

DevOps Culture in Life Science

Implementing DevOps in a Regulated Traditionally Waterfall Environment

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usenix

LISA16

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www.usenix.org/lisa16

#lisa16



Who we are

Introductions and About Us



Merck & Co., Inc

Healthcare Company

125 Year old healthcare company, in the Fortune 100, operating in 140+ countries, part of a highly-regulated industry



Applied Technology

Innovation Group

Bringing new technologies to speed up IT, creating new products and markets, enabling platform-based technical ecosystems.



Peter Lega

Director, Architecture

Applied Technology, former Web/Content Management lead at Merck. 12 years in Health Science. Ancient Unix Kernel Hacker, Silicon Valley 1.0 (c|net), Middleware geek on Wall St, European commission. Automation dweeb.



Jason Victor

Assoc. Director, DevOps

Architect at Merck, DevOps Lead, 15yrs in Health Science, 17yrs in IT, 6 sigma greenbelt, ITIL Practitioner, Software Developer, Support Lead, Masters from Drexel University, Moravian College Mentor

Intro

What we'll cover today



There is hope

It **is** possible to implement DevOps at a regulated company.



There is opportunity

DevOps presents an unprecedented opportunity to accelerate the science and practice of healthcare.



There are still challenges

Highly-regulated companies present unique challenges when introducing a technology culture like DevOps.



Our Approach

Our multi-year journey to augment our traditional, waterfall methodology with DevOps/Agile culture and methodology



Tool Chain

You still need technology to support DevOps. We'll show you what we're working on.



Cultural Shifts

How we went from "that will never work" to "that's the new way to work."

Highly Regulated Industries

Definition: “a type of business that is controlled by government rules” [2]
Regulations keep consumers/patients/populations safe.



Why Now?

It's the **Perfect Storm**

“[Y]ounger baby boomers held an average of 11.7 jobs from ages 18 to 48.” [1]

Exploding Sources of Data & Methods

- Longitudinal / IoT
- Genomic
- Historical
- Personalized Medicine
- Data-driven invention
- Open Data



Talent & Culture

- Agile career mindset
- Cross-functional Organizations
- CrowdSourcing
- **DEVOPS**

The Growing Arsenal of Technology

- Big Data tooling and infrastructure
- Mainstream Platform-driven ecosystems & economies
- Collaborative-based tooling
- Quantum
- Open Source

Impact



Reducing cycle time

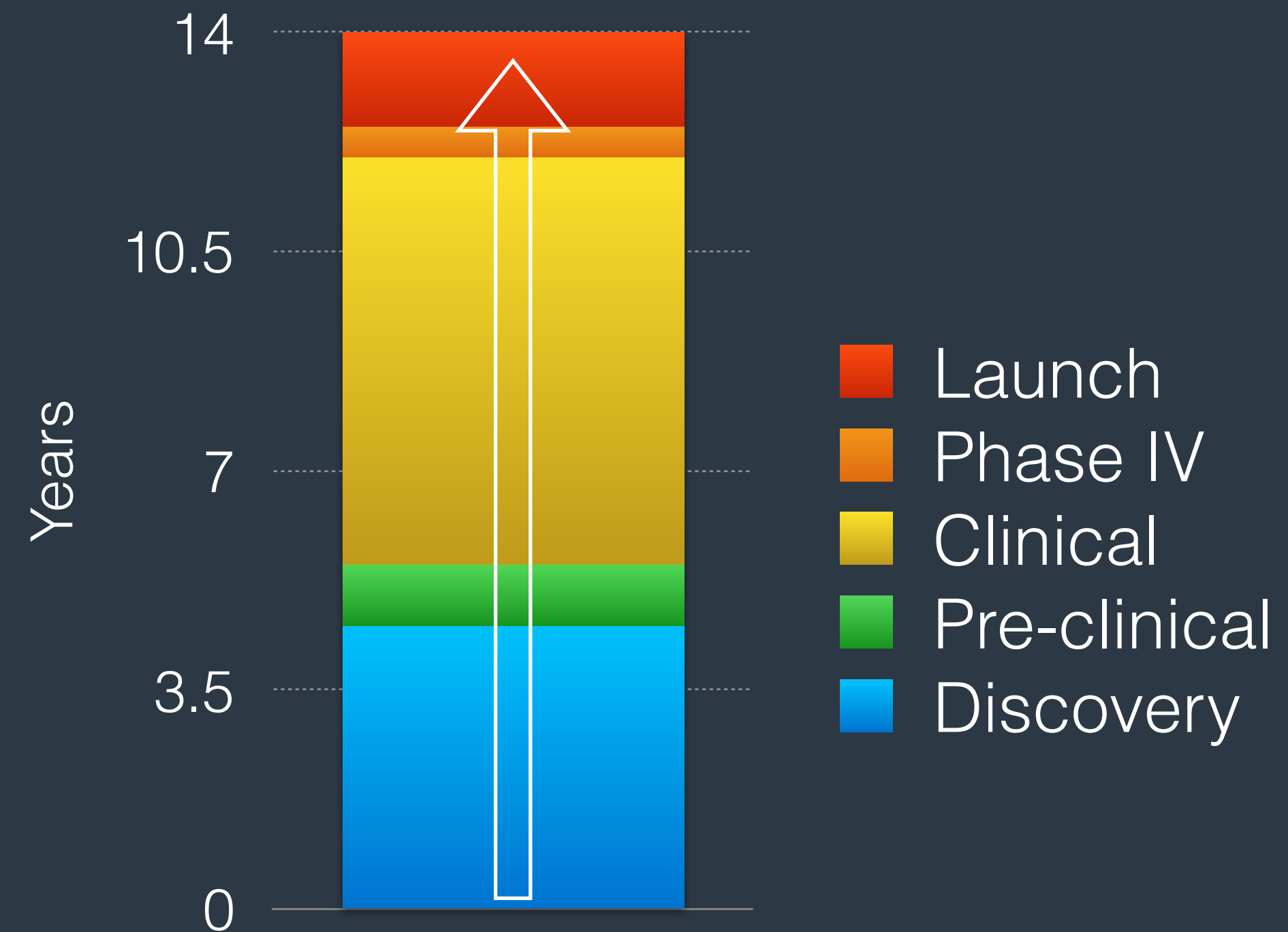


Discovering things faster



Health - Improving lives

Cycle Time [3]



How?

Our 4 Key Strategies



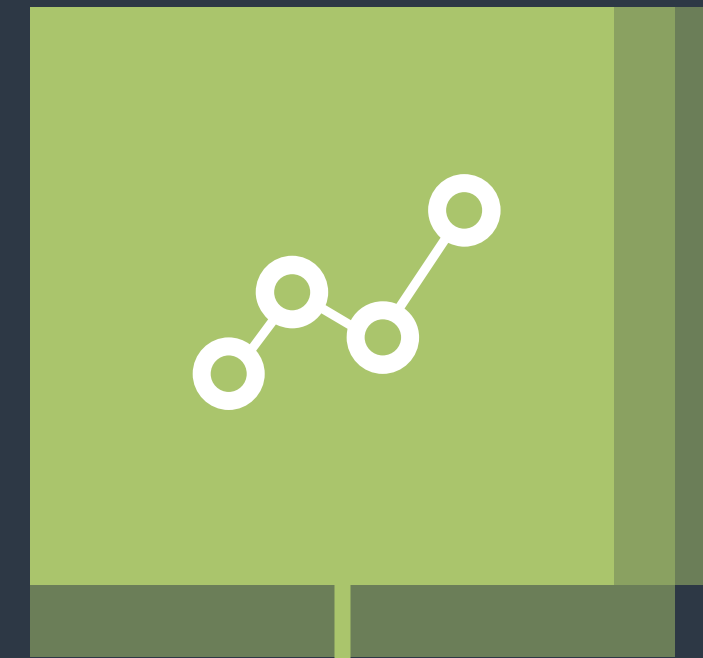
Community

Foster a community - Bottom up
w/ Key Decision-Makers



DevOps Platform

Co-Create an IT standard DevOps
platform



Improve

Iterate, improve, & Publish KPIs



Over-communicate

Over-communicate
Over-communicate
Over-communicate



Foster a Community



Key executive sponsors in word, wallet and deed.

Delivery-proven SW experts from both traditional and emerging sides.

(regulatory waterfall and agile/DevOps/tech)

The authoritative approvers (quality, compliance)

An effective training and communications group

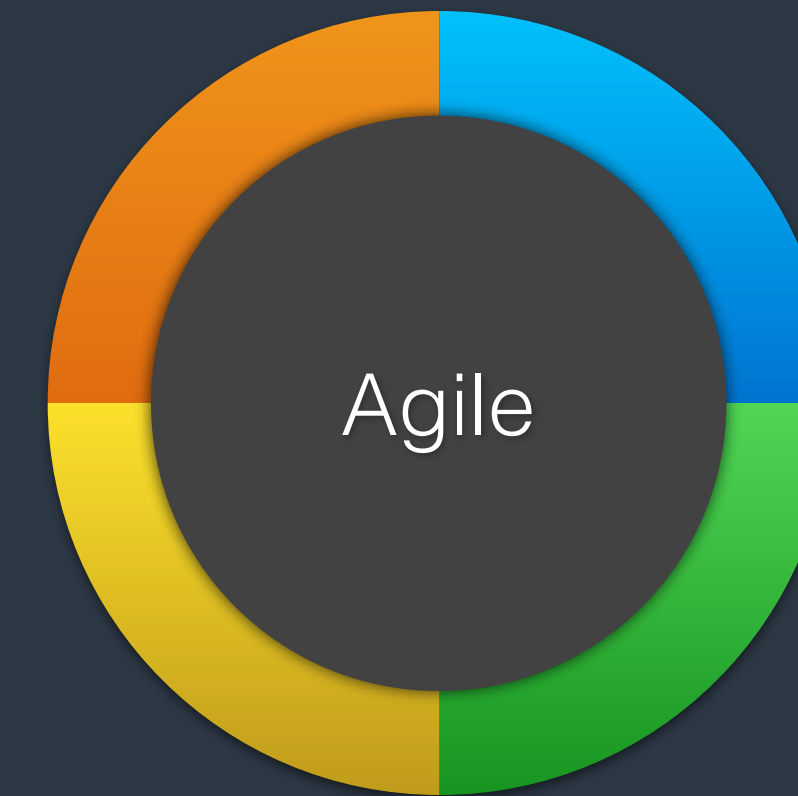
Key senior SMEs/leaders willing to facilitate cross-organizationally

A set of first-follower business partners.

Software Development Extremes



VS



Traditional Regulated Mindset

Risk Averse

Deliver complete solution

Specialization and hand-offs

Get it right / lock it down

Focused on Quality of Output

Innovation Mindset (Agile)

Fail Fast

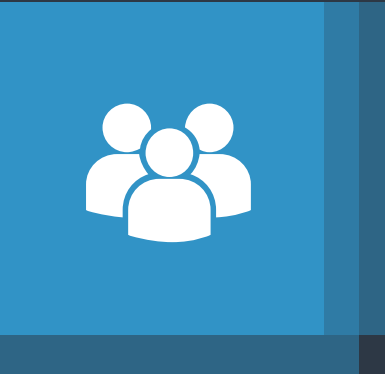
Minimum Viable Product (MVP)

Cross-disciplinary teams

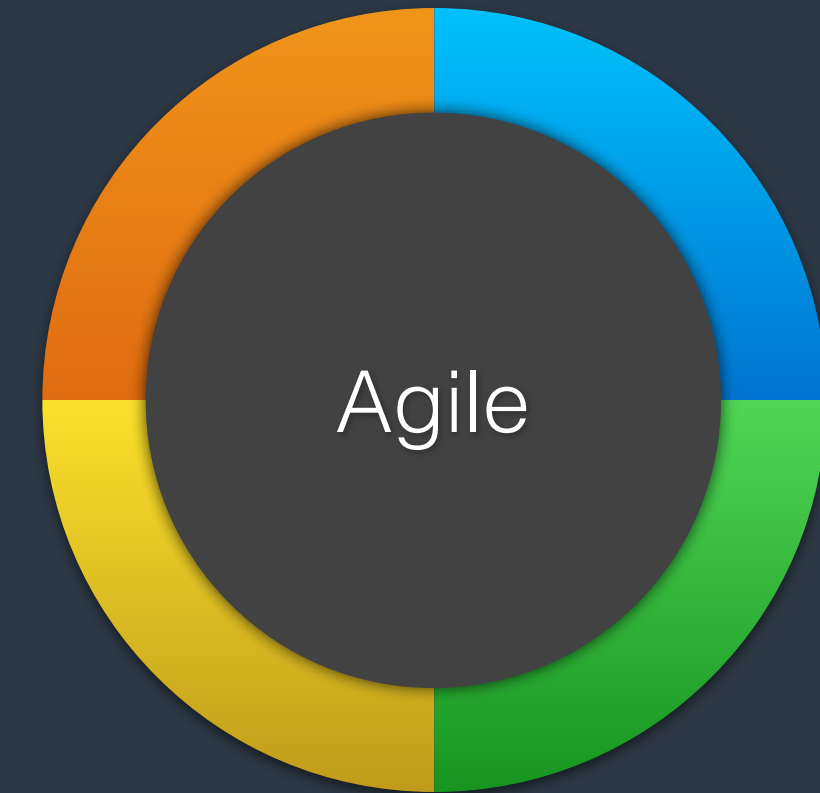
Continuous Improvement

Focused on Quality of Output

Bridging Understanding With “Why”

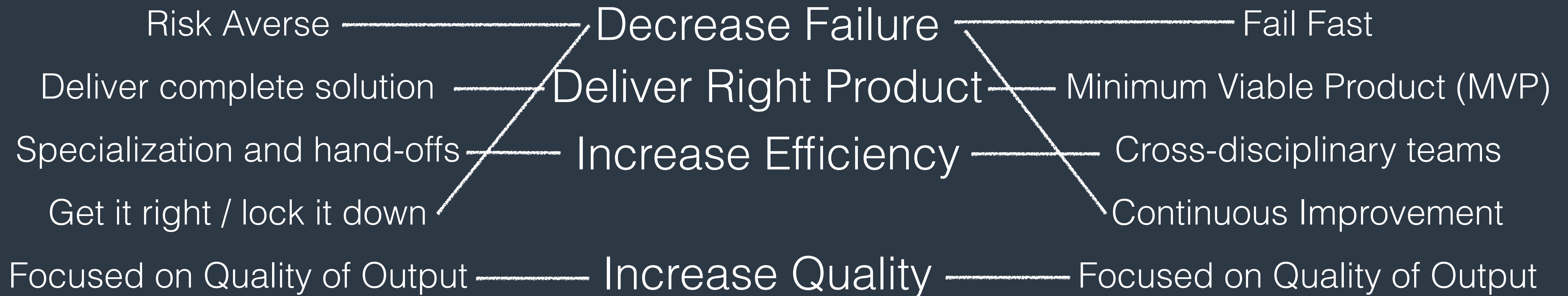


Why



Traditional Regulated Mindset

Innovation Mindset (Agile)





From Conflict to Synergy

Traditional

Established Support and Operations at Scale

Global Coverage

Global Communications Services

Mature Regulatory Services

Deep Regulatory Knowledge

DevOps

Viral Collaboration Ecosystems

Increased Transparency

Accelerated Software Delivery

Culture of Innovation & Invention

Industry Edge Sensing



From Conflict to Synergy

Traditional **AND** DevOps

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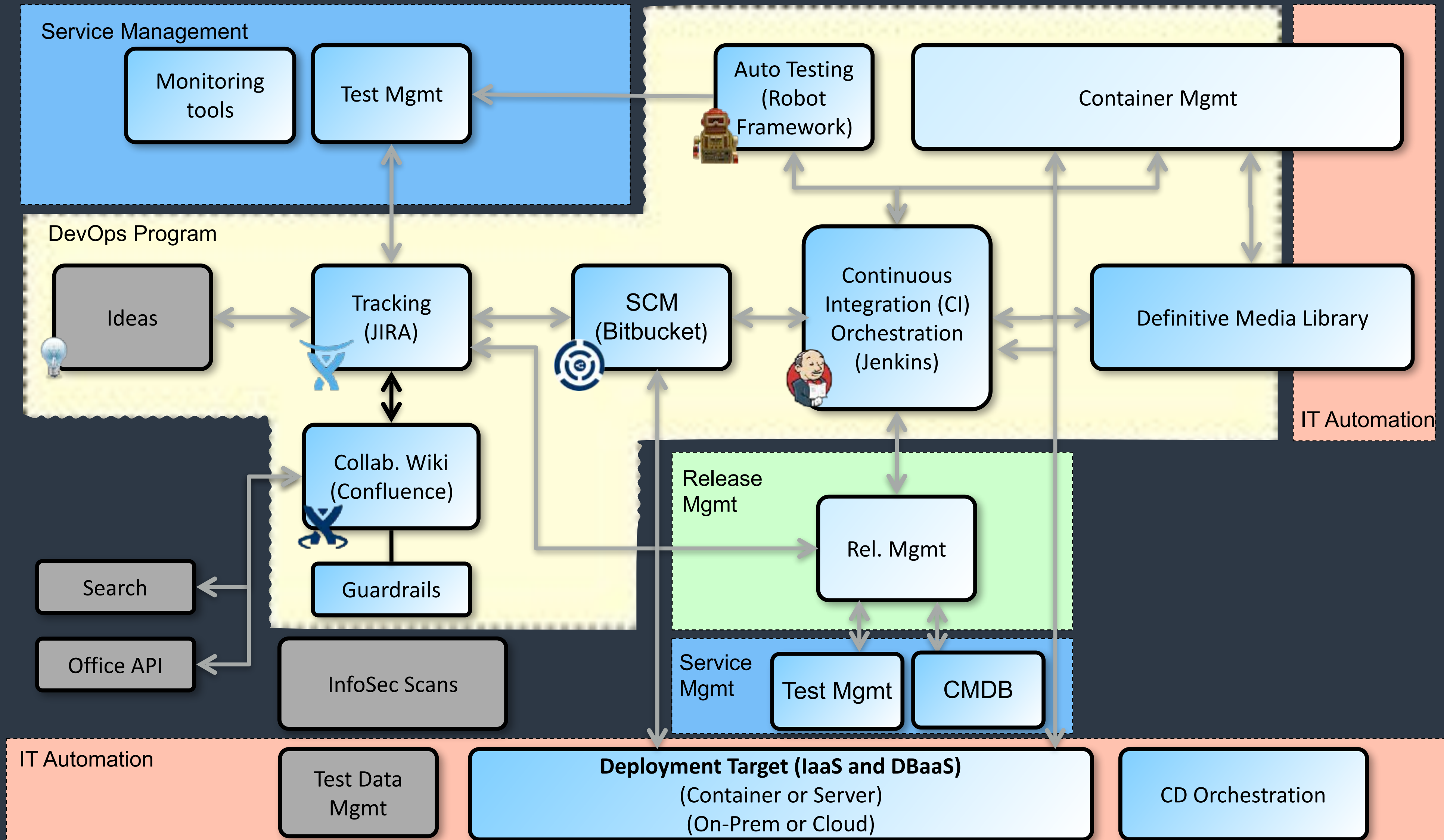
Iterate, improve, & Publish KPIs



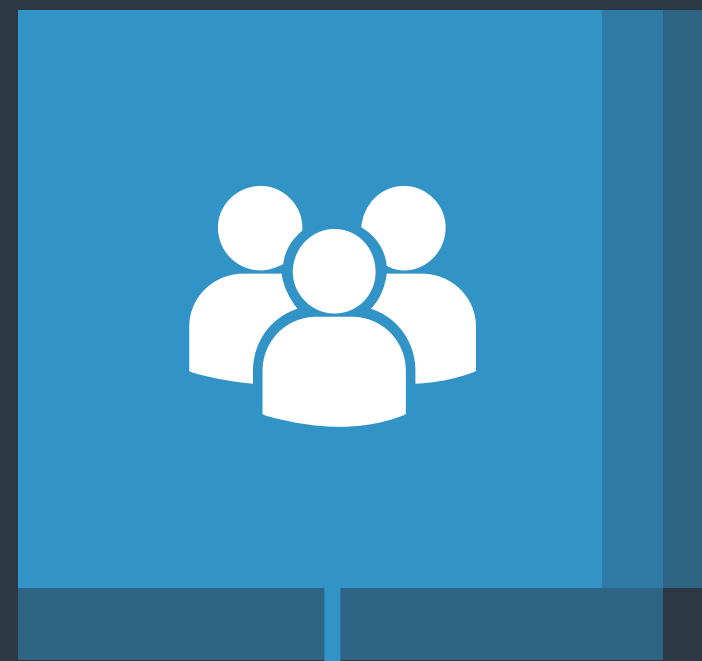
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Our DevOps Toolchain



Our 4 Key Strategies



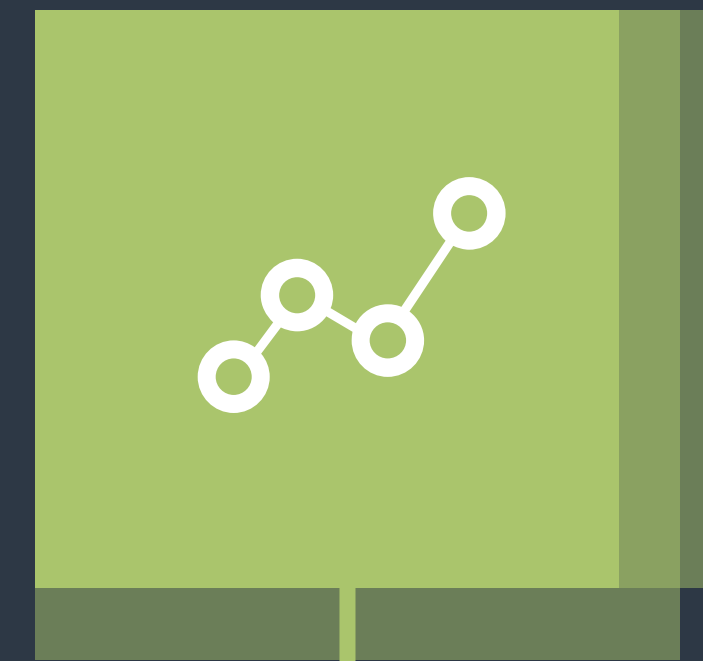
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Iterate, Improve & Gather Insights

Process that grows over time

Start with the **basic code check in**



Git Repo

Wiki, Issue Tracking



Collaboration Suite

CI / CD Suite



Automate



Partly Qualified

Regulated processes can use pieces of the DevOps Stack



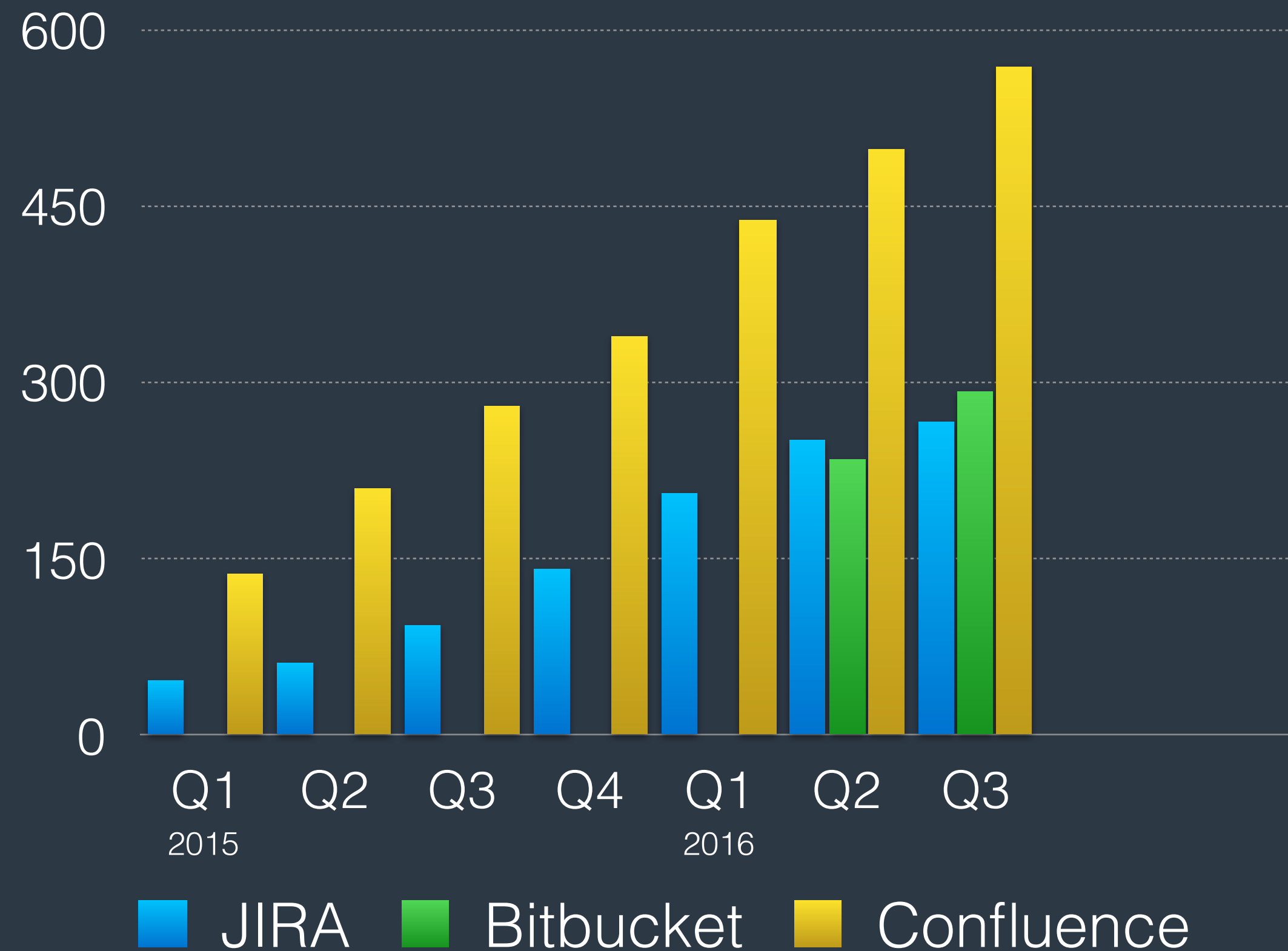
Fully Qualified

Regulated processes can fully utilize the DevOps Stack

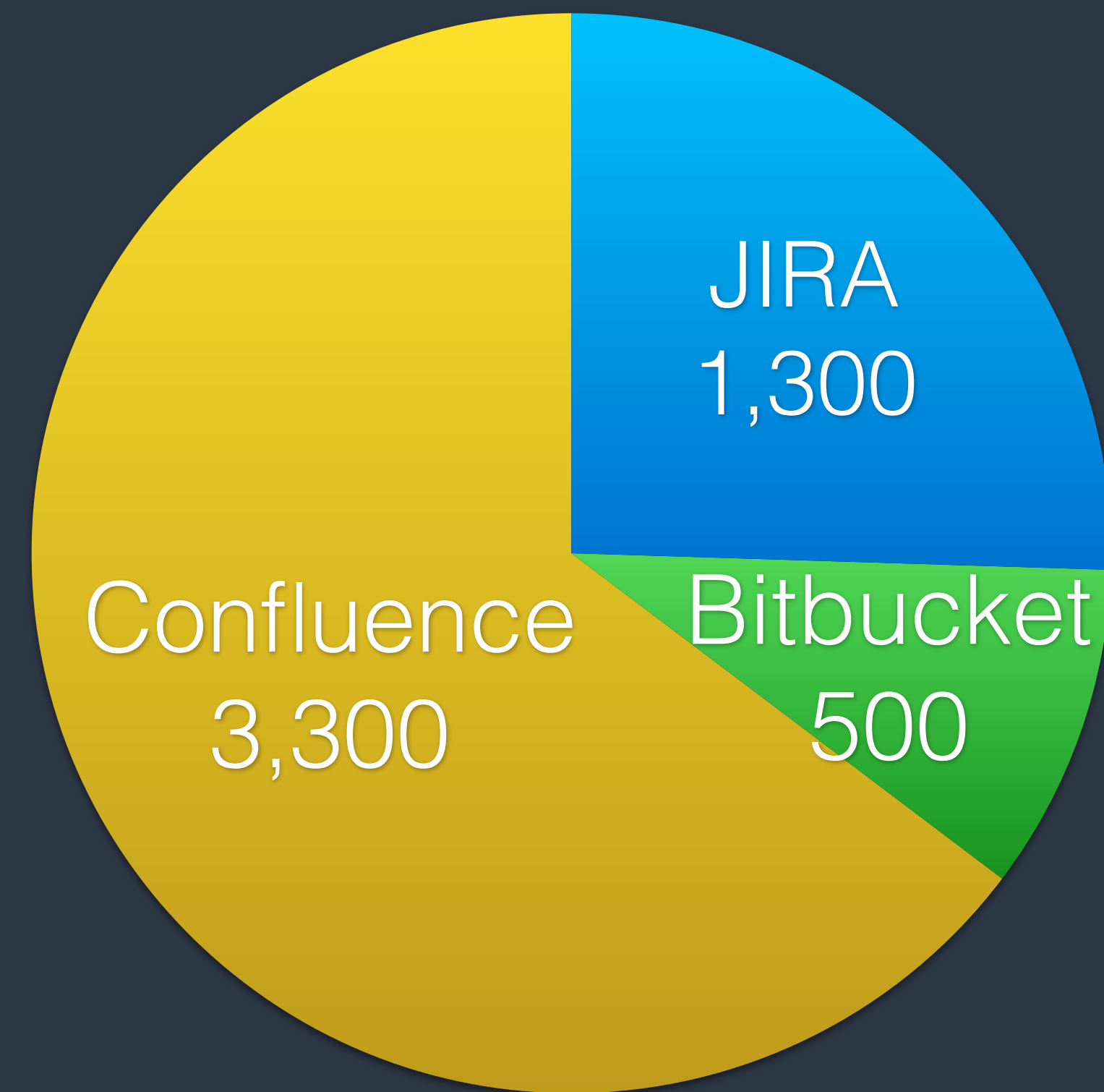


Acceleration of Dev Tools Usage

Active Projects



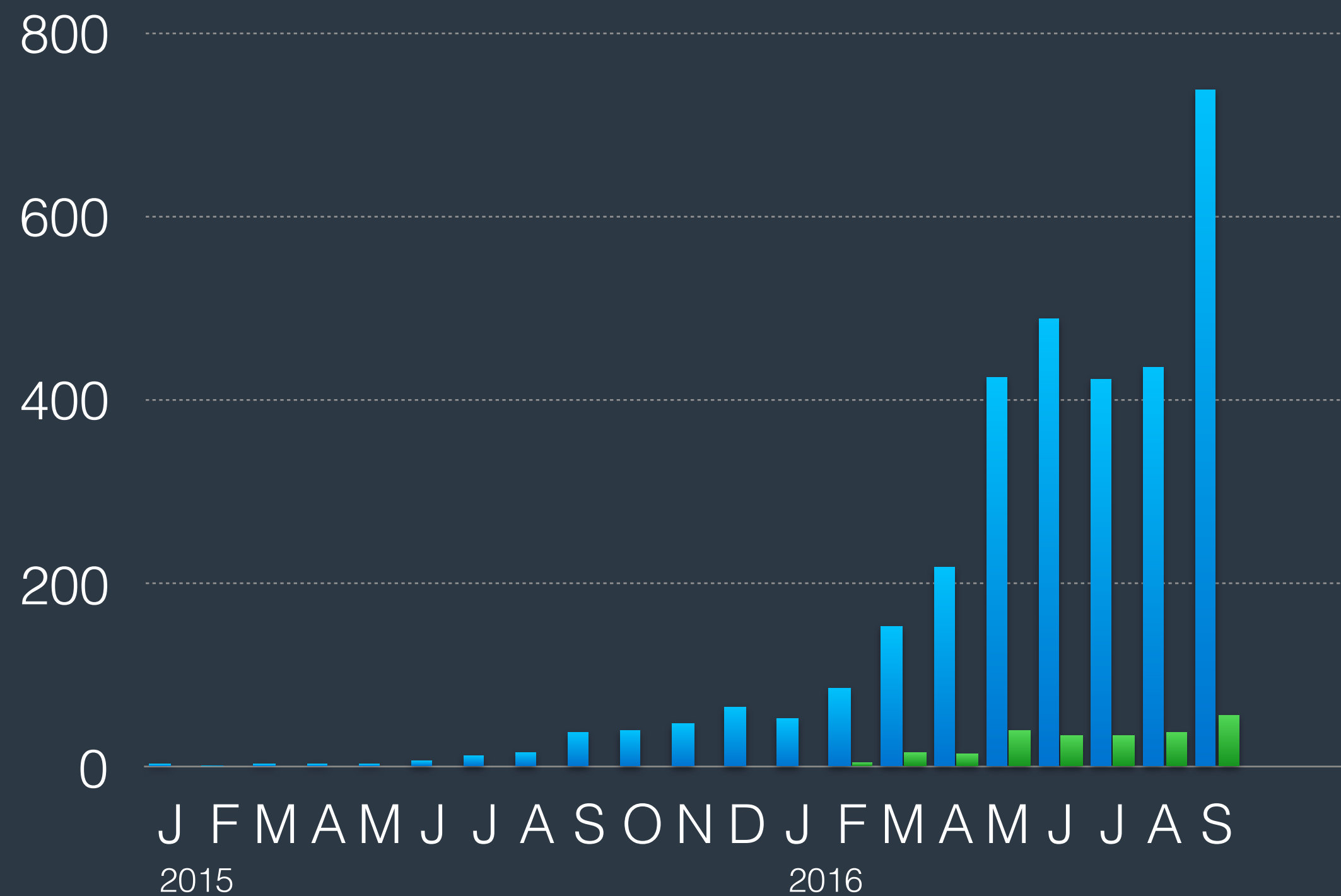
Active User Count



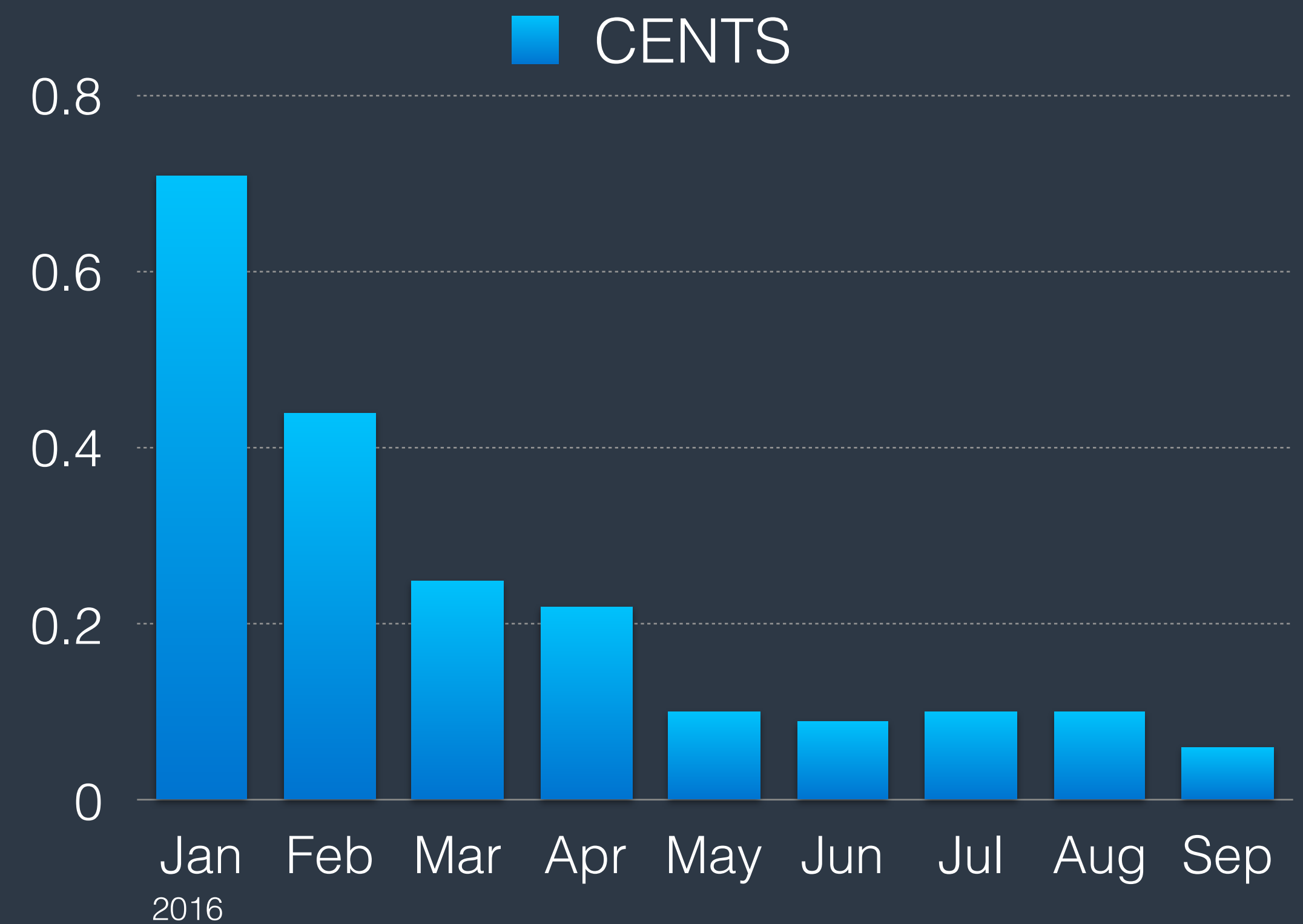


Acceleration of APIs

API Usage



API Costs per user

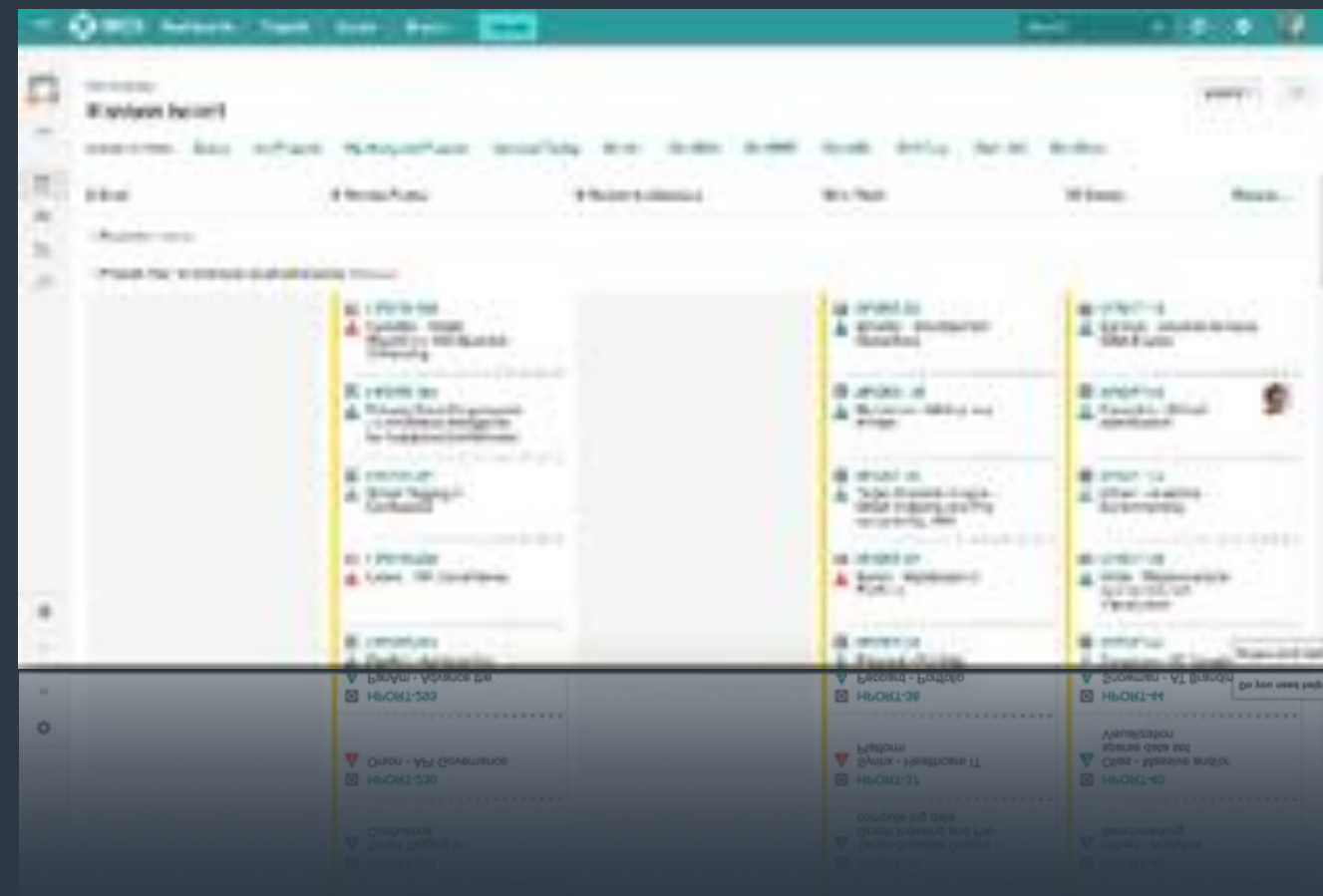


■ Requests/Month (thousands)
■ GBs/Month



Iterate, Improve & Gather Insights

Rinse & Repeat



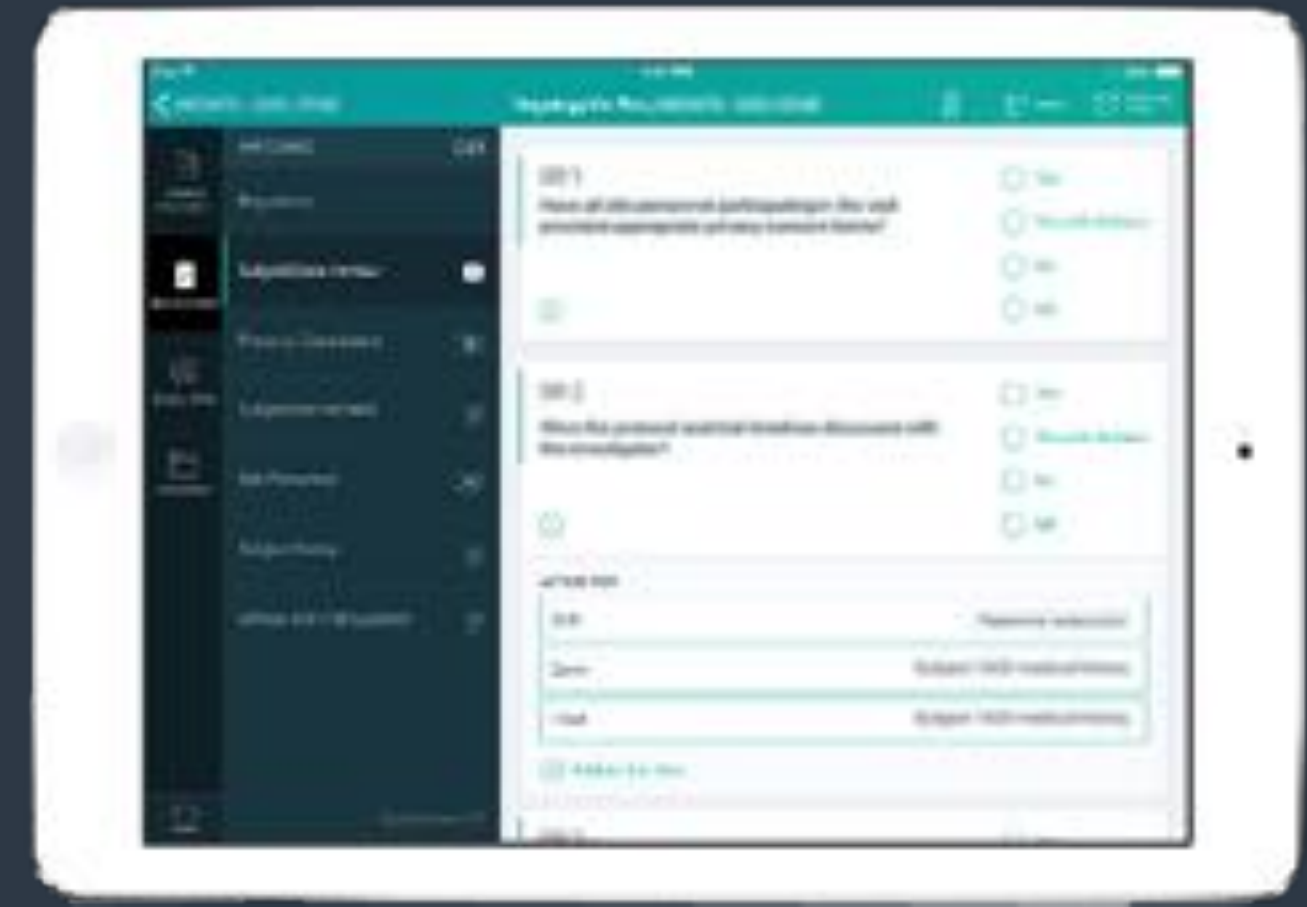
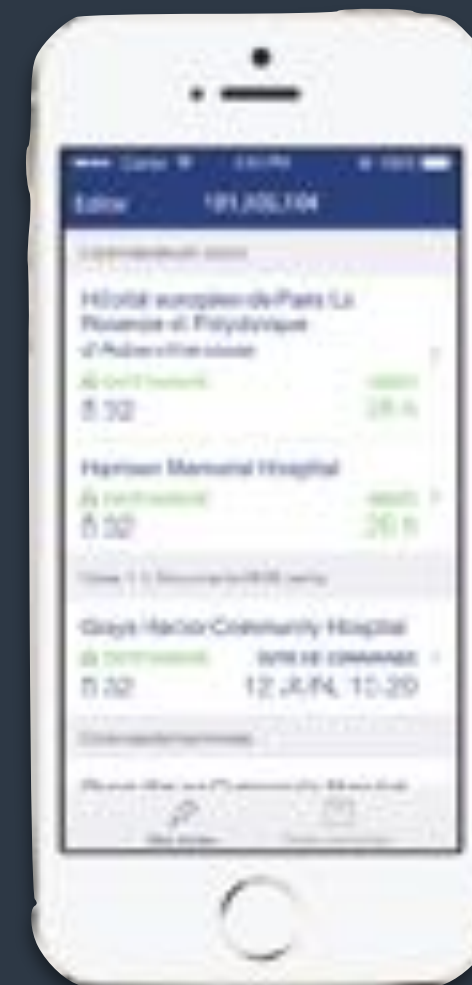
Inform the portfolio

Cross project insight & improvement



Sales App

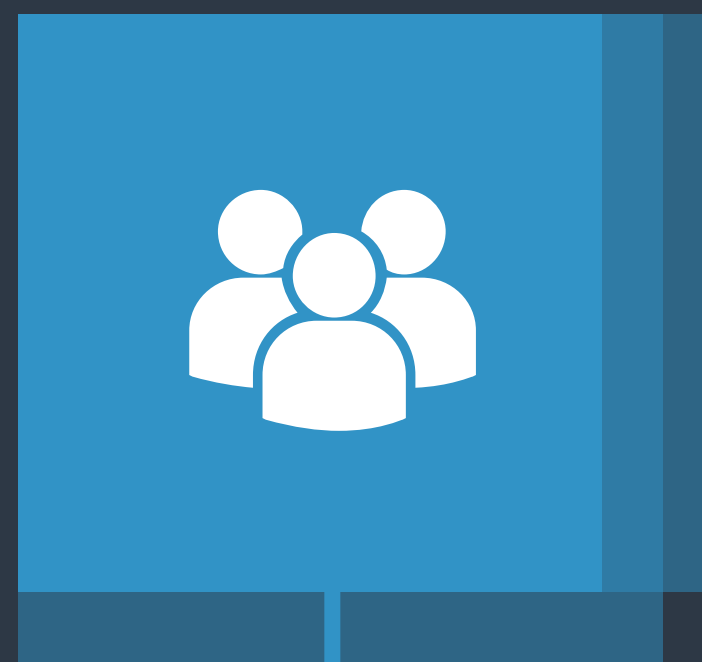
Working MVP in 2 months



Clinical Trials App

6 months instead of 18

Our 4 Key Strategies



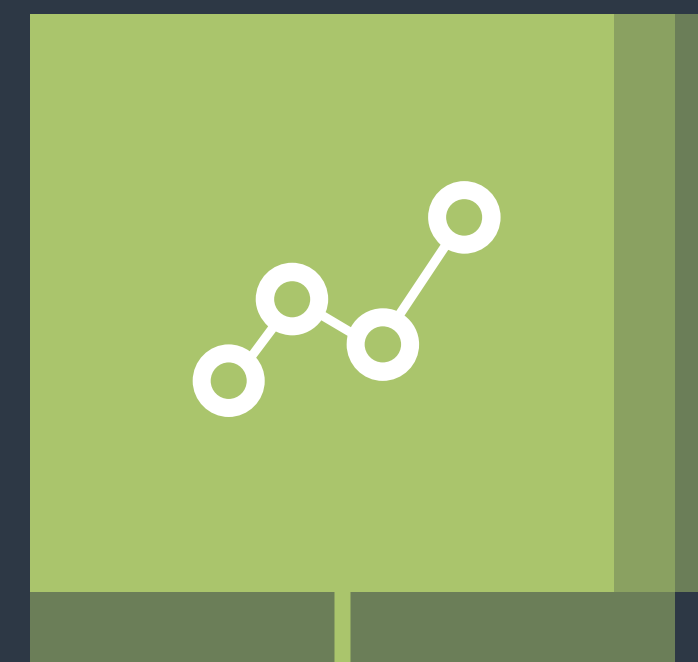
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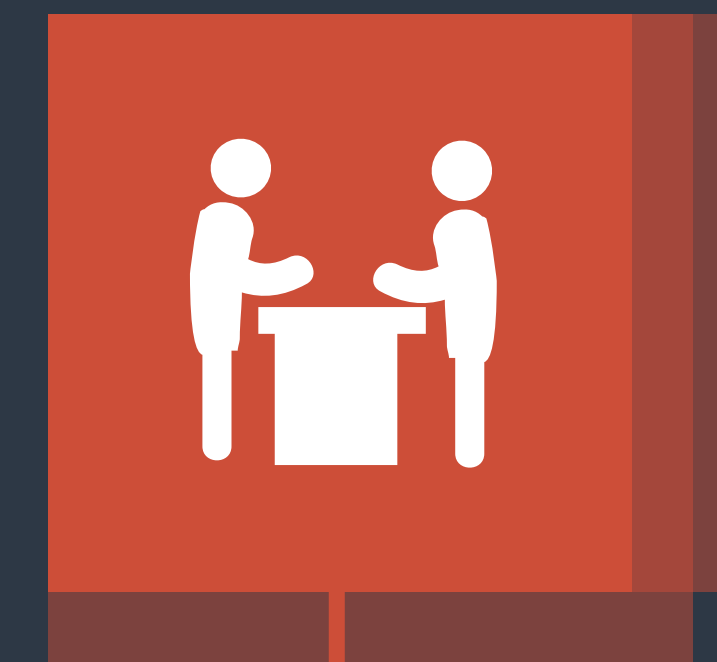
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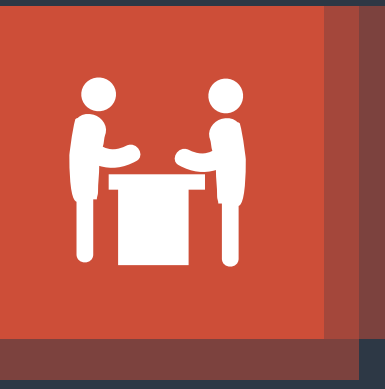
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Over Communicate

-  Telling stories
-  Sharing success
-  Showing data
-  Plain English, please



In the Spirit of Over Communicating...

Our 4 **Key Strategies**



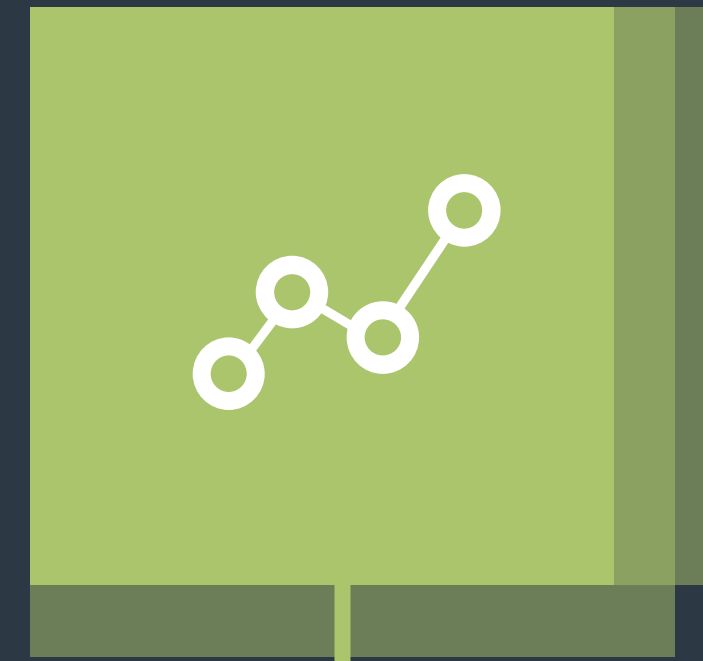
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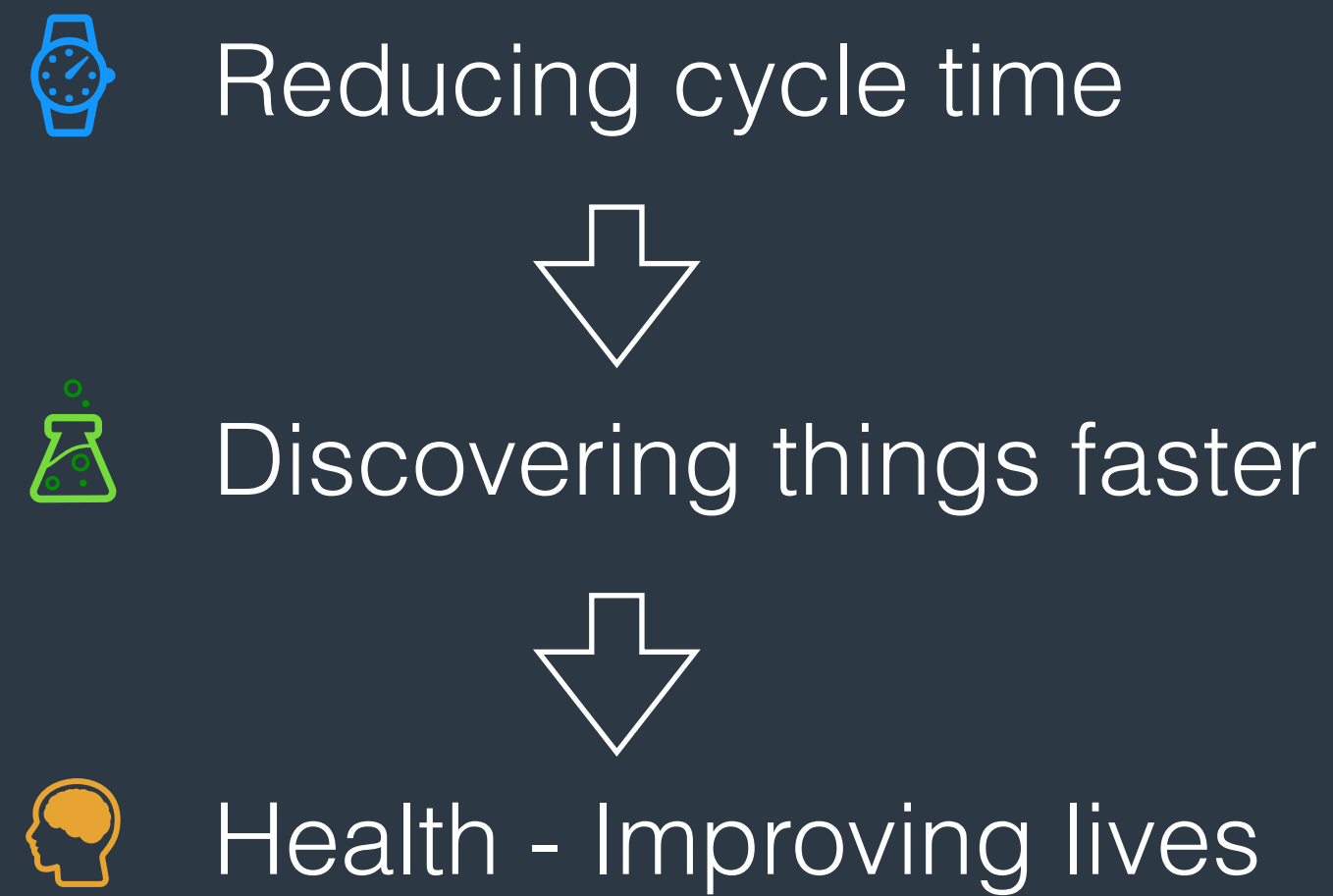
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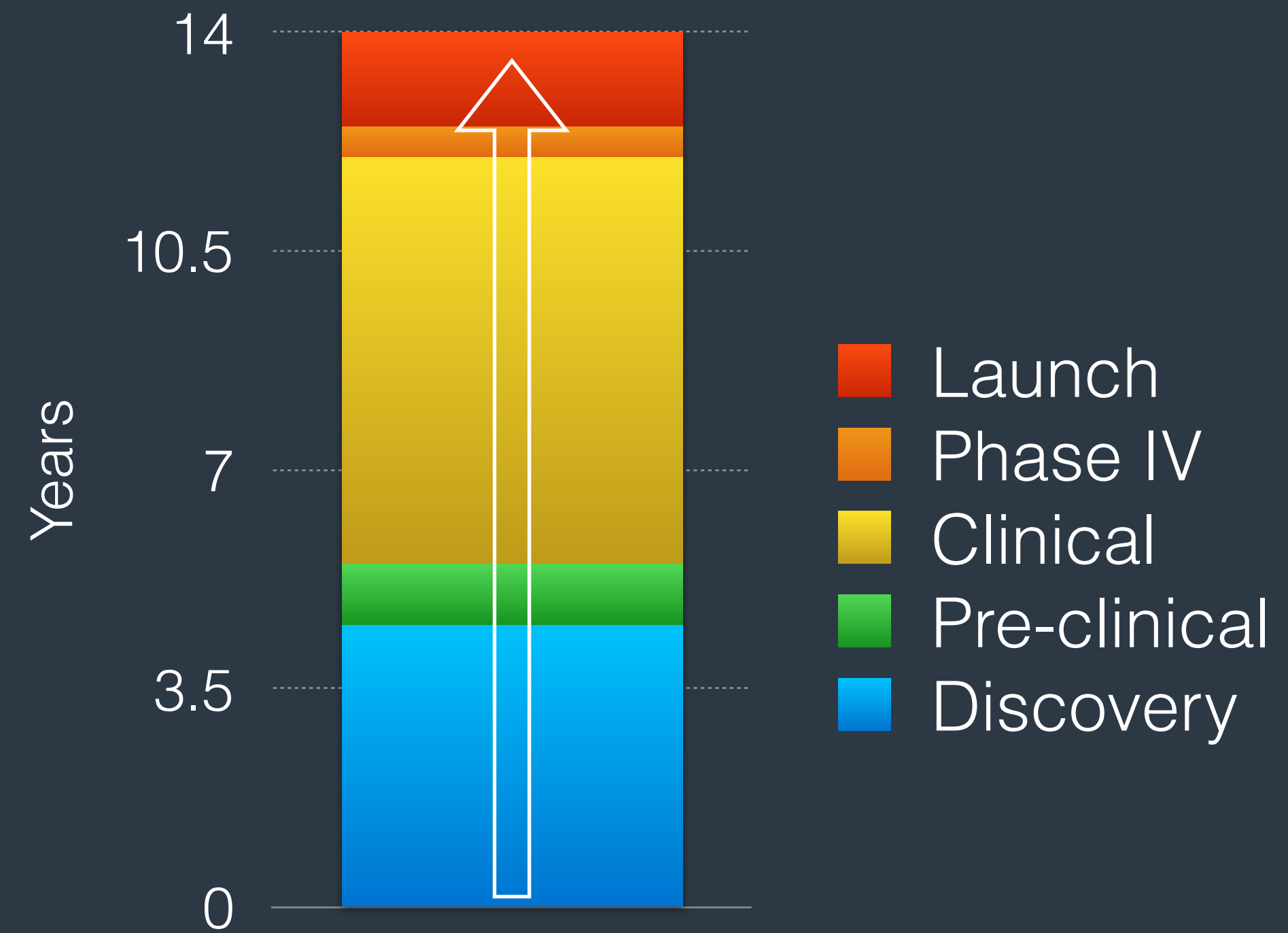
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Impact



Cycle Time



Impact



Reducing cycle time



Discovering things faster



Health - Improving lives



Remember - It's Personal

ANY
QUESTIONS
?