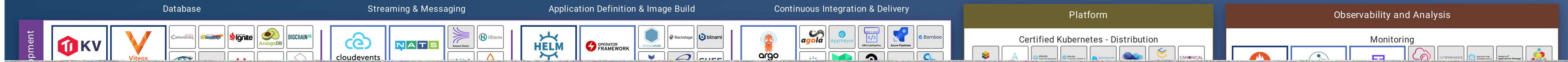
**The job of the platform team
should not be just about
building a platform...**

**...it should be about
enablement**

Does your platform team do outreach? Training? Spend time embedded with other teams?

**If not, they can become just
another silo**

Top Tip: Treat your microservice platform like a product



<https://landscape.cncf.io/images/landscape.png>

Here's the full list of AWS services

A complete list of services offered by Amazon Web Services, with the latest additions.

[Amazon Web Services](#) [Cloud computing](#)

Amazon Web Services offers hundreds of services ranging from compute and storage services to various analytics and security applications.

The number of products offered by AWS is constantly growing, and as of 2021, includes as many as 285 individual services.

Full list of AWS services

Service	Description	Category
AWS Accounts		
AWS Activate		
AWS Amplify	Build and deploy mobile and web applications	Front-End Web & Mobile
AWS Amplify Admin		
AWS App Mesh	Monitor and control microservices	Networking & Content Delivery
AWS App Mesh Preview		
AWS App Runner	Build and run containerized web apps at scale	Compute, Containers
AWS AppConfig		
AWS AppSync	Power your apps with the right data from many sources, at scale	Application Integration, Front-End Web & Mobile, Serverless

<https://www.eckher.com/c/21gjdl7gz4>

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AWS CloudFormation	Create and Manage Resources with Templates	Management & Governance
AWS CloudHSM	Hardware-based Key Storage for Regulatory Compliance	Security, Identity & Compliance
AWS CloudShell	Browser-based shell environment	Developer Tools
AWS CloudTrail	Track User Activity and API Usage	Management & Governance
AWS CodeArtifact	Secure, scalable, and cost-effective artifact management for software development	Developer Tools
AWS CodeBuild	Build and Test Code	Developer Tools
AWS CodeCommit	Store Code in Private Git Repositories	Developer Tools
AWS CodeDeploy	Automate Code Deployment	Developer Tools
AWS CodePipeline	Release Software using Continuous Delivery	Developer Tools
AWS CodeStar	Develop and Deploy AWS Applications	Developer Tools
AWS CodeStar Connections		
AWS CodeStar Notifications		
AWS Compute Optimizer	Identify optimal AWS Compute resources	Management & Governance
AWS Config	Track Resource Inventory and Changes	Management & Governance
AWS Connector Service		
AWS Control Tower	Set up and govern a secure, compliant, multi-account environment	Management & Governance
AWS Cost Explorer Service		
AWS Cost and Usage Report	Access Comprehensive Cost and Usage Information	Cloud Financial Management

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AWS CloudShell	Browser-based shell environment	Developer Tools
AWS CloudTrail	Track User Activity and API Usage	Management & Governance
AWS CodeArtifact	Secure, scalable, and cost-effective artifact management for software development	Developer Tools
AWS CodeBuild	Build and Test Code	Developer Tools
AWS CodeCommit	Store Code in Private Git Repositories	Developer Tools
AWS CodeDeploy	Automate Code Deployment	Developer Tools
AWS CodePipeline	Release Software using Continuous Delivery	Developer Tools
AWS CodeStar	Develop and Deploy AWS Applications	Developer Tools
AWS CodeStar Connections		
AWS CodeStar Notifications		
AWS Compute Optimizer	Identify optimal AWS Compute resources	Management & Governance
AWS Config	Track Resource Inventory and Changes	Management & Governance
AWS Connector Service		
AWS Control Tower	Set up and govern a secure, compliant, multi-account environment	Management & Governance
AWS Cost Explorer Service		
AWS Cost and Usage Report	Access Comprehensive Cost and Usage Information	Cloud Financial Management

AWS IoT 1-Click	One Click Creation of an AWS Lambda Trigger	Internet of Things
AWS IoT Analytics	Analytics for IoT Devices	Internet of Things
AWS IoT Core Device Advisor		
AWS IoT Core for LoRaWAN		
AWS IoT Device Tester		
AWS IoT Events	IoT event detection and response	Internet of Things
AWS IoT Fleet Hub for Device Management		
AWS IoT Greengrass		
AWS IoT Greengrass V2		
AWS IoT SiteWise	IoT data collector and interpreter	Internet of Things
AWS IoT Things Graph	Easily connect devices and web services	Internet of Things
AWS Key Management Service	Managed Creation and Control of Encryption Keys	Security, Identity & Compliance
AWS Lake Formation	Build a secure data lake in days	Analytics
AWS Lambda	Run your Code in Response to Events, Run code without thinking about servers	Compute, Serverless
AWS License Manager	Track, manage, and control licenses	Management & Governance
AWS Marketplace		

<https://www.eckher.com/c/21gjdl7gz4>

Here's the full list of AWS services

A complete list of services offered by Amazon Web Services, with the latest additions.

[Amazon Web Services](#) [Cloud computing](#)

AWS CloudFormation	Create and Manage Resources with Templates	Management & Governance
AWS CloudHSM	Hardware-based Key Storage for Regulatory Compliance	Security, Identity & Compliance
AWS CloudShell	Browser-based shell environment	Developer Tools
AWS CloudTrail	Track User Activity and API Usage	Management & Governance
	Secure, scalable, and cost-	

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Amazon Web Services offers hundreds of services ranging from compute and storage services to various analytics and security applications.

The number of products offered by AWS is constantly growing, and as of 2021, includes as many as 285 individual services.

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Management Service	Control of Encryption Keys	Compliance
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AWS App Mesh	microservices	Content Delivery
AWS App Mesh Preview		
AWS App Runner	Build and run containerized web apps at scale	Compute, Containers
AWS AppConfig		
AWS AppSync	Power your apps with the right data from many sources, at scale	Application Integration, Front-End Web & Mobile, Serverless

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ONLY



ONLY



Top Tip: It's OK to provide a
curated experience

Governance

**Deciding how things should
be done, and making sure
they are done**

Pitfall 3: Trying to implement governance through tooling

“You must use the platform!”

**Forcing people to use your
platform isn't about enablement,
it's about control**

**If you make it hard for people
to do their jobs, people will
likely either bypass your
controls, or leave**

aws

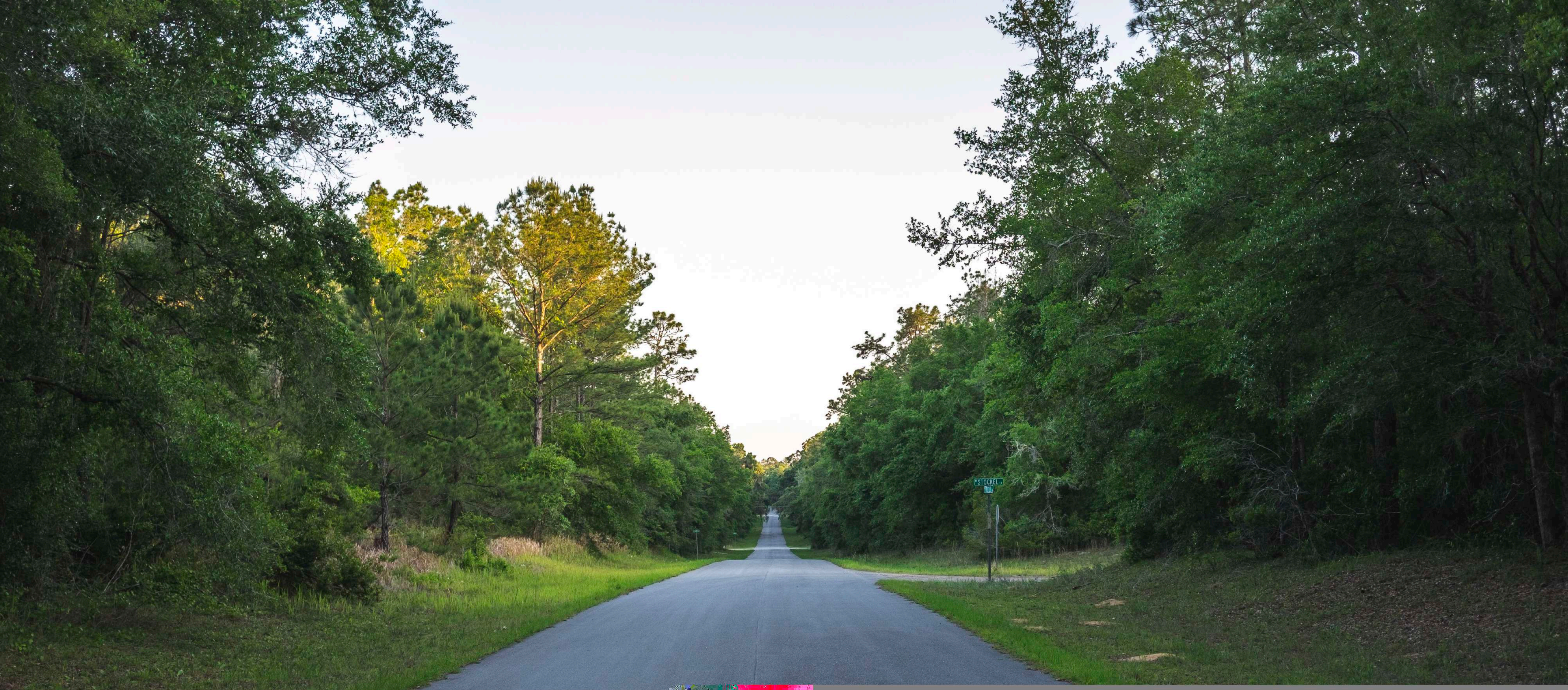




Bonus Top Tip: You probably want to keep the people who bypass controls to get the job done - they're motivated!

**Be clear about what needs to
be done, and why**

**Then make it as easy as possible
to do the right thing**



<https://flickr.com/photos/candelabrumdanse/42455302630/>

Top Tip: Provide a paved road

This project is currently in BETA, please provide feedback, or volunteer to take part in UX testing, in the #ops-and-rel slack channel.



System Operability Score powered by Biz Ops

ALL GROUPS

TEAM LEAGUE TABLE

SYSTEM LEAGUE TABLE

ABOUT

ALL GROUPS > ENTERPRISE SERVICES > CLOUD ENABLEMENT > FTPLATFORM2

System: ftplatform2 Silver Production

Score: 92%



Manual review status: Ready for ops review 🤖

Score updated: 42 minutes ago

Bear in mind that the scoring rules are a work in progress. In some cases (particularly with regard to third party systems) they won't always make perfect sense, so use your discretion. Not getting 100% is normal for now. Fixing all the things you know how to fix is the main thing to aim for.

[Fix these errors](#) [View runbook](#) [Rescore](#)

Runbook aspect ↕	Status ↕	Failings ↕	Remedial actions ↕
dependents	Error	Some dependents have a serviceTier above Silver	-
healthchecks	Warning	healthchecks has Healthcheck without URL	-
moreInformation	Info	moreInformation contains HTML - prefer to use markdown moreInformation contains links moreInformation contains references to non-platinum documentation (confluence, google sites)	-
monitoring	Info	monitoring contains HTML - prefer to use markdown monitoring contains links	-
firstLineTroubleshooting	Info	firstLineTroubleshooting contains links	-
secondLineTroubleshooting	Info	secondLineTroubleshooting contains links	-

Top Tip: Make the platform
optional

**This will ensure that the
platform owners are focused
on ease of use**

It also allows for alternative solutions where warranted

Not enabling self-service

Not enabling self-service

Not helping people use the tools well

Not enabling self-service

Not helping people use the tools well

Trying to implement governance through tooling

TOP TIPS - IN SUMMARY

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Trust your people

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Treat your platform like a product

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It's OK to provide a curated experience

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Provide a paved road

TOP TIPS - IN SUMMARY

Trust your people

Treat your platform like a product

It's OK to provide a curated experience

Provide a paved road

Make the platform optional

But distilling it all down?

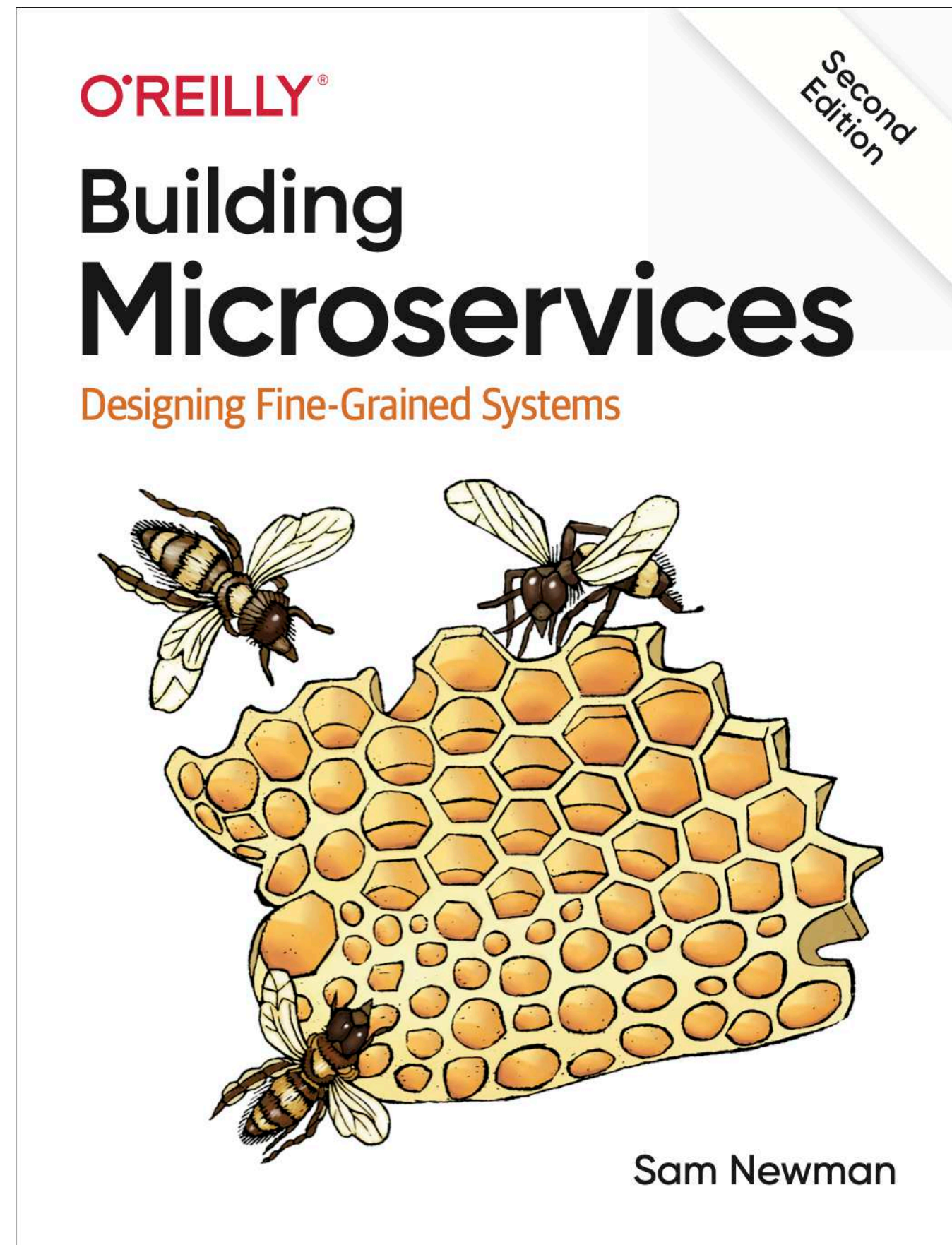
So many of are using the
cloud, without really *using* it



<https://www.team-bhp.com/forum/international-automotive-scene/87351-worlds-most-expensive-clamping-koenigsegg-ccxr-lamborghini-murcielago-superveloce.html>

**It all starts with trusting
your people**

THANKS!



@samnewman

Sam
Newman
& Associates



The image is a screenshot of the website samnewman.io. At the top, there is a navigation bar with links for Home, About, Talks (highlighted in orange), Podcast, Writing, and Contact. The main content area is titled 'Talks & Workshops.' and includes a paragraph of introductory text and a link to an 'events' page. A featured talk is titled 'What Is This Cloud Native Thing Anyway?' with a '45min Talk' tag and a 'Find Out More' link. To the right of the text is a diagram showing the relationship between Agile/Lean, Continuous Delivery, DevOps, Cloud, Microservices, and Cloud Native. A 'Book!' section on the right features a thumbnail of the book 'Building Microservices' and a 'Read on...' link. At the bottom, there is a 'Video!' section with a thumbnail for a video titled 'Feature Branches And Toggles In A Post-GitHub World'.

https://samnewman.io/

@samnewman