

“Value Stream Thinking” – Learnings from engineering a SaaS Platform

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About me



Dominik Rose

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LeanIX

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SEI SERIES IN SOFTWARE ENGINEERING

Software Architecture in Practice

Second Edition



Len Bass

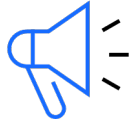
Paul Clements

Rick Kazman

LeanIX in a nutshell



600+
Customers



60+
Net Promoter Score



Leader
rating by Analysts



Cloud Native SaaS
Technology



SOC II Type 2 & ISO 27001
certified



400+
Employees



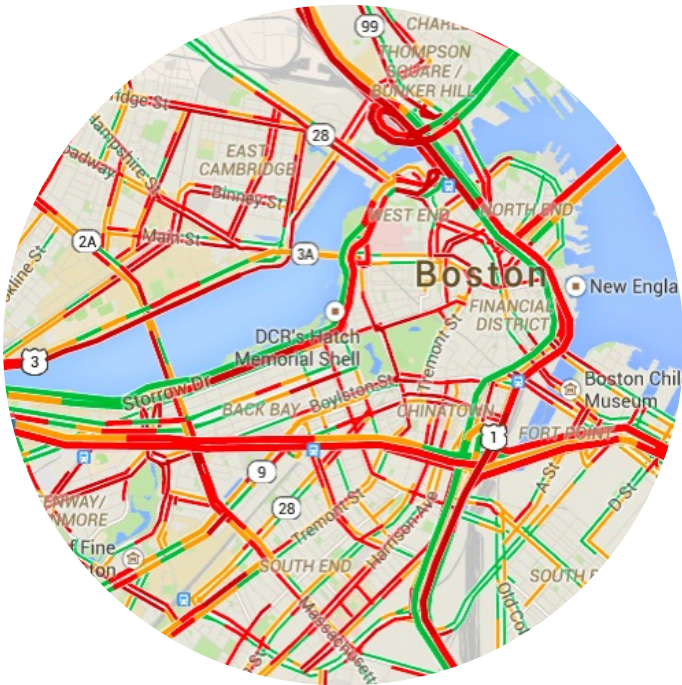
Best Place to Work
rated by Employees



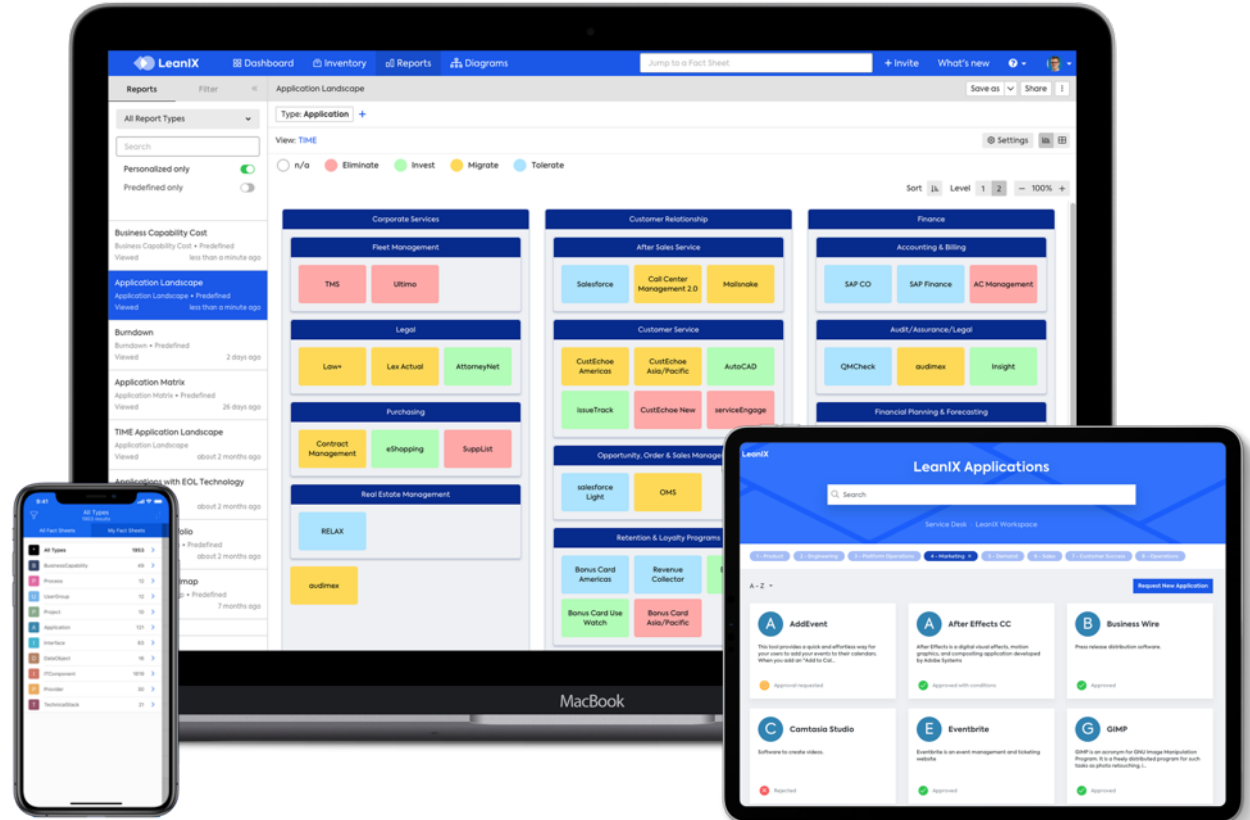
\$ 120m
Funding



LeanIX is like a “Google Maps for IT”



Map for Streets, Cities, Traffic, ...

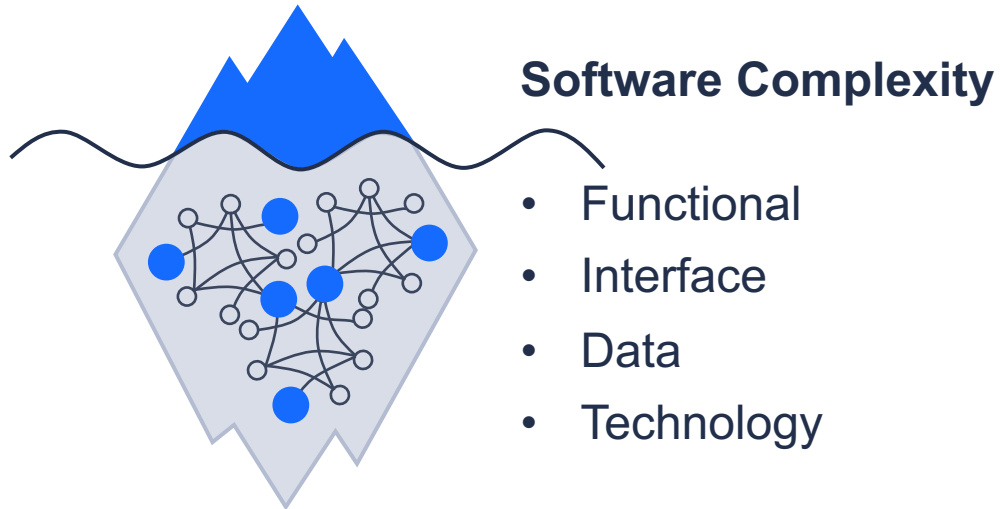


Map for SaaS, Applications, Microservices, Cloud Services, ...

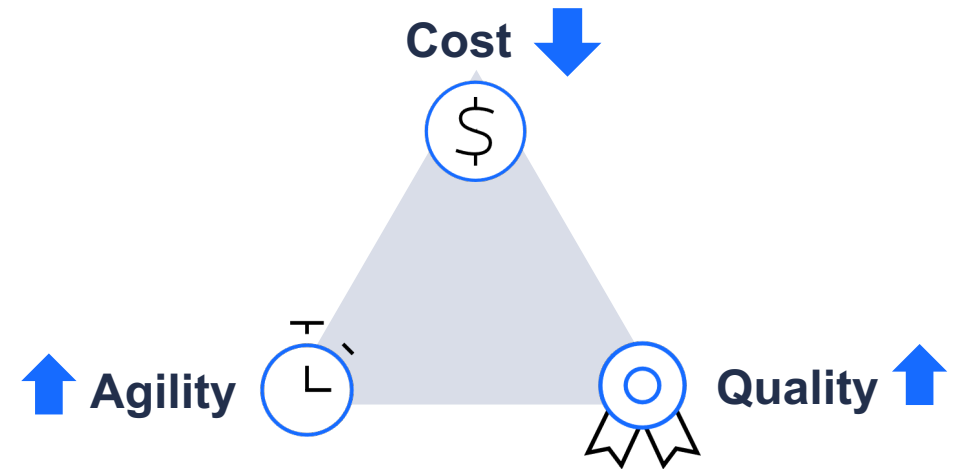
We help businesses solving a massive problem



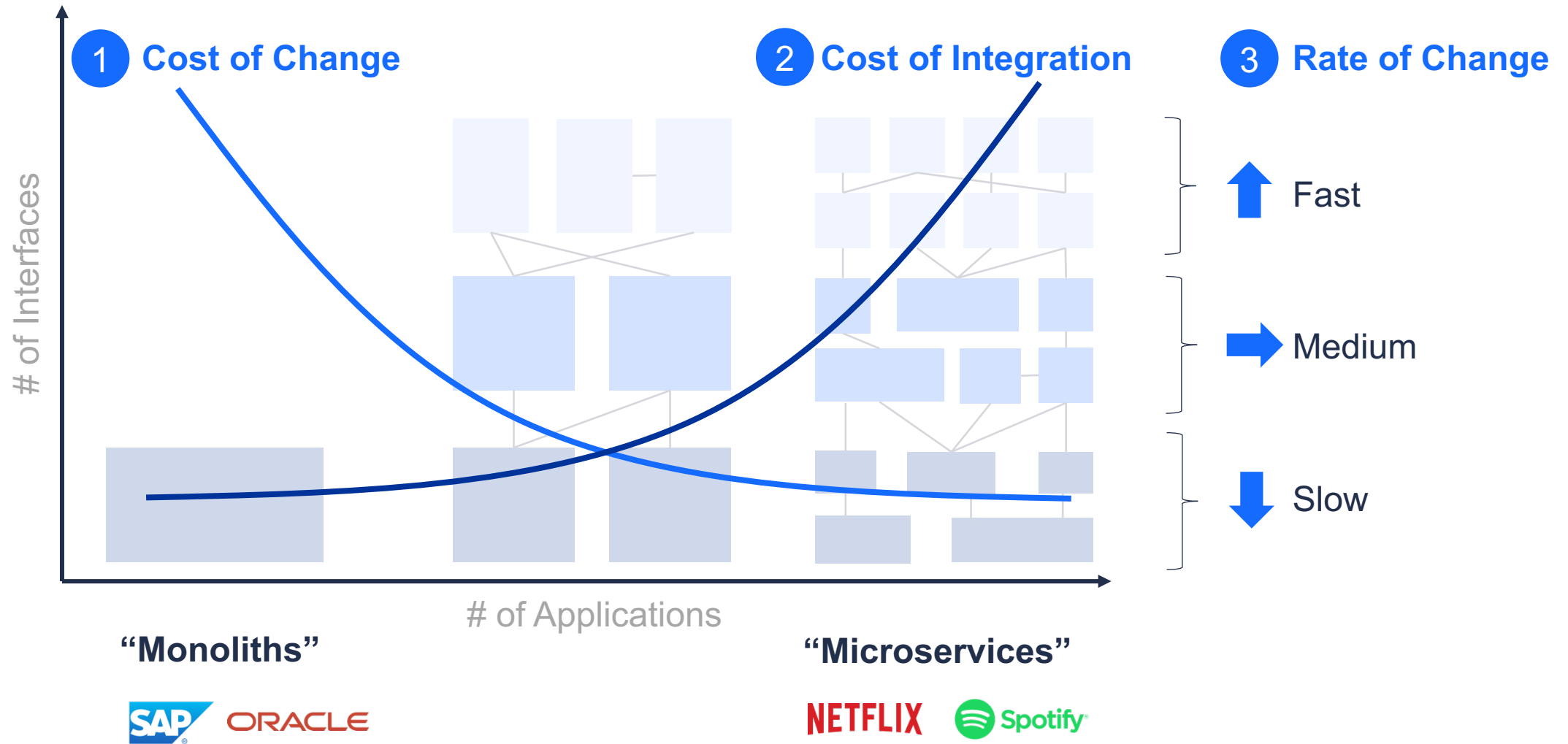
What is a key hidden factor



What businesses want to achieve



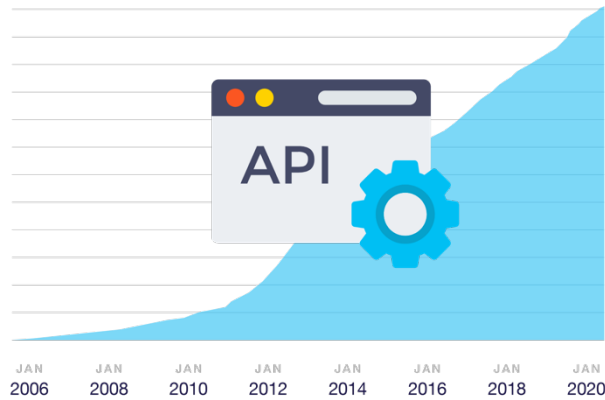
Software Complexity != Number of Software



Major shifts further increasing granularity

API Economy

>24.000 public web APIs,
“API first” mentality



Software-as-a-Service

SaaS spend to grow by
87% to \$ 250Bn by 2025



Citizen Developer

70% of Development using Low
Code / No Code in 2024



Business Benefit

Compose applications faster and more flexibly based on reusable capabilities behind APIs

Increase productivity and employee experience with best of breed solutions

Build applications faster without relying on limited IT resources to reduce IT backlog

IT Priorities

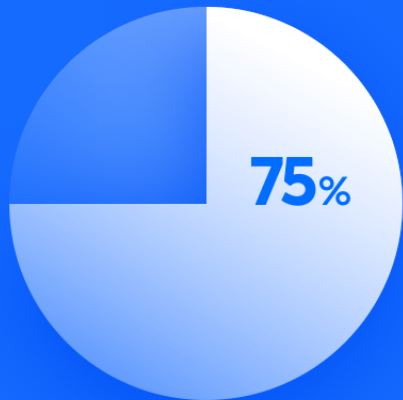
Protect API endpoints, scale cloud infrastructure and ensure API reusability

Avoid security risks, optimize procurement, and ensure data integration

Provide reliable IT core-services and avoid inefficiency based on central governance

Building software efficiently is a key differentiator LeanIX

Every company is
a tech company



Yet 75% of DevOps
initiatives will fail to meet
expectations value in 2022

Accelerating shift
from project to product



Yet Agile, Project Management
and DevOps metrics track
activities, not business value

DevOps commoditization
is accelerating



Yet Value Streams are
spread across many tools
and complex workflows

Gartner

The Future of DevOps Toolchains Will Involve Maximizing Flow in IT Value Streams

Refreshed 4 June 2021, Published 14 January 2020 - ID G00464224 - 18 min read

FOUNDATIONAL This research is reviewed periodically for accuracy.

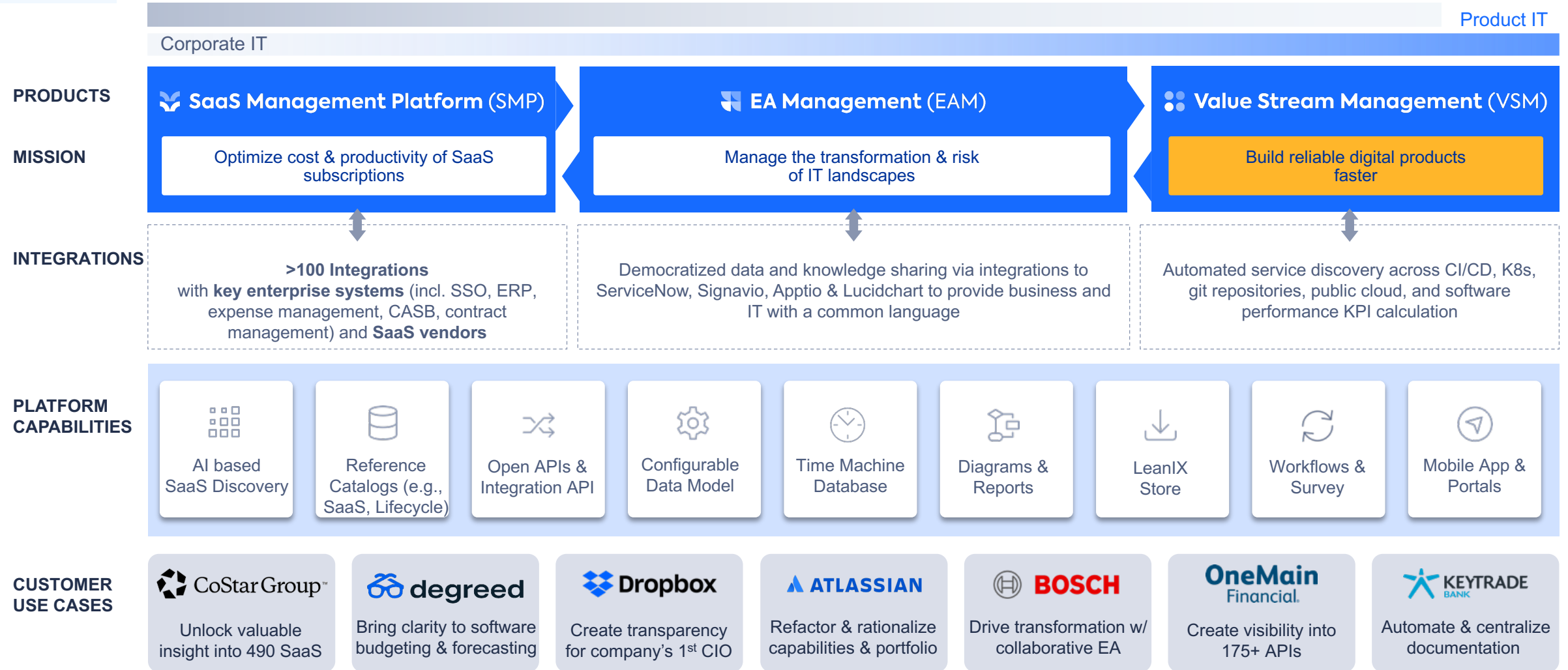
By Analyst(s): Manjunath Bhat, Daniel Betts, Hassan Ennaciri, Chris Saunderson, Thomas Murphy

Initiatives: [Infrastructure and Operations Leaders](#)

DevOps toolchains are changing, and the discrete automation silos of the past are evolving into platforms that orchestrate application delivery as a value stream. Infrastructure and operations leaders should revisit their toolchain strategies to meet digital business demands.

By 2023, 70% of organizations will use value stream management to improve flow in the DevOps pipeline, leading to faster delivery of customer value.

LeanIX Continuous Transformation Platform®



— >650 Customers | >50 Global 500 Customers | >65 NPS | 2021 Gartner® Magic Quadrant™ **EA Leader** —



- 1. Start**
2. Scale
3. Learn

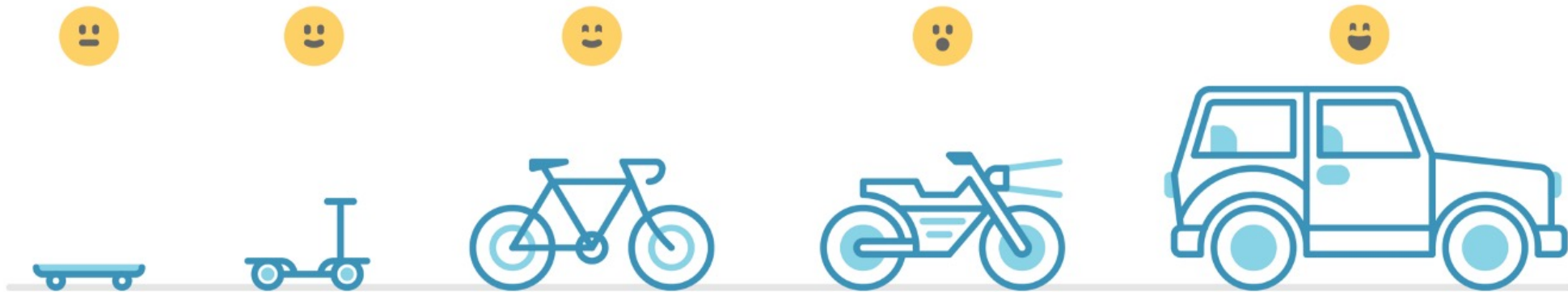
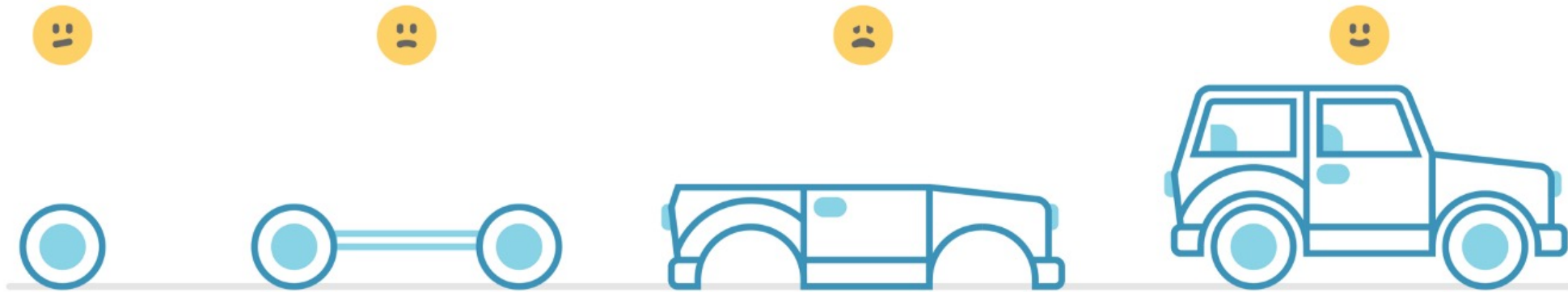




APACHE

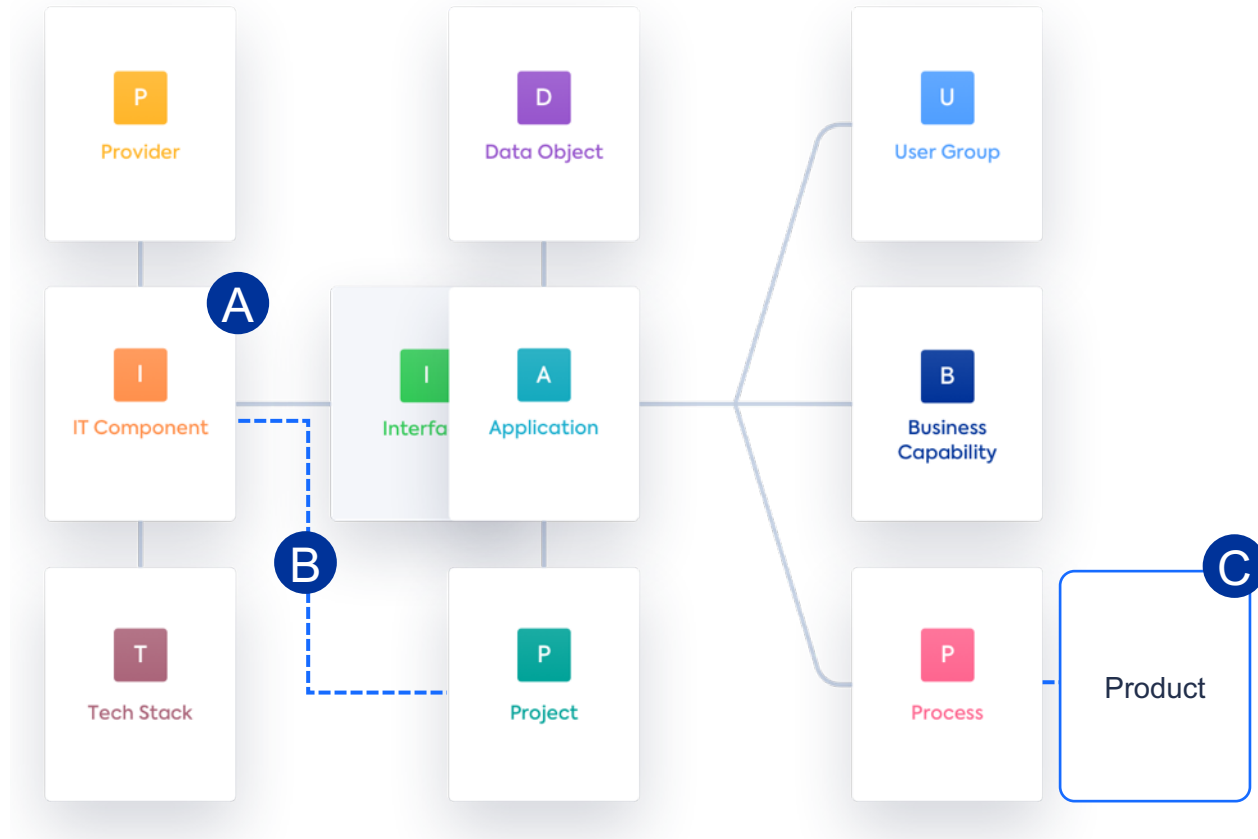


Misunderstood, so often



Solve problem first, then generalize solution

Hard-Coded Data Model (until 2017, 100 customers)

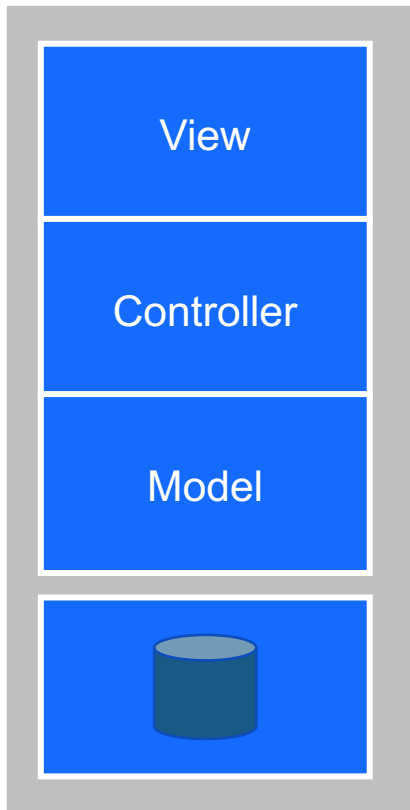


Added Levels of Configuration

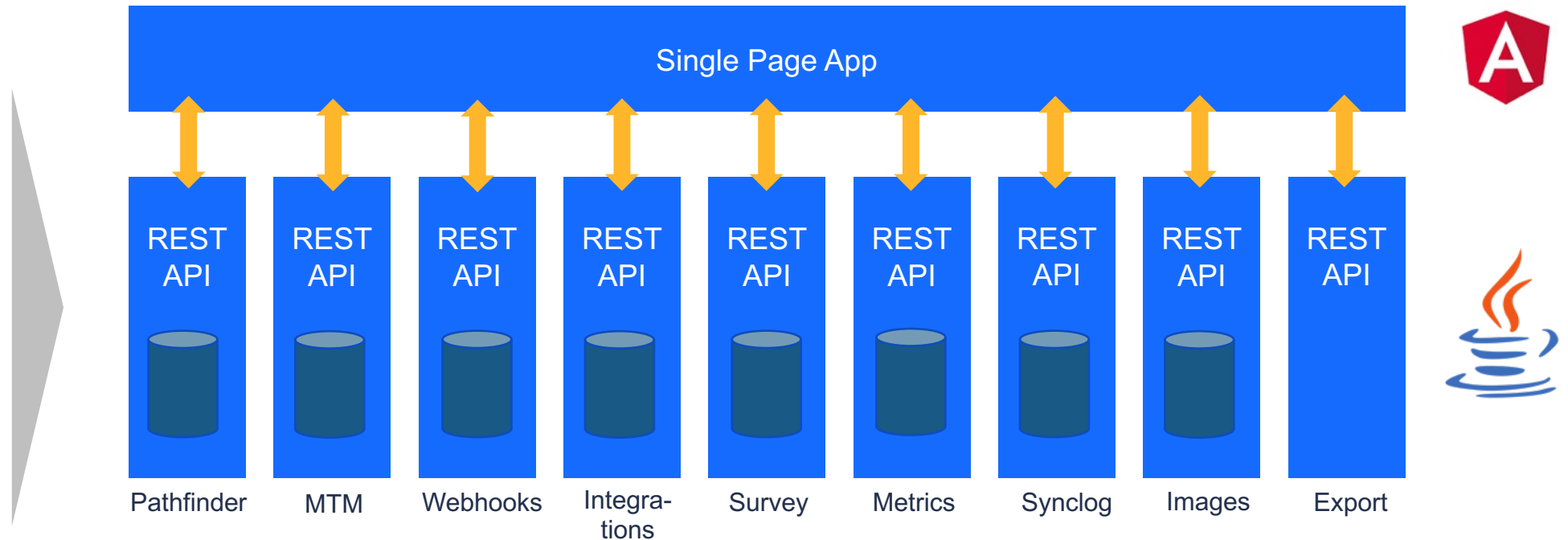
- A** Attributes*
- B** New Relations
- C** New Fact Sheets
- Authorization & Reporting

After product market fit, we shifted to scaling

Monolith
2012 - 2014



Microservices
2015 - Today



We are not Netflix – careful of granularity

Developers > # Microservices

API first

One Concern

Swagger API Docs

Containerized

No shared Database

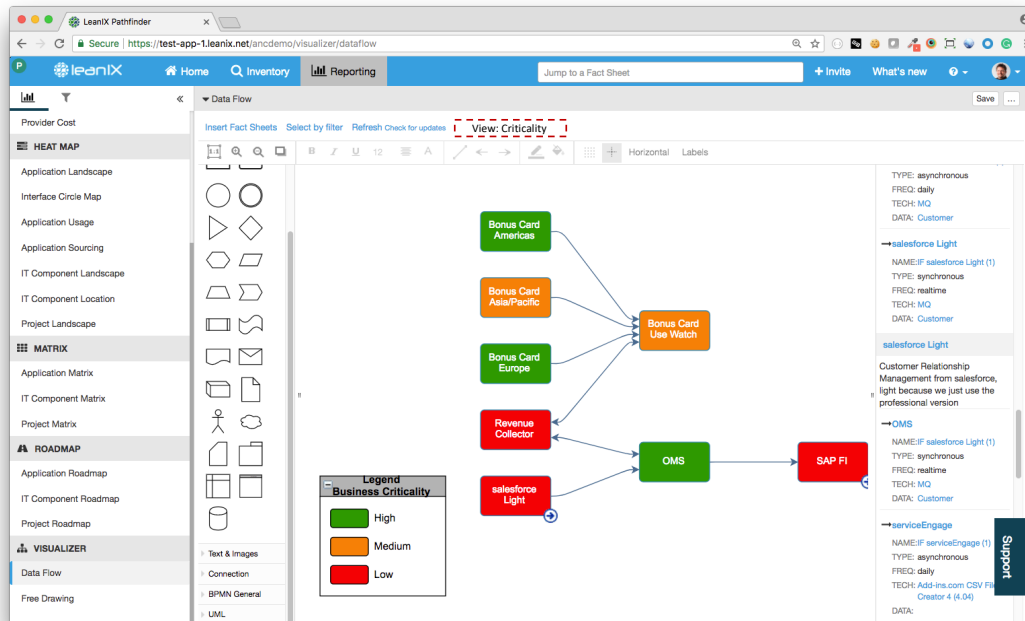
Configurable



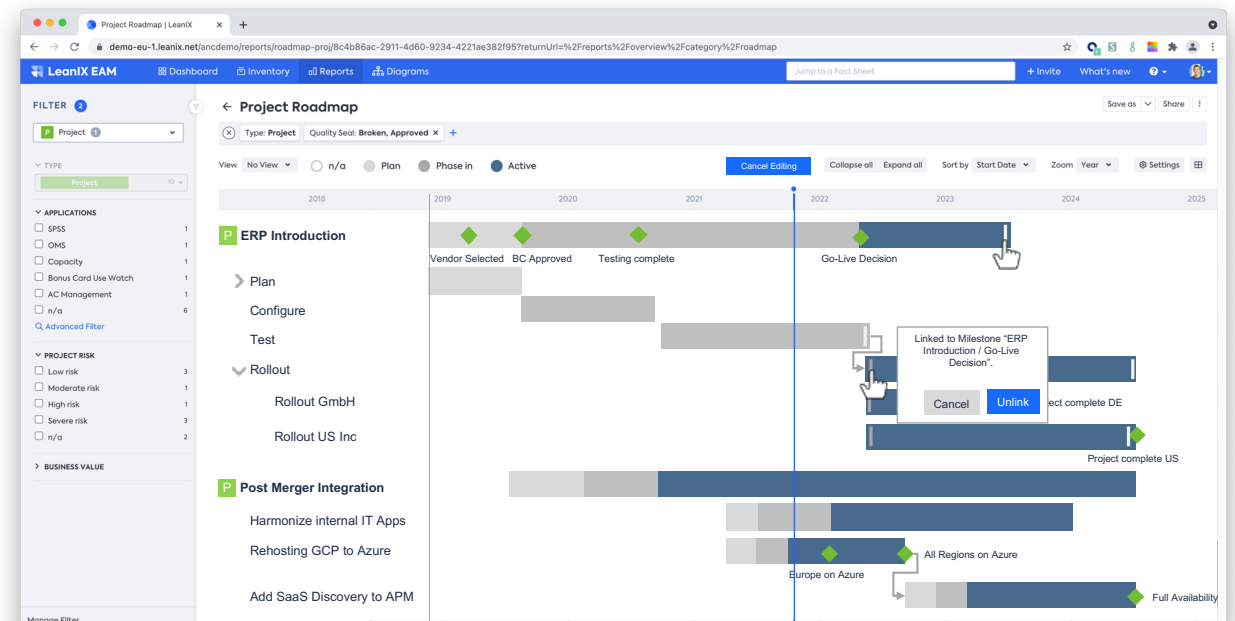
Adrian Cockcroft
ex-CTO Netflix

Create mockups and save time with long stories

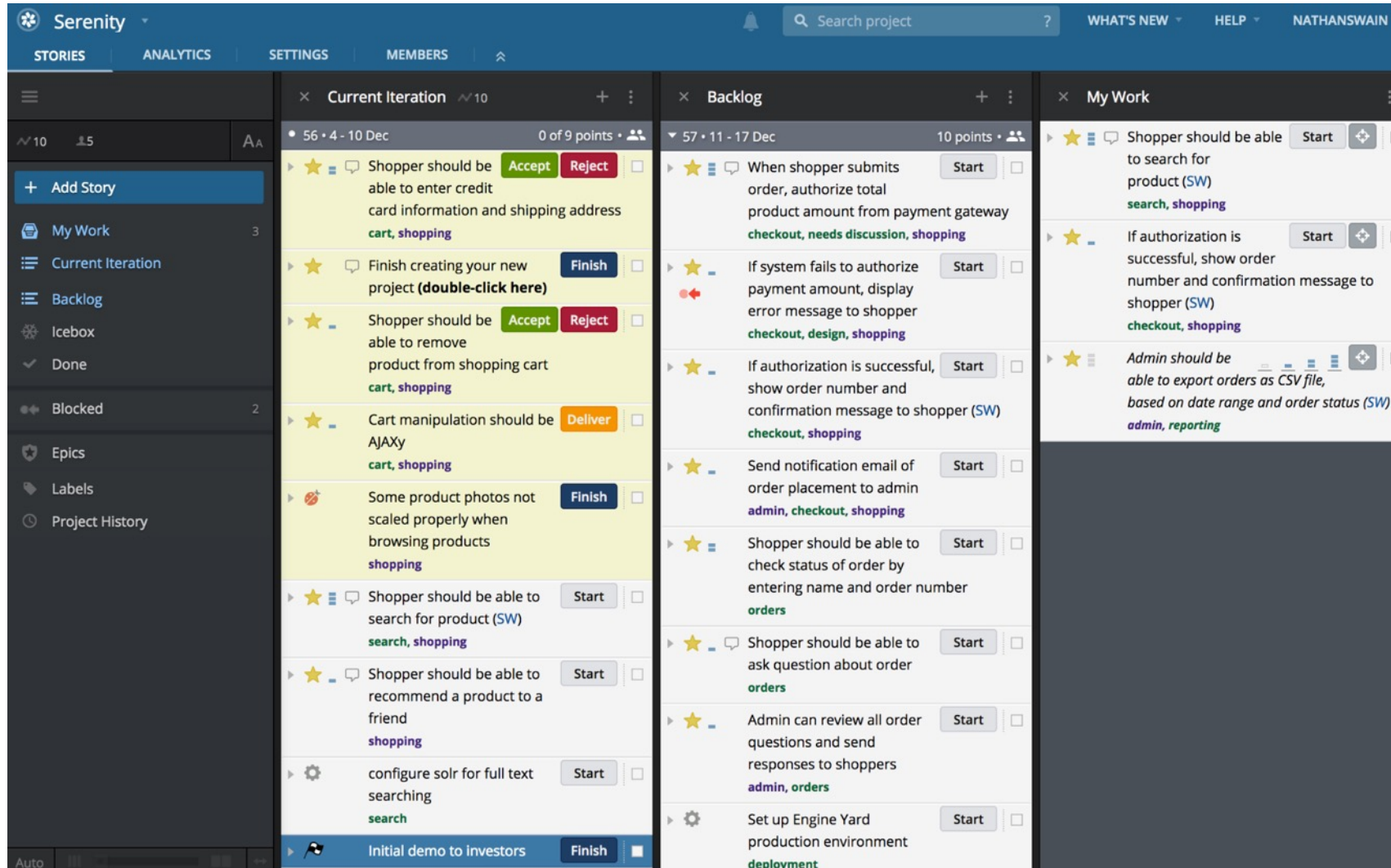
Valid in 2017 – Improvements in Diagrams



Still valid in 2021 – Refined BTM Concept



Stay light in your stories until you can afford it

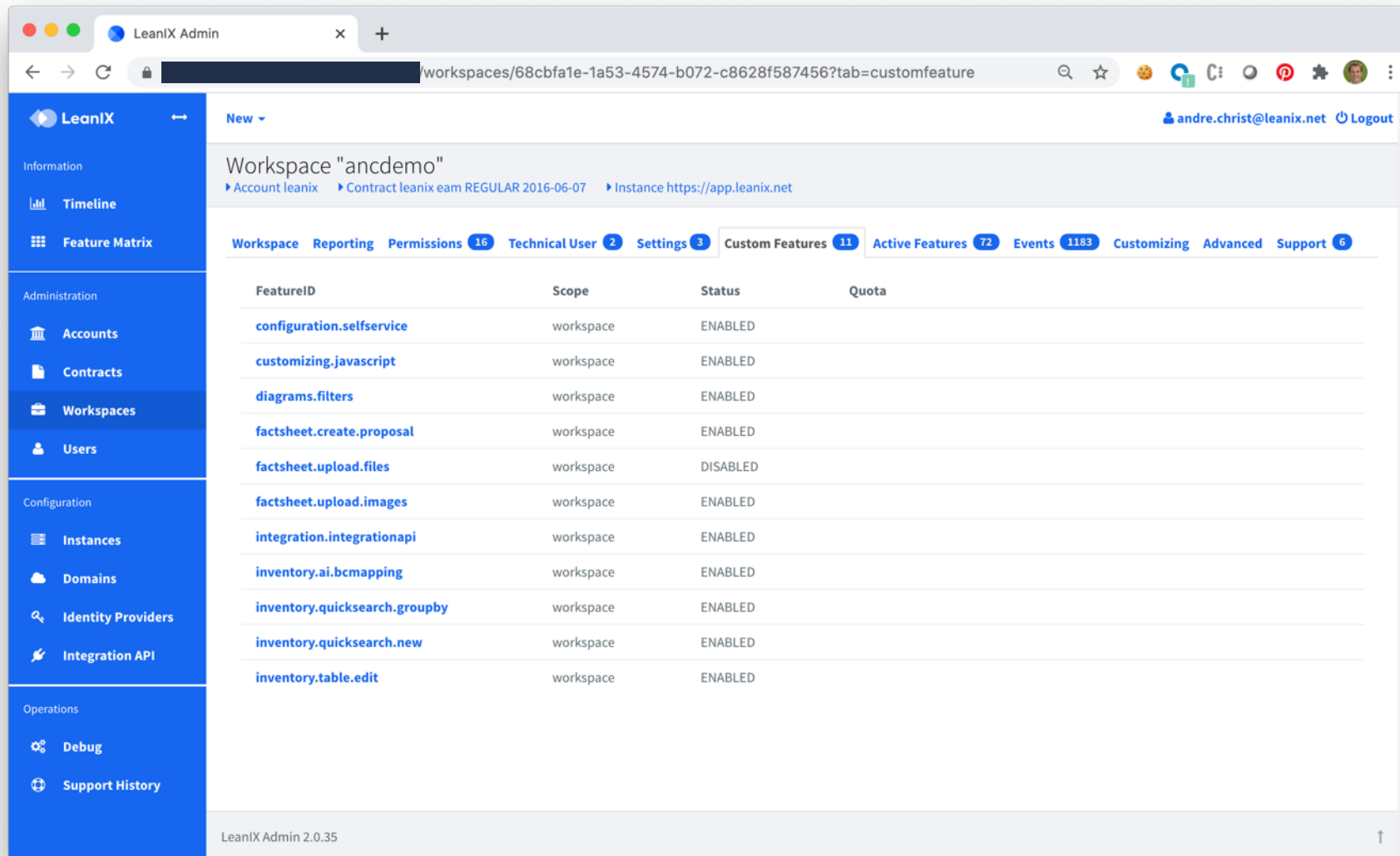


The screenshot displays the Serenity project management tool interface. It features a top navigation bar with 'STORIES', 'ANALYTICS', 'SETTINGS', and 'MEMBERS'. Below this, there are three main panels:

- Current Iteration:** Shows a list of stories for the current iteration (Dec 4-10). Stories include: 'Shopper should be able to enter credit card information and shipping address', 'Finish creating your new project (double-click here)', 'Shopper should be able to remove product from shopping cart', 'Cart manipulation should be AJAXy', 'Some product photos not scaled properly when browsing products', 'Shopper should be able to search for product (SW)', 'Shopper should be able to recommend a product to a friend', and 'configure solr for full text searching'. Each story has a 'Start', 'Accept', 'Reject', or 'Deliver' button.
- Backlog:** Shows a list of stories in the backlog (Dec 11-17). Stories include: 'When shopper submits order, authorize total product amount from payment gateway', 'If system fails to authorize payment amount, display error message to shopper', 'If authorization is successful, show order number and confirmation message to shopper (SW)', 'Send notification email of order placement to admin', 'Shopper should be able to check status of order by entering name and order number', 'Shopper should be able to ask question about order', 'Admin can review all order questions and send responses to shoppers', and 'Set up Engine Yard production environment'.
- My Work:** Shows a list of stories assigned to the user. Stories include: 'Shopper should be able to search for product (SW)', 'If authorization is successful, show order number and confirmation message to shopper (SW)', and 'Admin should be able to export orders as CSV file, based on date range and order status (SW)'.

- Pivotal Tracker: Single line stories, simple grouping to epics
- Forced first engineers to think in product
- Move to Jira creates more structure, workflows, ... and overhead
- Makes only sense if Product Management is established and Admin exists

Feature toggles for continuous deployment



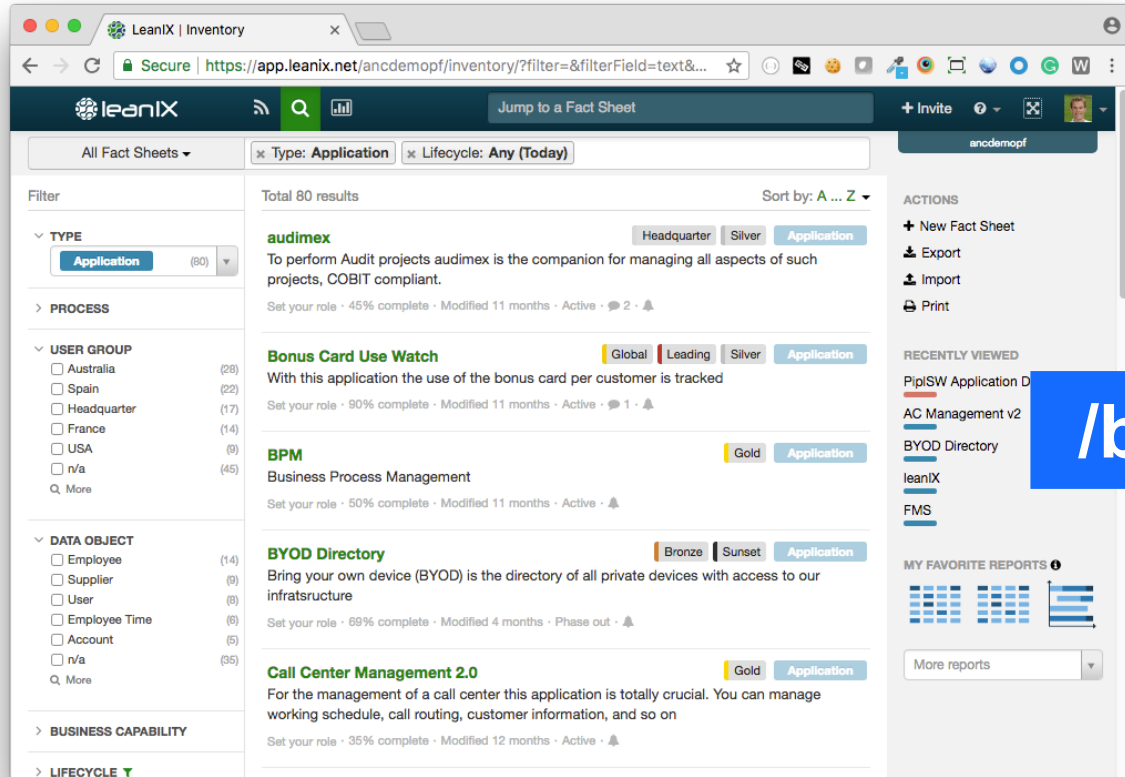
The screenshot shows the LeanIX Admin interface. The browser address bar displays the URL: `workspaces/68cbfa1e-1a53-4574-b072-c8628f587456?tab=customfeature`. The user is logged in as `andre.christ@leanix.net`. The main content area is titled "Workspace 'ancdemo'" and shows a navigation bar with various tabs: Workspace, Reporting, Permissions (16), Technical User (2), Settings (3), Custom Features (11), Active Features (72), Events (1183), Customizing, Advanced, and Support (6). The "Custom Features" tab is active, displaying a table of features.

FeatureID	Scope	Status	Quota
configuration.selfservice	workspace	ENABLED	
customizing.javascript	workspace	ENABLED	
diagrams.filters	workspace	ENABLED	
factsheet.create.proposal	workspace	ENABLED	
factsheet.upload.files	workspace	DISABLED	
factsheet.upload.images	workspace	ENABLED	
integration.integrationapi	workspace	ENABLED	
inventory.ai.bcmapping	workspace	ENABLED	
inventory.quicksearch.groupby	workspace	ENABLED	
inventory.quicksearch.new	workspace	ENABLED	
inventory.table.edit	workspace	ENABLED	

LeanIX Admin 2.0.35

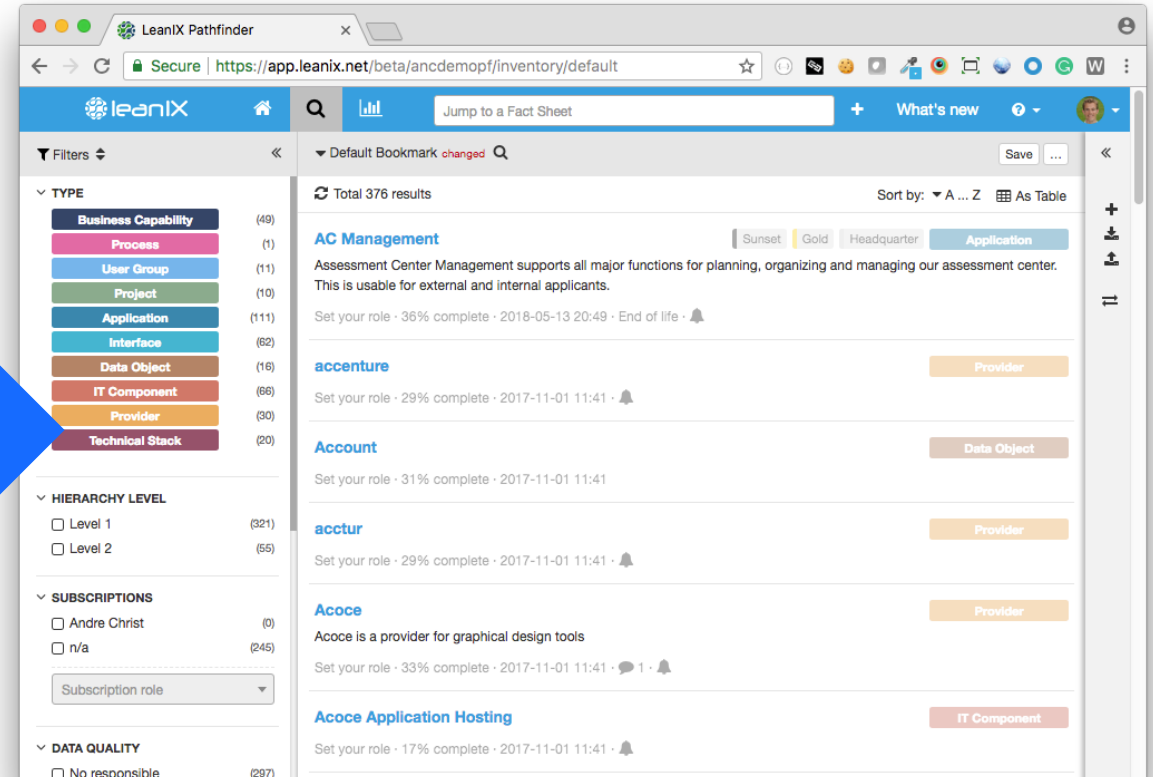
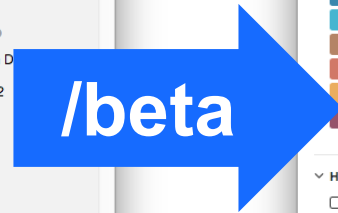
- Own solution for product feature flags:
 - Beta Features
 - Special Features
- Can be configured per workspace (customer)
- Can be grouped into an edition

Provide users easy way to see (fast) progress



The screenshot shows the 'Inventory' page in LeanIX. The top navigation bar includes the LeanIX logo, a search bar, and a 'Jump to a Fact Sheet' button. Below the navigation, there are filters for 'All Fact Sheets', 'Type: Application', and 'Lifecycle: Any (Today)'. The main content area displays a list of fact sheets with details such as 'audimex', 'Bonus Card Use Watch', 'BPM', 'BYOD Directory', and 'Call Center Management 2.0'. Each fact sheet includes a progress indicator (e.g., '45% complete') and a 'Set your role' button. The right sidebar contains 'ACTIONS' (New Fact Sheet, Export, Import, Print), 'RECENTLY VIEWED' items, and 'MY FAVORITE REPORTS'.

Version 3

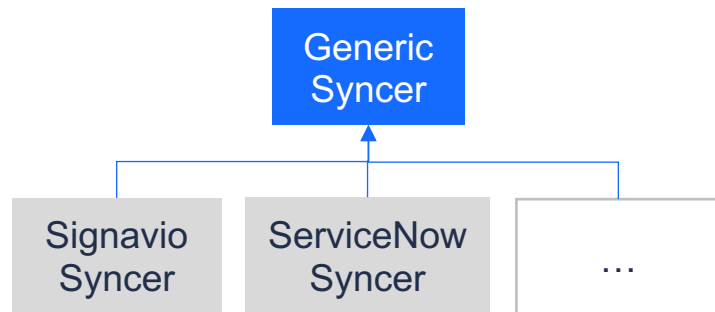


The screenshot shows the 'Pathfinder' page in LeanIX. The top navigation bar includes the LeanIX logo, a search bar, and a 'Jump to a Fact Sheet' button. Below the navigation, there are filters for 'TYPE' (Business Capability, Process, User Group, Project, Application, Interface, Data Object, IT Component, Provider, Technical Stack), 'HIERARCHY LEVEL' (Level 1, Level 2), 'SUBSCRIPTIONS' (Andre Christ, n/a), and 'DATA QUALITY' (No responsible). The main content area displays a list of fact sheets with details such as 'AC Management', 'accenture', 'Account', 'acctur', 'Acoco', and 'Acoco Application Hosting'. Each fact sheet includes a progress indicator (e.g., '36% complete') and a 'Set your role' button. The right sidebar contains 'ACTIONS' (New Fact Sheet, Export, Import, Print), 'RECENTLY VIEWED' items, and 'MY FAVORITE REPORTS'.

Version 4 - "Pathfinder"

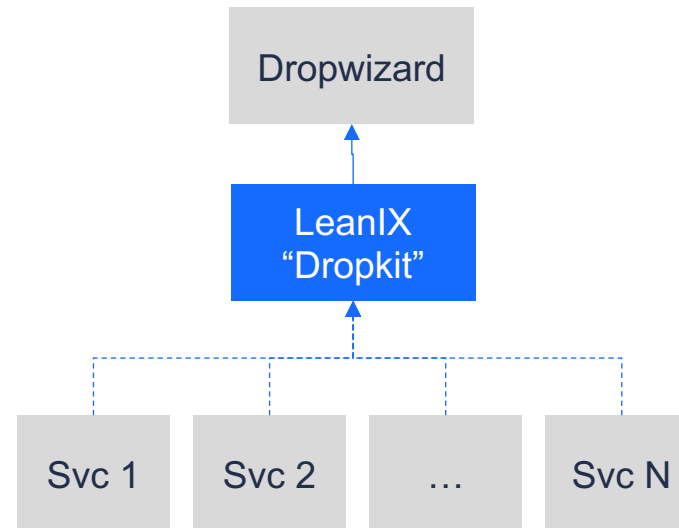
Usability & flexibility > reuse & abstraction

A) Re-usable sync framework



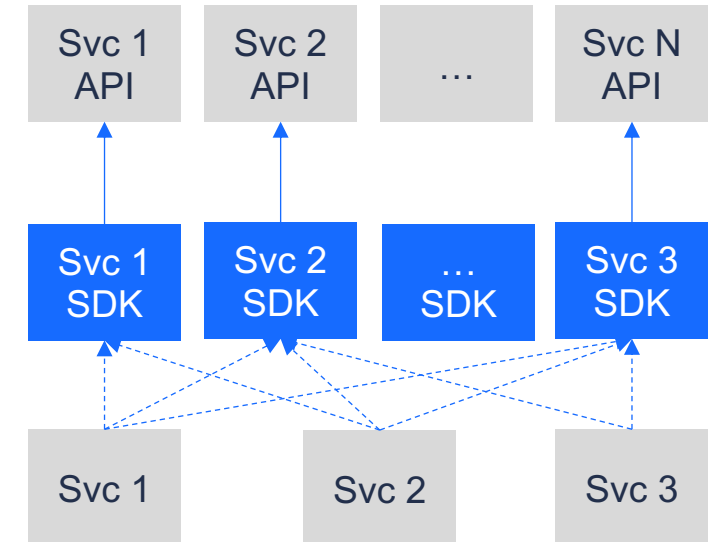
- High abstraction level created big complexity
 - Every change risks issues
- Extract into Integration API

B) Centralize bootstrapping code



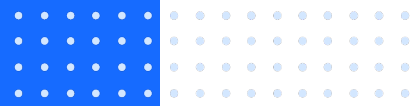
- Maintaining own library for simple code creates overhead
 - Version updates time consuming
- Include Dropwizard directly

C) Generated SDKs via Swagger



- High overhead for re-generating SDKs for API changes
 - Long roundtrip for simple changes
- Use light HTTP-Client (retrofit)

1. **Start**
2. **Scale**
3. **Learn**



Reality in 2022

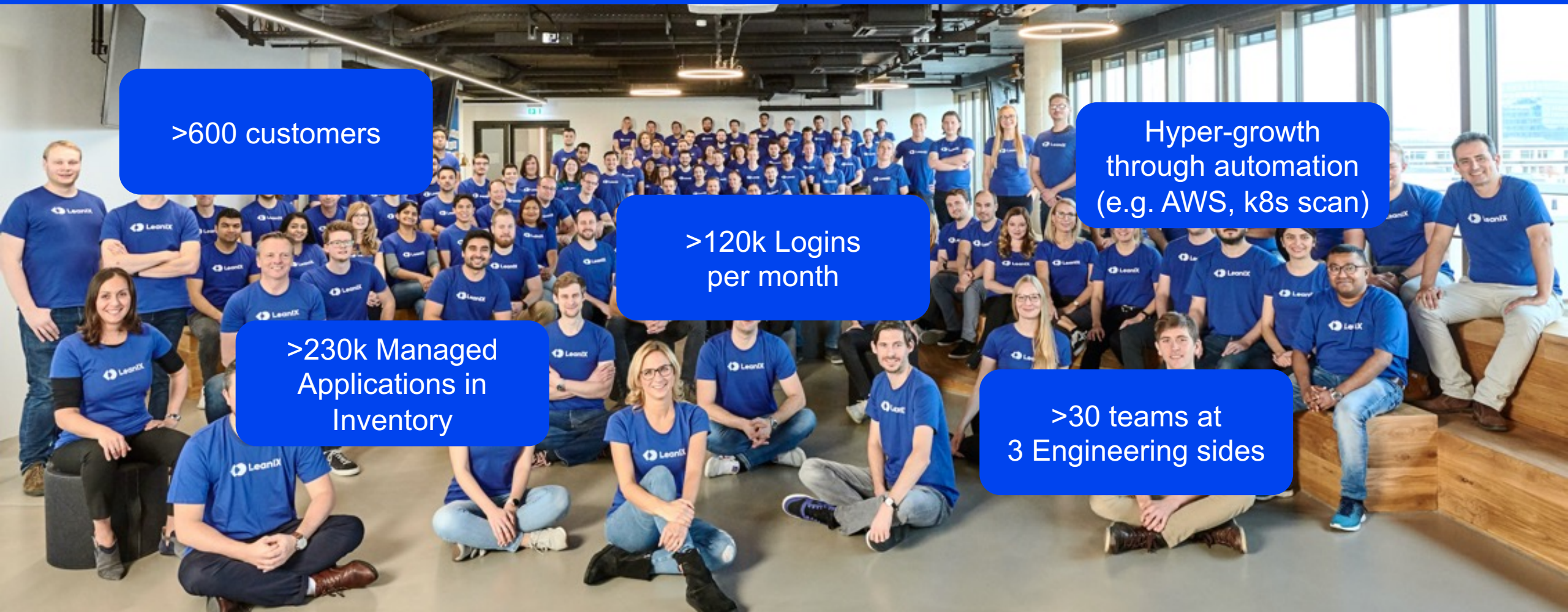
>600 customers

Hyper-growth
through automation
(e.g. AWS, k8s scan)

>120k Logins
per month

>230k Managed
Applications in
Inventory

>30 teams at
3 Engineering sides



Different stage, different problems


#general General announcements and news relevant for every LeanIX Power User / Champion

April 13th, 2021

André Christ 4:32 PM
@channel Update on Outage / Performance Issues All, I'd like to provide another update on Outages / Performance issues esp. in the first quarter this year. As you see in the first picture attached, in Q1 / 2021 we have seen a strong increase in Outages compared to many month before. During Q1 we have improved our tracking under <https://status.leanix.net>. With the change of our CDN architecture (post above) we have removed one root cause - but I'd like to provide more visibility here into the full picture of issues, root causes and already completed mitigations. We continue to track a couple of important open mitigations which will further increase reliability - but will also need the investment. We have decided for a strong investment into performance and reliability in Q2 to continue our work here. We will provide another update during / end of Q2 to inform you about the progress. Please let me know if you have any questions / feedback. Thank you for your trust and support - my team and I sincerely appreciate it, André

2 files

Reliability – Significant Outage Increase



Significant increase observed
mediate re-priorization for
Root cause analysis
Root cause mitigation
Issue Categories
System Health Issues
Performance
Human Error
Major increase
Reported System Performance Issues

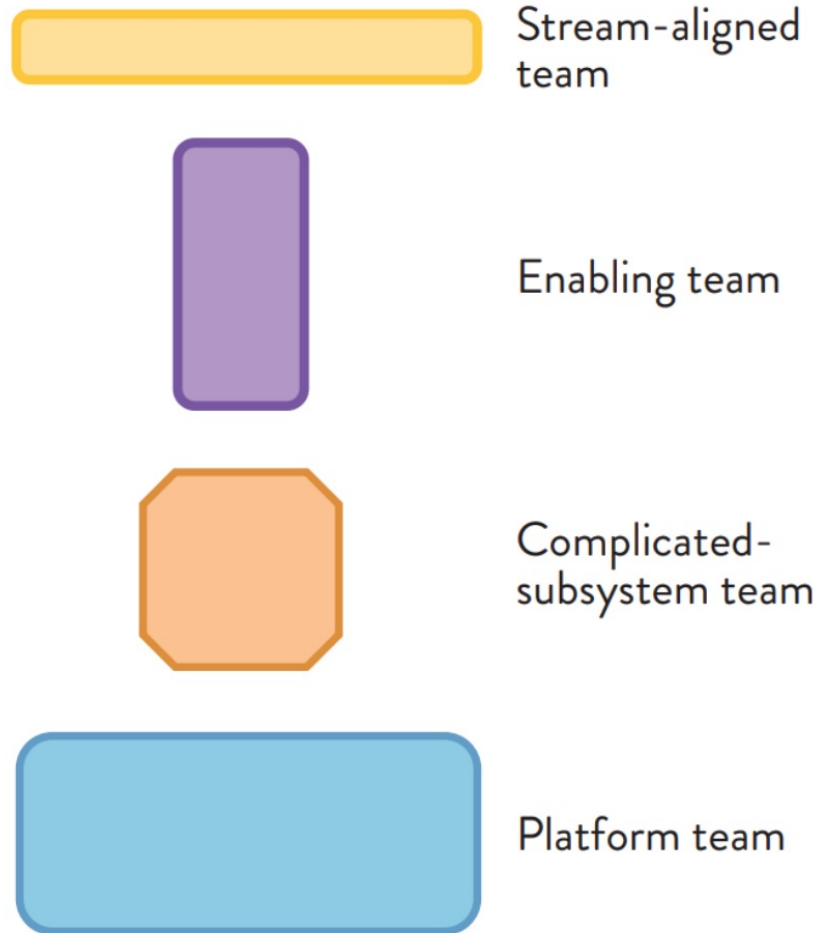
Reliability – Outage Details

Customer Impact	Root Cause	Counter measures implemented	Open Counter Measures
Application slow, temporarily unavailable	Webhooks slow, impacting MTM & Pathfinder	Webhook Performance Improvements	Decouple Pathfinder from Move MTM to K8s (XL, in progress)
Users not able to login, integration failures	Network issues for requests originating from K8s	CDN usage removed Automated Proxy restart Added retries	
Email notifications not send	Payment issues with Mailjet	Mailjet payment plan adjusted Fallback to 2nd provider	
Application unavailable	Azure CDN unavailable	CDN usage removed	
Application temporarily slow/unresponsive	Pathfinder DB overloaded / Connection Pool full	Internal API rate limitations Large instances split High load requests improved	Abort long-running requests
Application unavailable	Broken VM network stack	Alerting improved	Move MTM to K8s (XL, in progress) Move PF service to K8s (XL, in progress)
Various Functionality unavailable	Database CPU / Memory exhausted	Database upscaled Alerting improved	
Application unavailable	Human error: Faulty CDN & k8s config	Dev awareness raised CDN usage removed	
Export not working, Application unavailable	Human error: Faulty software released	Dev awareness raised Rollback improvements, Silent & canary releases	

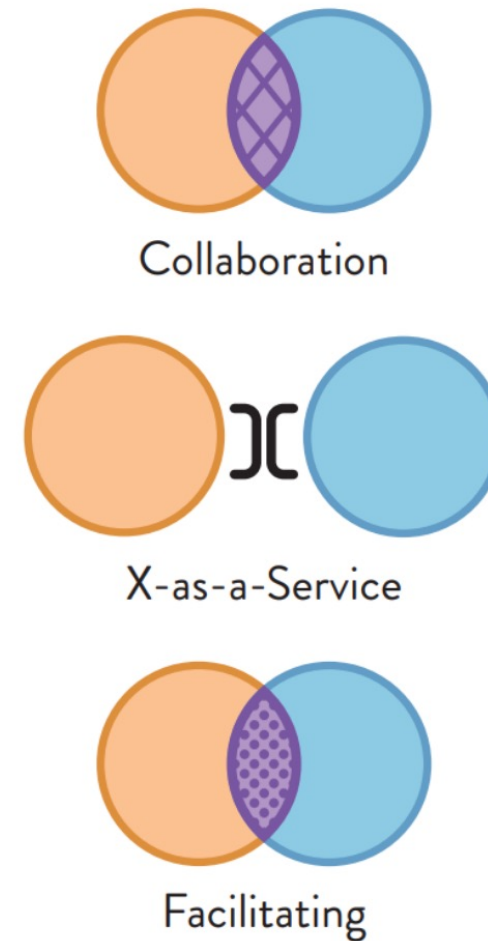
2

Message #general

Four Team Types



Three Interaction Modes





Empowered to solve hard problems in ways their customer love

Inspired to discover valuable, usable, feasible & viable solutions

Establish trust with their teammates & the rest of the company

Need ongoing coaching on business context from leadership



TWO WAY
TRAFFIC



Mean Time to Recovery



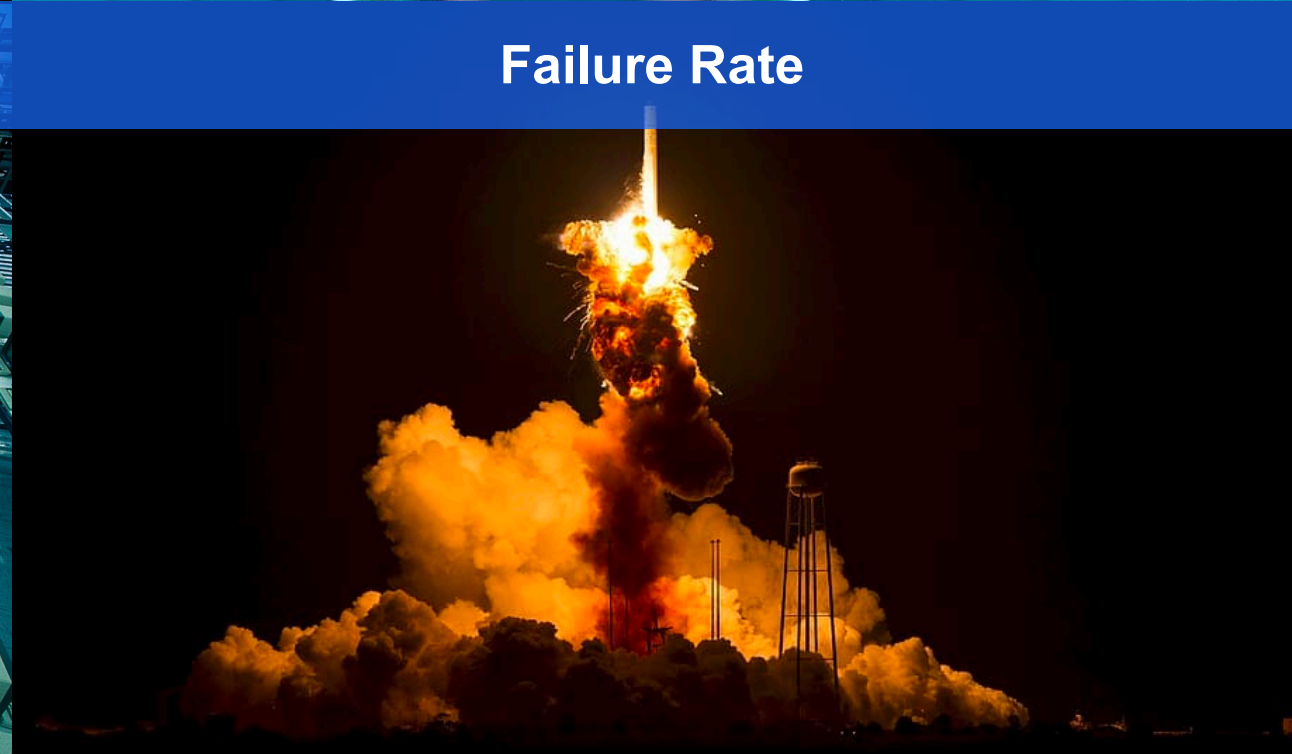
Deployment Frequency



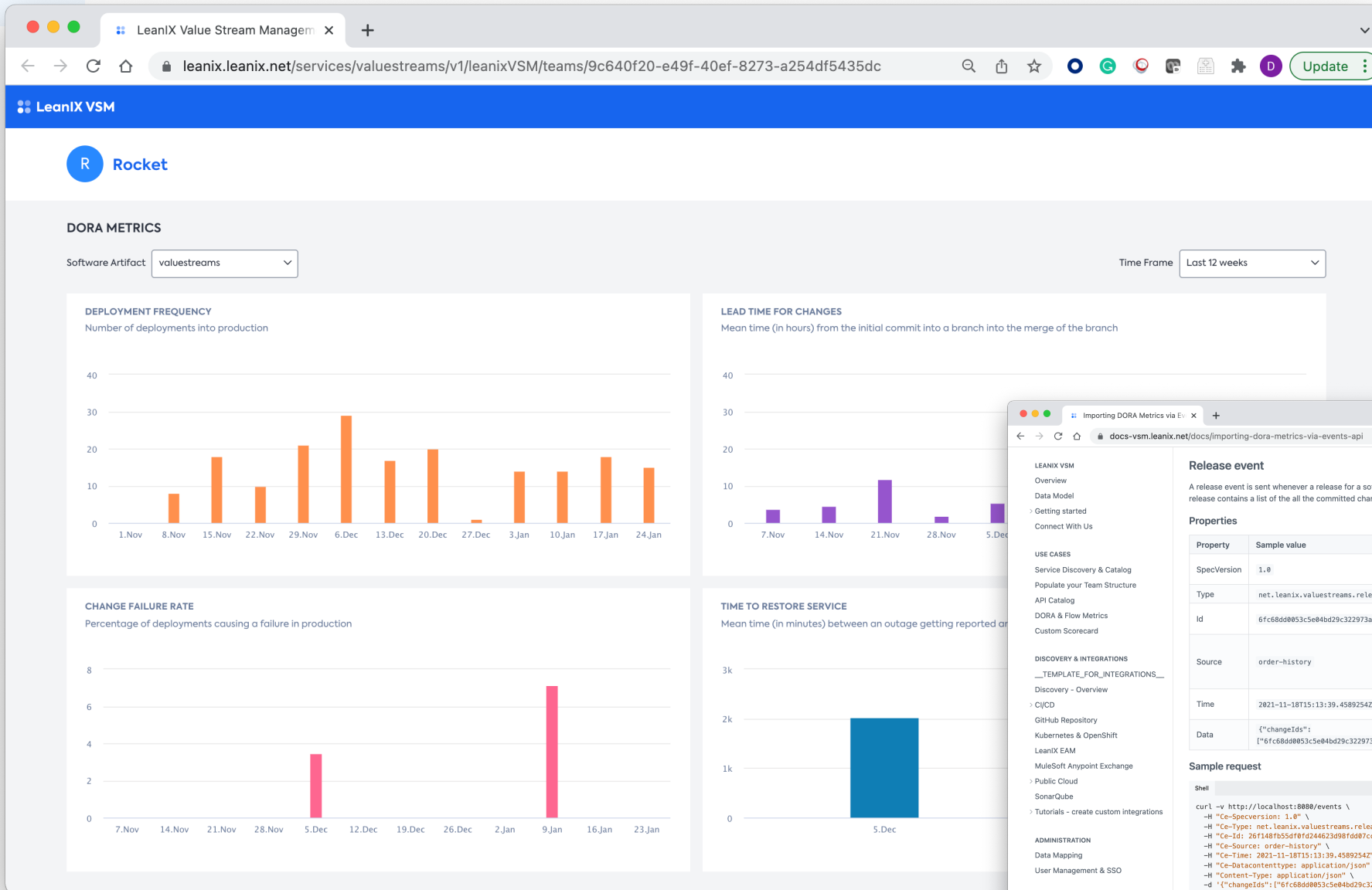
Lead Time



Failure Rate



Event-based DORA calculation



LeanIX VSM

Rocket

DORA METRICS

Software Artifact: **valuestreams** | Time Frame: **Last 12 weeks**

DEPLOYMENT FREQUENCY

Number of deployments into production

Date	Number of deployments
1.Nov	0
8.Nov	8
15.Nov	18
22.Nov	10
29.Nov	21
6.Dec	29
13.Dec	17
20.Dec	20
27.Dec	1
3.Jan	14
10.Jan	14
17.Jan	18
24.Jan	15

LEAD TIME FOR CHANGES

Mean time (in hours) from the initial commit into a branch into the merge of the branch

Date	Mean time (hours)
7.Nov	4
14.Nov	4
21.Nov	12
28.Nov	2
5.Dec	5

CHANGE FAILURE RATE

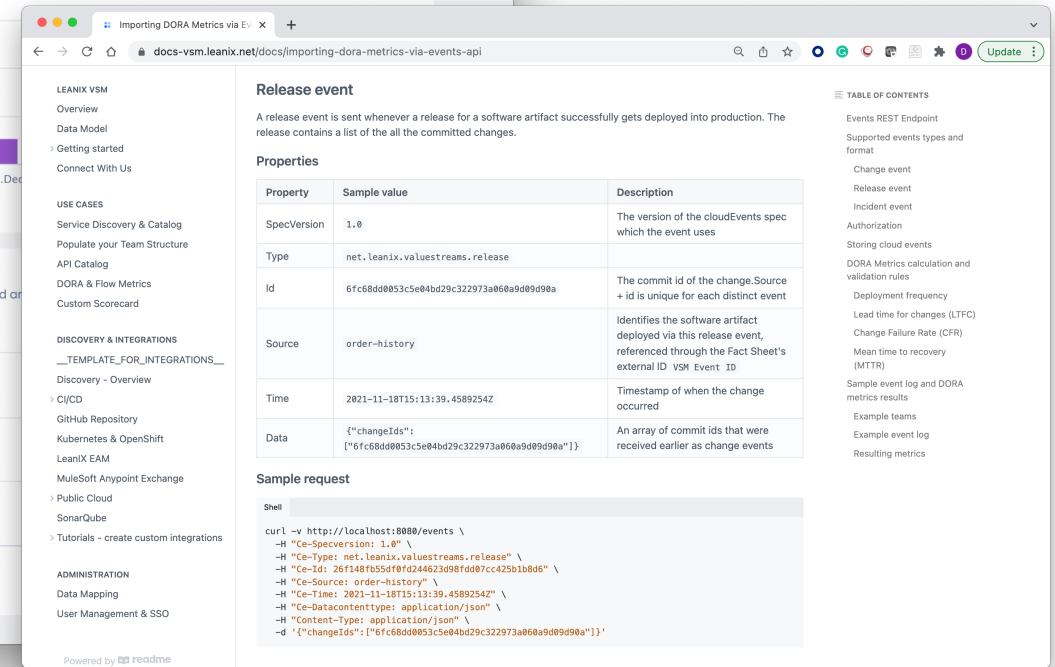
Percentage of deployments causing a failure in production

Date	Percentage of failures
7.Nov	0
14.Nov	0
21.Nov	0
28.Nov	0
5.Dec	3.5
12.Dec	0
19.Dec	0
26.Dec	0
2.Jan	0
9.Jan	7
16.Jan	0
23.Jan	0

TIME TO RESTORE SERVICE

Mean time (in minutes) between an outage getting reported and service restored

Date	Mean time (minutes)
5.Dec	2000



Importing DORA Metrics via Events API

Release event

A release event is sent whenever a release for a software artifact successfully gets deployed into production. The release contains a list of all the committed changes.

Properties

Property	Sample value	Description
SpecVersion	1.0	The version of the cloudEvents spec which the event uses
Type	net.leanix.valuestreams.release	
Id	6fc68d0853c5e84bd29c322973a060a9d09d90a	The commit id of the change. Source + id is unique for each distinct event
Source	order-history	Identifies the software artifact deployed via this release event, referenced through the Fact Sheet's external ID VSM Event ID
Time	2021-11-18T15:13:39.4589254Z	Timestamp of when the change occurred
Data	{ "changeIds": ["6fc68d0853c5e84bd29c322973a060a9d09d90a"] }	An array of commit ids that were received earlier as change events

Sample request

```
curl -v http://localhost:8080/events \
-H "Ce-Specversion: 1.0" \
-H "Ce-Type: net.leanix.valuestreams.release" \
-H "Ce-Id: 26f1487b55df0fd244623d98fdd07cc425b1b8d6" \
-H "Ce-Source: order-history" \
-H "Ce-Time: 2021-11-18T15:13:39.4589254Z" \
-H "Ce-Datacontenttype: application/json" \
-H "Content-Type: application/json" \
-d '{"changeIds": ["6fc68d0853c5e84bd29c322973a060a9d09d90a"]}'
```

Simplify compliance by adding context

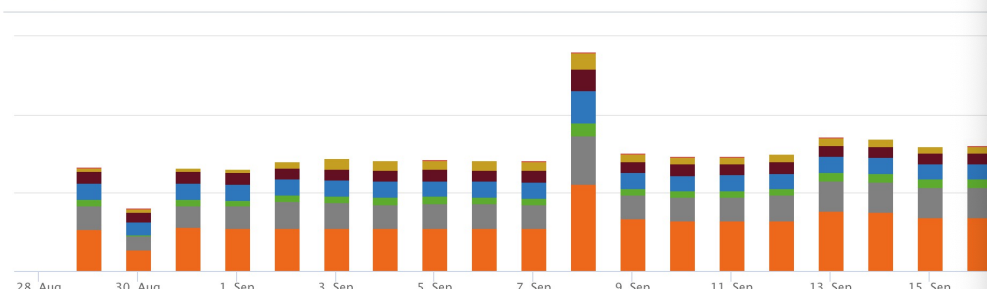
LeanIX VSM Dashboard

Vulnerability dash

Security vulnerabilities by Artifact and Team in my Teams

Responsible Teams	Display Name	Security Issues S1	Security Issues S2 ↓
CI / MI Product Group / Rocket	leanix-confluence-cloud	0	7
CI / MI Product Group / Rocket	onboarding	0	5
CI / MI Product Group / Rocket	violations	0	1
CI / MI Product Group / Nimbus	portal	0	1
CI / MI Product Group / Rocket	violations-report	0	
CI / MI Product Group / Rocket	leanix-jira-cloud	0	
App Core / Dragon; App Core / Reinvent; App Core ...	leanix-pathfinder-web	2	
CI / MI Product Group / Cider	connector-functions-on-prem-adapter	0	
CI / MI Product Group / Helios	cloud-connector-mapper	0	

Library Vulnerabilities trends overall



team-sailors-status

December 12th, 2021

leanix-vsm-automation APR 10:33 AM
Snyk W2 vulnerability in project leanix-apptio-connector without a Jira ticket was found: <https://snyk.io/org/leanix/project/4152f9e1-d175-426d-a240-d667678aaf7e#issue-SNYK-JAVA-COMGOOGLECODEGSON-1730327> (edited)

Snyk
Snyk - Log in or sign up to secure your projects
Log in to Snyk

Snyk W2 vulnerability in project leanix-integrations without a Jira ticket was found: <https://snyk.io/org/leanix/project/75836d8c-3e95-4c39-9275-176d1c7d2492#issue-SNYK-JAVA-COMGOOGLECODEGSON-1730327> (edited)

Snyk
Snyk - Log in or sign up to secure your projects
Log in to Snyk

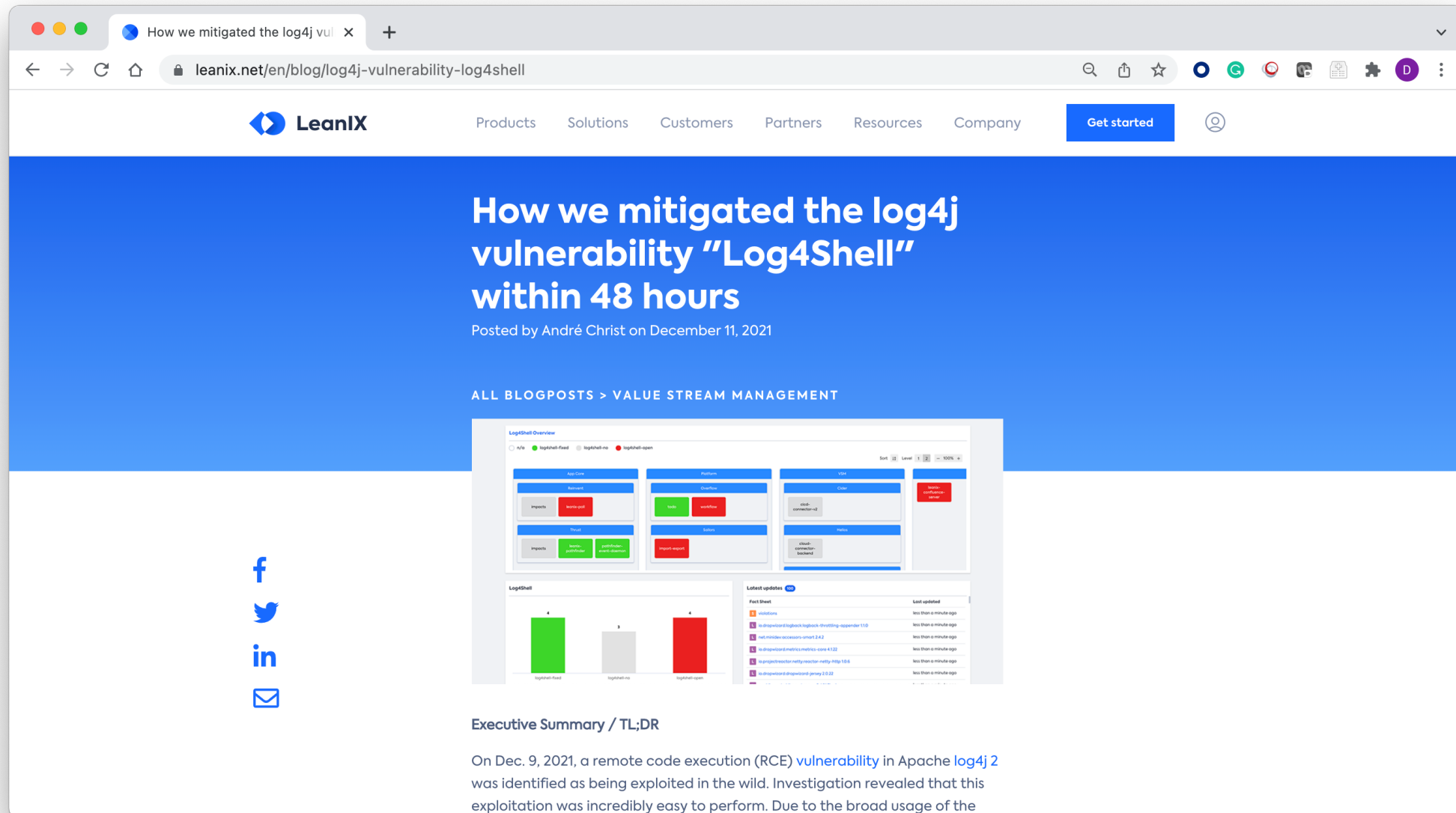
Snyk W2 vulnerability in project integration-hub without a Jira ticket was found: <https://snyk.io/org/leanix/project/b76910cb-d228-41ac-9b79-4e1c28121af6#issue-SNYK-JAVA-IOMICRONAUT-1320020> (edited)

Snyk
Snyk - Log in or sign up to secure your projects
Log in to Snyk

Snyk W2 vulnerability in project leanix-apptio-connector without a Jira ticket was found: <https://snyk.io/org/leanix/project/4152f9e1-d175-426d-a240-d667678aaf7e#issue-SNYK-JAVA-COMNIMBUSDS-1243767> (edited)

Snyk
Snyk - Log in or sign up to secure your projects
Log in to Snyk

And then there was...

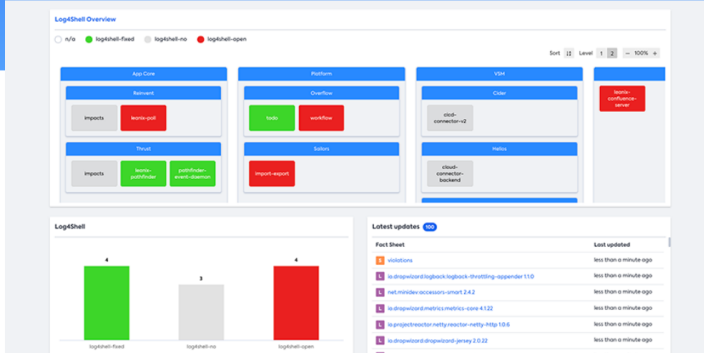


The screenshot shows a web browser window with the URL `leanix.net/en/blog/log4j-vulnerability-log4shell`. The page features a blue header with the LeanIX logo and navigation links. The main content area has a large blue background with the article title and author information. Below the title is a navigation breadcrumb and a screenshot of the LeanIX Log4Shell Overview dashboard. To the left of the dashboard are social media icons for Facebook, Twitter, LinkedIn, and Email. Below the dashboard is an 'Executive Summary / TL;DR' section.

How we mitigated the log4j vulnerability "Log4Shell" within 48 hours

Posted by André Christ on December 11, 2021

ALL BLOGPOSTS > VALUE STREAM MANAGEMENT



Log4Shell Overview

Info Log4Shell-Fixed Log4Shell-Not Log4Shell-Open

App Data Patterns CVE

Log4Shell

Latest updates

Executive Summary / TL;DR

On Dec. 9, 2021, a remote code execution (RCE) vulnerability in Apache log4j 2 was identified as being exploited in the wild. Investigation revealed that this exploitation was incredibly easy to perform. Due to the broad usage of the



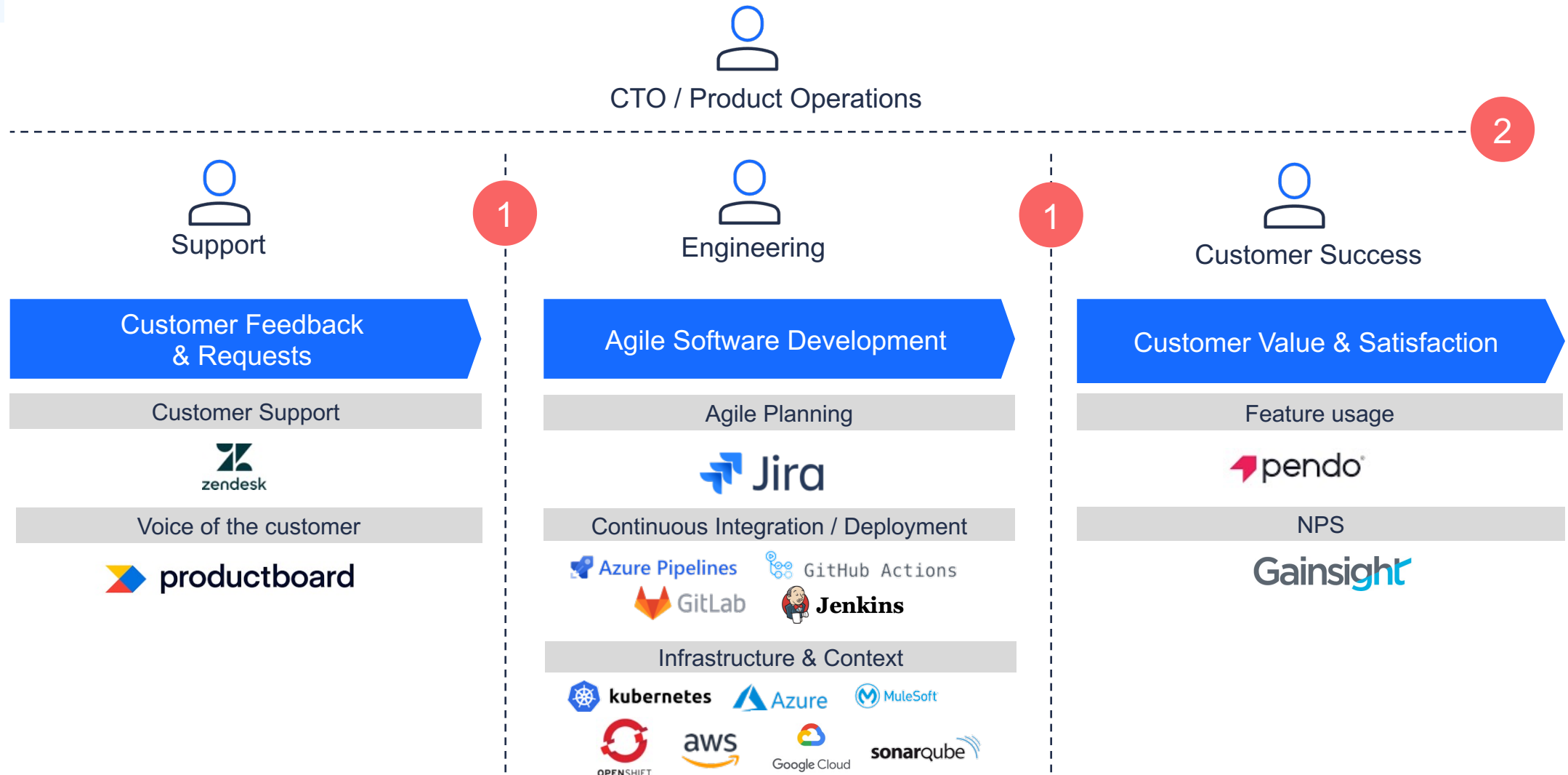
Floating or Sinking



1. Start
2. Scale
3. **Learn**



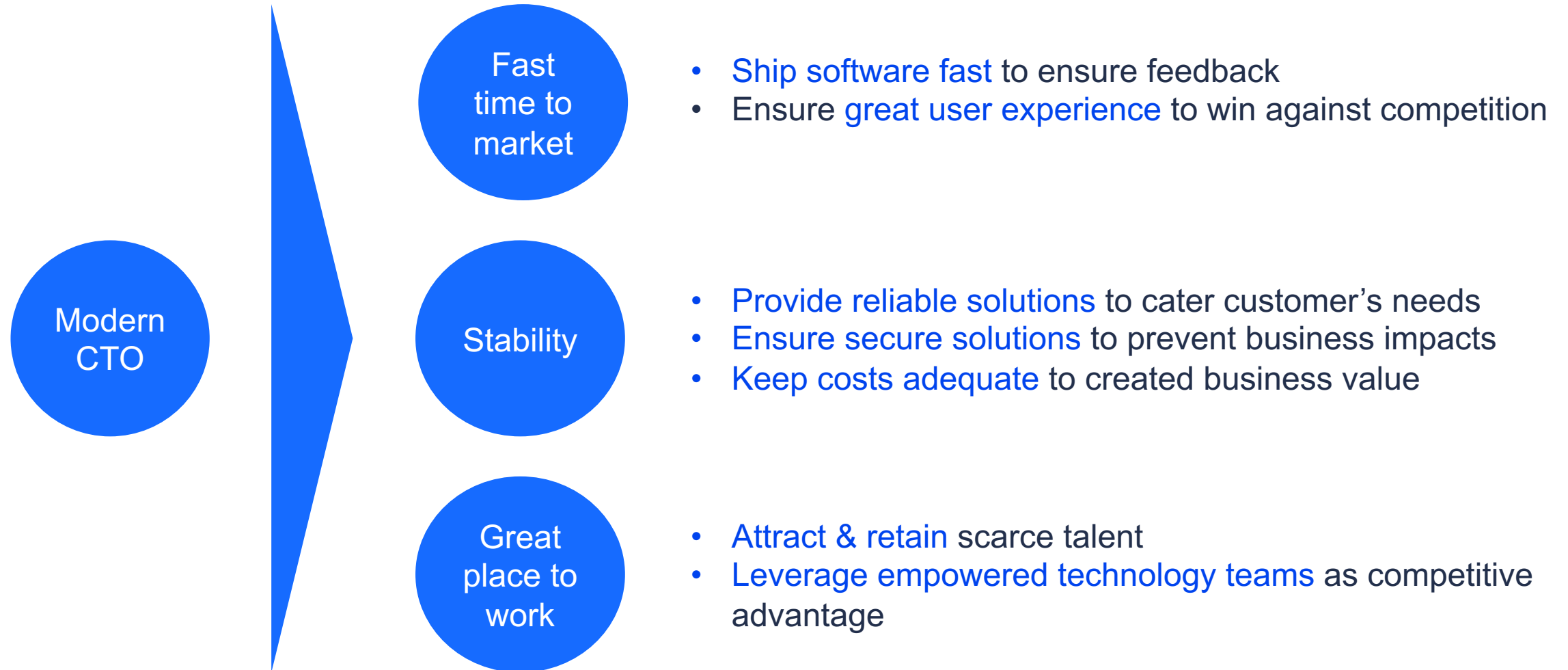
Your value stream is always in motion



1 Decisions are made based on local, insufficient or misleading data

2 Leadership either missed end-to-end view, or relies on tedious, intransparent data gathering

Software is eating the world – every company is a technology company



The tool-of-choice for product teams



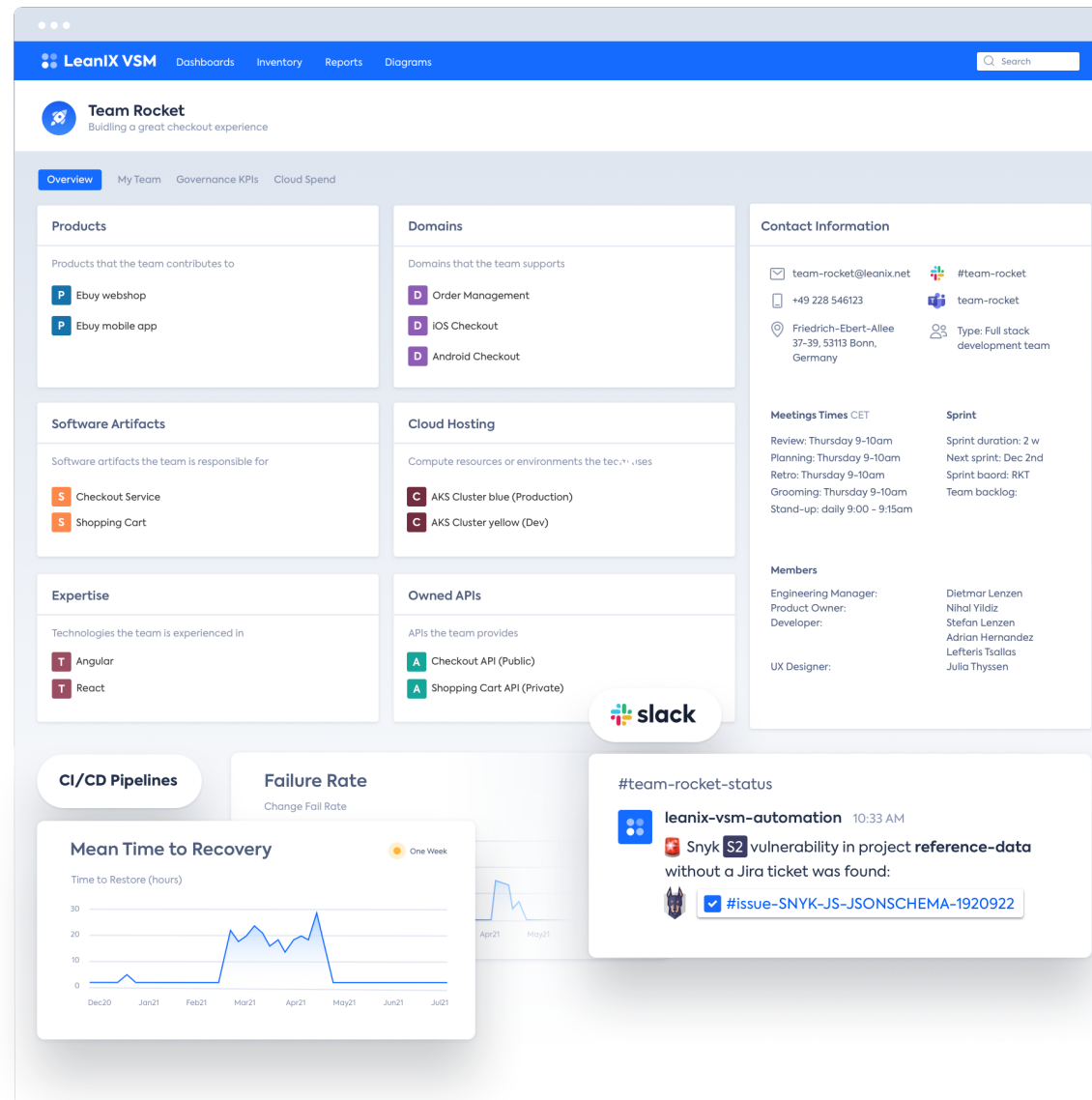
Increase efficiency by automating documentation



Ensure focus by sharing knowledge & promoting ownership



Objectify engineering effectiveness based on established best-practices & KPIs



The screenshot shows the LeanIX VSM interface for 'Team Rocket'. The top navigation bar includes 'LeanIX VSM', 'Dashboards', 'Inventory', 'Reports', and 'Diagrams'. The main content area is divided into several sections:

- Products:** Lists products the team contributes to, such as 'Ebuy webshop' and 'Ebuy mobile app'.
- Domains:** Lists domains the team supports, such as 'Order Management', 'iOS Checkout', and 'Android Checkout'.
- Contact Information:** Provides contact details for the team, including email, phone, and address.
- Software Artifacts:** Lists software artifacts the team is responsible for, such as 'Checkout Service' and 'Shopping Cart'.
- Cloud Hosting:** Lists compute resources or environments the team uses, such as 'AKS Cluster blue (Production)' and 'AKS Cluster yellow (Dev)'.
- Expertise:** Lists technologies the team is experienced in, such as 'Angular' and 'React'.
- Owned APIs:** Lists APIs the team provides, such as 'Checkout API (Public)' and 'Shopping Cart API (Private)'.
- Members:** Lists team members and their roles, such as 'Engineering Manager', 'Product Owner', and 'Developer'.
- CI/CD Pipelines:** A section for monitoring CI/CD pipelines.
- Failure Rate:** A section for monitoring failure rates, including a 'Mean Time to Recovery' chart showing 'Time to Restore (hours)' from Dec20 to Jul21.
- Slack Integration:** A Slack channel '#team-rocket-status' showing a message about a vulnerability in 'project reference-data'.



Improve developer experience by making business impact transparent







Simplify compliance & governance by contextualizing findings





Drive decisions with leadership based on common language

Target: Optimize DevOps Value Stream Metrics





-  **Deployment frequency**
How often do we release to production
-  **Lead time**
Time from commit to production
-  **Failure rate**
% of deployments causing failure
-  **Mean time to recovery**
Time to recover from a failure

 **Flow Velocity**
Completed work over a period of time

 **Flow Time**
Time from customer request to delivery

 **Flow Distribution**
Current mix of items

 **Flow Efficiency**
Distribution of items in work vs. waiting

 **Flow Load**
Number of items actively worked on

Modern Enterprise Architects embrace VSM

What

How

Why



Faster time-to-value based on discovery from software development, runtime & API Management

Out-of-the-box integrations to Github, CI/CD, Public Cloud, Kubernetes, MuleSoft, OpenAPI & more

Save time & avoid errors compared to manual data maintainance



Faster detection & mitigation of technical risk (e.g. GDPR violation, OSS licenses)

Discover OSS licenses directly from CI/CD, locations directly from public cloud, **promote** technical ownership and alignment

Switch from **reactive to proactive risk management**, create accountability across the entire software development cycle

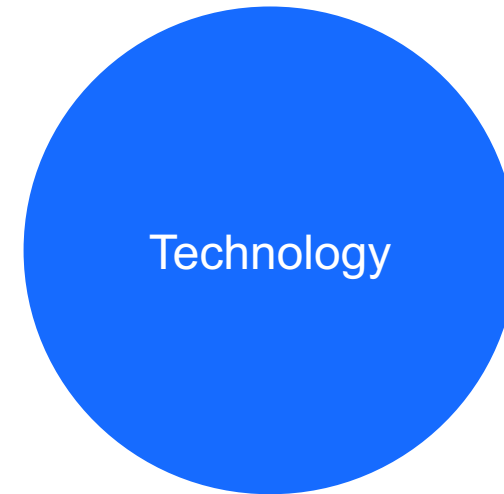
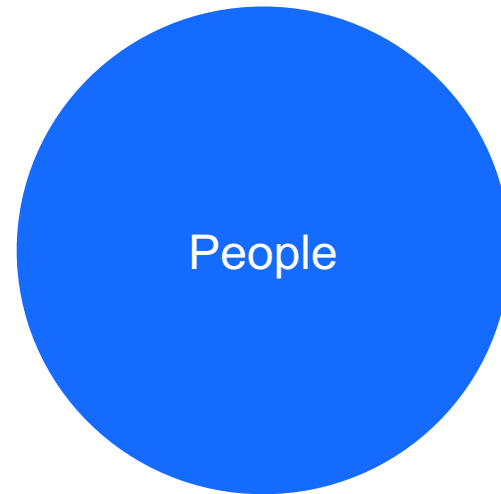


Higher architectural alignment between product & cooperate IT

Share business context to product IT **via EAM-VSM integration**, derive joint flow KPIs **via dedicated integrations & APIs**

Ensure technical synergies & promote joint architecture, evolve digital products **data-driven**

What is Value Stream Thinking?



Thank you!

