# FINOPS PRACTITIONER CERTIFICATION

## Student Handbook
## FinOps Practitioner Certification

For Finance, Technology and Business Professionals to understand how collaborative FinOps practices enhance business value in their organizations

FinOps Foundation

# Course Overview

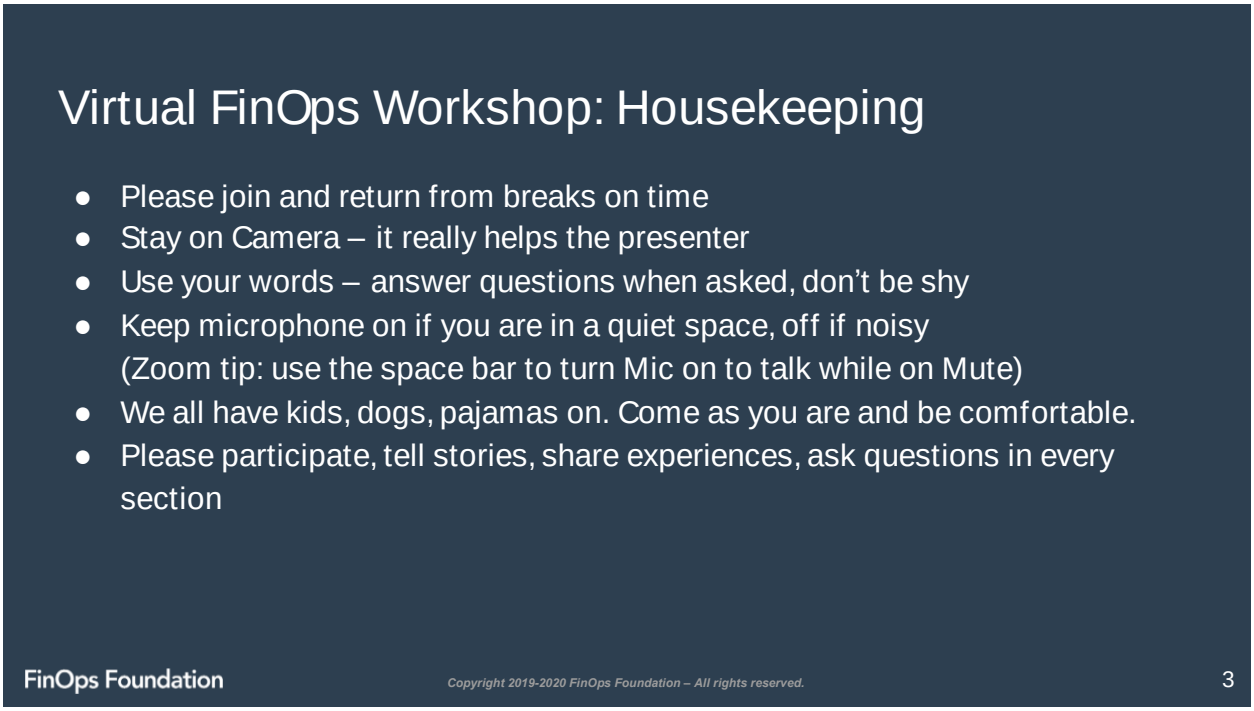
FinOps is the practice of bringing together Finance, Technology, and Business to manage the unit economics of Cloud for competitive advantage. While there are core principles of FinOps and key capabilities to manage cloud environments, FinOps is at its base a practice that relies upon collaboration, transparent information sharing, common understanding, and clear responsibility for the cost and usage of cloud across an organization. FinOps practice is not about saving money, it's about making money leveraging the cloud.

The FinOps Foundation has created the FinOps Practitioner Certification course in order to provide a fundamental grounding for Finance, Technology, and Business professionals to understand the key concepts of FinOps. The workshop presents information on FinOps Principles, Capabilities, and the FinOps Lifecycle. Interactive activities reinforce learning and provide perhaps the most valuable aspect of the course, a chance to interact with instructors and other participants who share common challenges in the cloud, and a common desire to find the efficiency FinOps can provide.

FinOps works together with development methodologies like DevOps, Lean and Agile to enable developers and engineers to better use cost as an efficiency metric, as well as financial methodologies like Total Business Management (TBM) which similarly seeks to provide IT finance data to business leaders to enable good decision making. FinOps focus on fast-cycle activities, rapid adjustments and leveraging the variable cost model cloud offers makes it the ideal partner to TBM's overall focus on IT costs across the board.

Following the workshop, participants will have the opportunity to take the FinOps Practitioner Exam, to become certified at this fundamental level.

This edition of the FinOps Certification workbook was made for virtual courses in 2020.



## What We're Going to Learn Today

- Why the Cloud?
- Challenges of Cloud
- What is FinOps?
- Why do we FinOps?
- What is in FinOps?
- How to FinOps?

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13

## Structure of the Course

- Day One – FinOps Concepts and Basics (5 hours)
  - 5 Sections of Content
  - 6 Activities
  - 2 Breaks (20 minutes each)
- Day Two – FinOps Practice (5 hours)
  - 3 sections of Content
  - 5 Activities
  - 2 Breaks (20 minutes each)

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12

Table of Contents

# History of FinOps

The FinOps Foundation was born out of Cloudability's quarterly customer advisory board meetings where many cloud practitioners expressed the need for a community of practitioners and best practices.

Founded in Feb 2019, The FinOps Foundation is a Non-Profit trade association, seeking 501(c)(6) status and governed by a board of industry leaders.

Currently, underwriting and administrative support is provided by Apptio, with a goal to make the Foundation self-sufficient.

The FinOps Practitioner Certification workshop was presented the first time in September 2019.

# Getting Started

You should understand the basics of how cloud computing works, know the key services on your cloud providers, including their common use cases, and have a basic understanding of billing and pricing models. You should already be able to describe the basic value proposition of running in cloud and understand the core concept of using a pay-as-you-go consumption model.

You'll also need to have a base level of knowledge of at least one of the three main public cloud providers (AWS, Azure, Google Cloud). For AWS, we recommend AWS Business Professional training or, even better, the AWS Cloud Practitioner certification. For Google, check out the Google Cloud Platform Fundamentals course. For Azure, try the Azure Fundamentals learning path. Each can usually be completed in a full day workshop.

Additionally, there are several terms and definitions you should know before attempting this certification. You will find these terms and definitions in the glossary.

# FinOps Certification Workshop Ground Rules

- Confidentiality: don't share anything that isn't public information.
- Any Recordings will not be made available outside of the FinOps Foundation, unless speaker authorizes their portion to be shared
- Anonymized best practices may be taken out of comments at the course for FinOps.org
- Get involved in the conversation! (And keep contributions short and focused)

# Confidentiality

Members of FinOps Foundation **should not exchange or discuss** any confidential, competitively sensitive information: competitive information, such as sales or price information, fees, discounts, terms or conditions of sale, sales or operational strategies, marketing strategies, target, customer demographics, customer lists, financial status or information, profit margins, budget projections, production or other costs, production or sales forecasts, wages/salaries, or third-party contract terms.

Do not share or discuss information that would be suggestive or conclusory as to how a Member should deal with any customer, vendor, or other third party.

Do Not Use any information shared in FinOps for any purpose outside of the pro-competitive purposes and mission of FinOps.

## Code of Conduct

- **As a participant I will:** contribute and be respectful
- **Inclusion**: Treat others will respect
- **No sales pitches**: Share knowledge and learnings, not advertisements
- **Defamation**: don't talk bad about products, organizations, or others

## Preparing for Certification

This course is designed to prepare you to become certified as a Practitioner of FinOps. The workshop you are attending today allows individuals in a large variety of cloud, finance and technology roles to validate their FinOps knowledge and enhance their professional credibility. The proceeding certification exam covers FinOps fundamentals and an overview of key concepts in each of the three sections of the FinOps lifecycle: Inform, Optimize and Operate.

The FinOps Foundation intends to offer multiple levels of certification in the future.


# The Challenge of Cloud

The cloud presents many challenges: technical, organizational, skills, structure.

Each organization's journey to the cloud will be different.

- Cloud Native
- All In
- Cloud First
- Hybrid

Your organization may be running to the cloud, or dragging there; carefully planning your move or trying to catch up to early adopters.

Every cloud journey is different, and we want to start today by exploring some of the reasons we're moving there.

# Activity 1: Why Are You Moving to the Cloud?

This is a survey of attendees using the Mentimeter tool.

- Go to Menti.com with your device of choice and use the code found on the screen to enter your responses
- Keep responses short
- You may answer more than once
- Feel free to repeat answers you see if you agree with them
- Remember do not share non-public information
- Use the space below to make notes during the discussion

## Question:

***Why is your organization moving to the cloud? What are your goals? What ideals are you trying to achieve?***

_____

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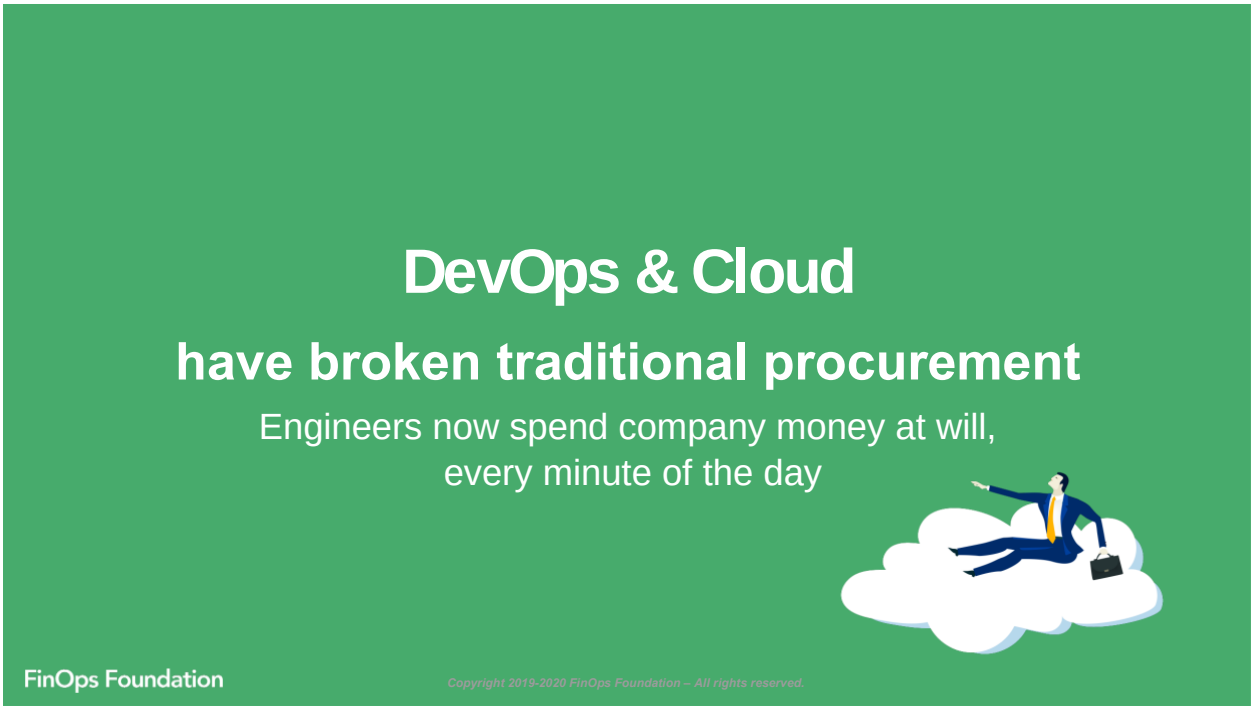
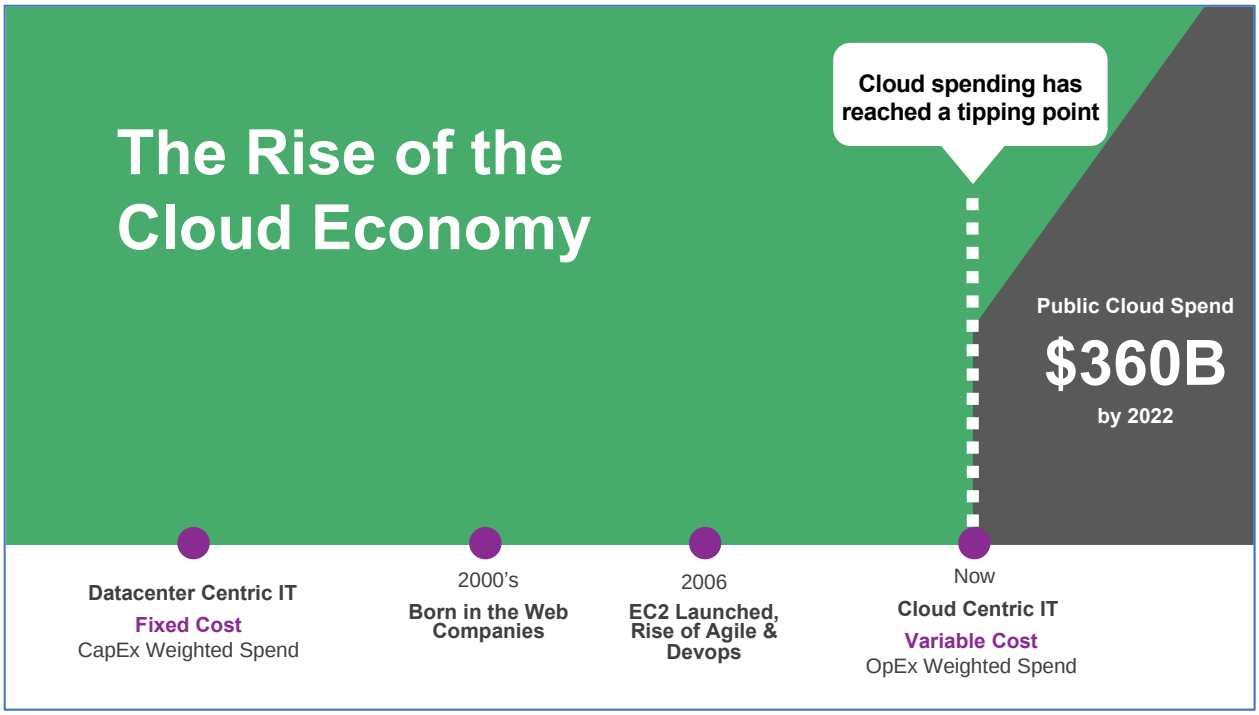
# Addressing the Challenge of Cloud



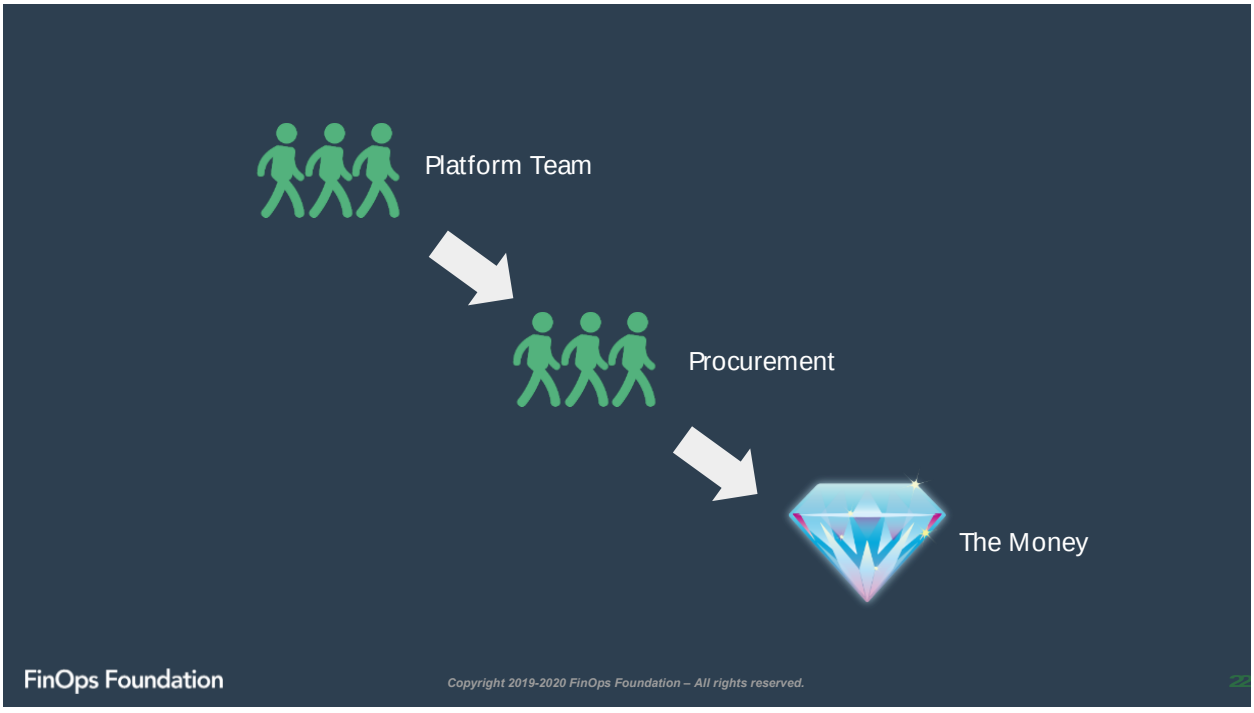

Since before 2000, the IT landscape has evolved from large data centers full of equipment, purchased with Capital Expenses and depreciated in a flat line. Data centers are a fixed cost from the perspective of application teams.

Born in the web companies like Google and Amazon changed customers' expectations of what digital technology they get from companies they do business with. DevOps allowed companies to move faster, to develop more effectively and to delivery incremental digital value to customers more consistently. The rise of the public cloud enabled that transformation to explode in scale and scope. Today, IT investment is at a tipping point where much of future investment in infrastructure will be operating expense, in a variable cost and consumption model. Numbers are growing and ever expanding.

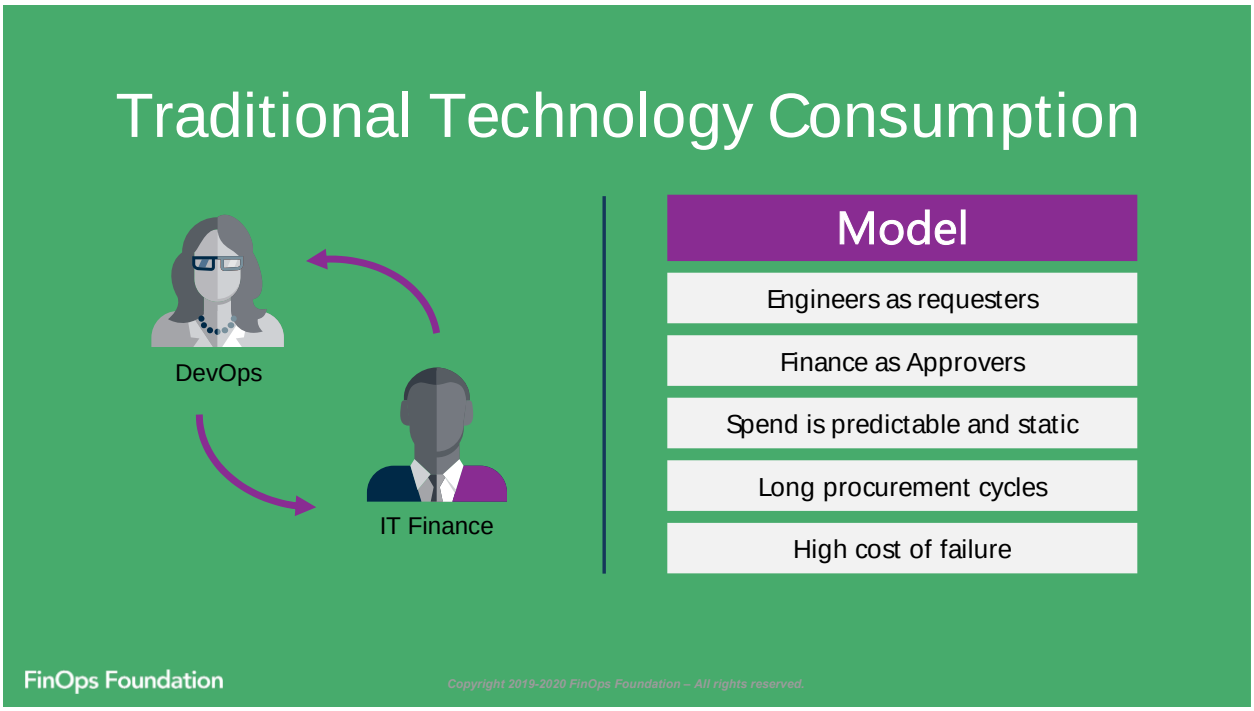
- Fixed Costs of Traditional IT are changing to Variable Costs.
- Use of the Internet and mobile devices increased user demand for innovative software that delivered value, demanding more of IT
- DevOps, Agile and other methodologies allowed IT to keep up with the speed of business demands
- Cloud use is now introducing huge changes to cloud cost management as well, and cloud is at a tipping point

Let's look at what changed.

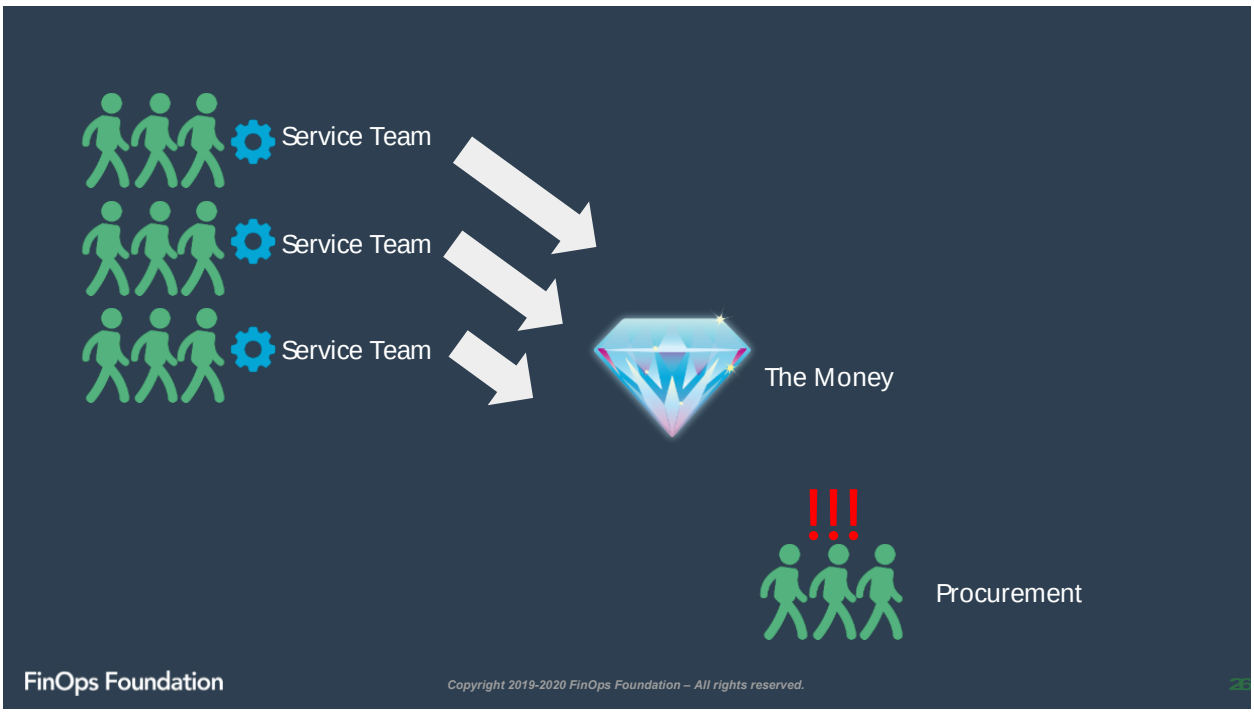
Previously when Platform teams wanted hardware to run their apps. They presented a case to Finance/Procurement, who reviewed their complex business case and if sufficient, gave them access to the money.



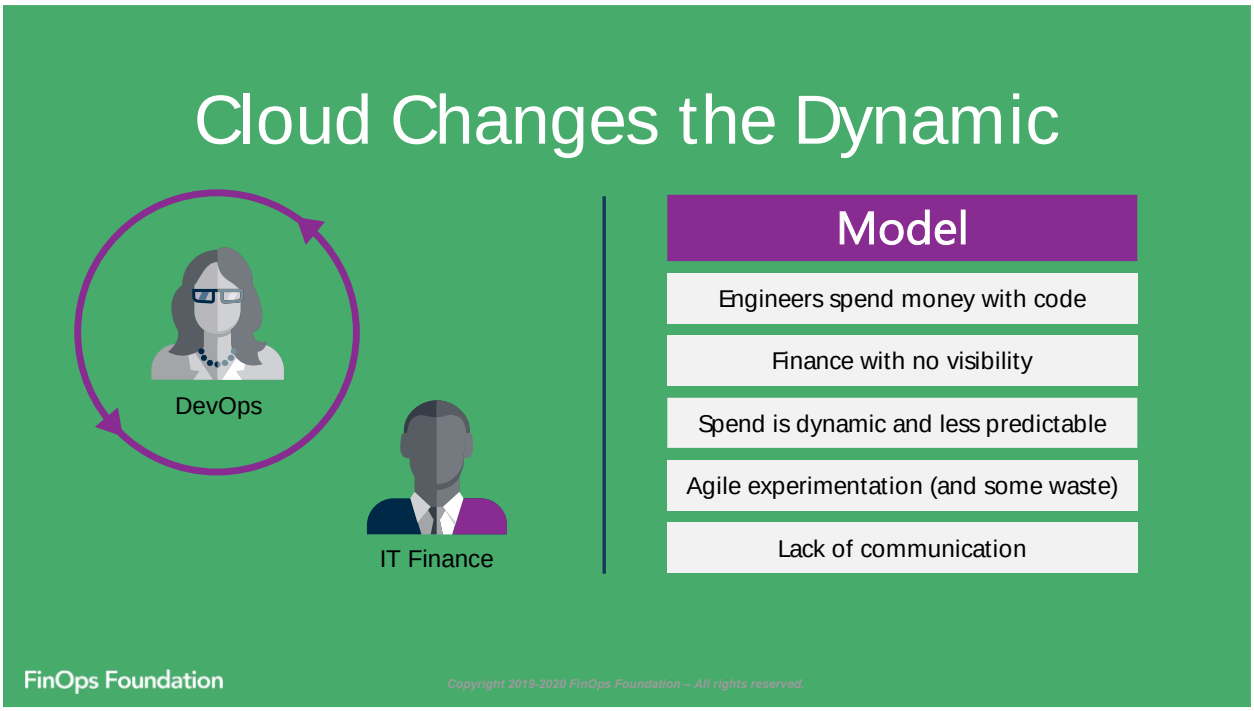

This is the Traditional Technology Consumption model.




Fast forward to today, there are many more service and product teams, with the ability to build infrastructure as code with automation or cloud consoles, who have direct access to the money. And Procurement and finance can be cut out of the loop. This isn't good for Finance, but it also isn't good for the business as a whole to lose this visibility.



Cloud and DevOps have changed the dynamic of procurement overall.



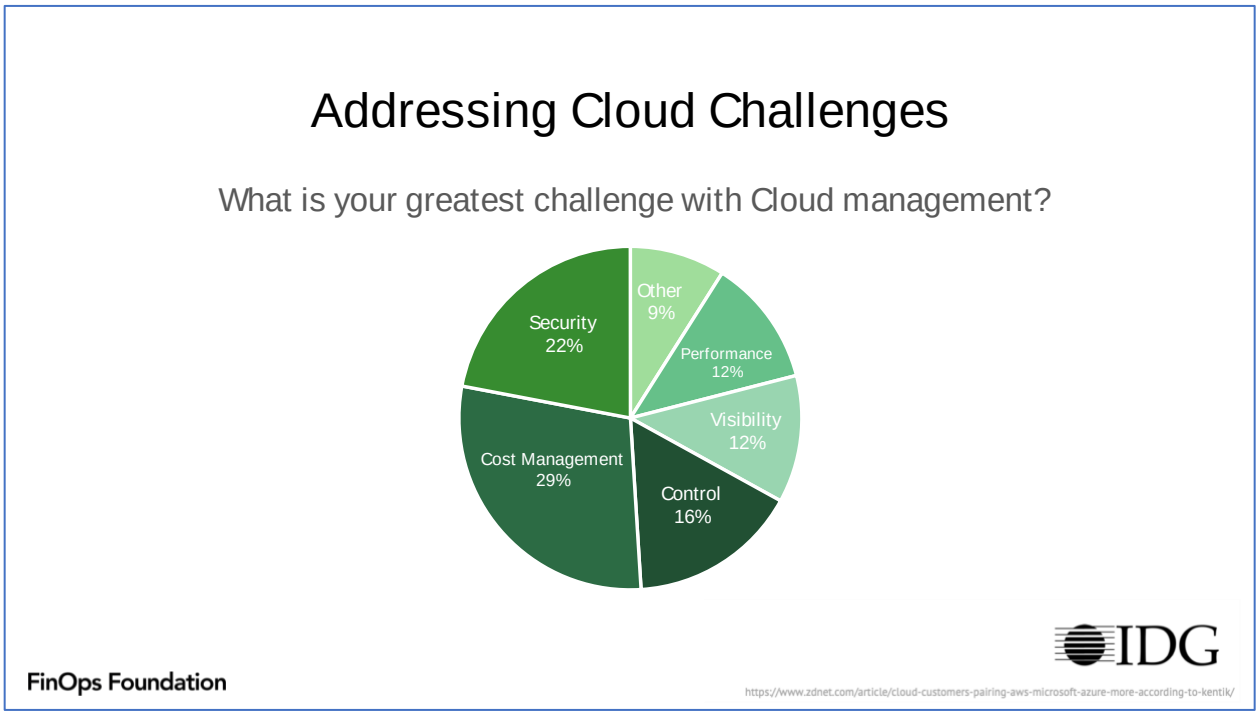

## Activity 2: The Reality of the Move to the Cloud

- Join one of the breakout groups
- Pick a group that closely describes your role in your company (Finance, IT, Business)
- If you do more than one thing, or something else, pick a group that needs people in it
- Remember do not share non-public information
- Use the space below to make notes during the discussion

### Question:

***Share your ACTUAL stories of moving to the cloud. How did they fulfill the ideals you were moving to the cloud to achieve?***

The challenges of cloud are many, but many organizations find cost management to be the biggest one.



Through 2020, **80%** of organizations will initially overshoot their IaaS budget, due to a lack of cloud cost optimization governance and misguided upfront cloud spend commitments.

The challenges of cloud are real and material to many businesses. A new cloud reality requires a new operating model to address these challenges.

## The New Cloud Realities for IT

**Decentralized**

Buying centers for cloud are siloed from Finance and Central IT

**Material**

24% year over year increase in public cloud spend

**Variable**

Variable/consumption based cloud spend replacing data center/fixed cost spend

**Inefficiency**

Macroeconomic instability pressuring cloud spend and usage towards efficiency

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# What is FinOps

FinOps is the **operating model** for the cloud. FinOps enables a shift — a combination of **systems, best practices and culture** — to increase an organization's ability to **understand cloud costs and make tradeoffs**.

In the same way that DevOps revolutionized development by breaking down silos and increasing agility, FinOps increases the business value of cloud by bringing together technology, business and finance professionals with a new set of capabilities.

It's a collaborative way of doing business that builds on DevOps to allow Finance, IT and the Business all to manage at speed demanded by today's customers.

If it seems that FinOps is only about *saving* money, then think again. FinOps is about managing the use of the cloud to *make* money. Spending more in cloud can drive more revenue, can be a sign of customer base growth, can enable more product and feature release velocity, or even help shut down a data center.

Removing blockers, empowering engineering teams to deliver better features, apps and migrations faster, and enabling a cross-functional conversation about where to invest and when, is what FinOps is all about. Sometimes a business will decide to tighten the belt, sometimes they'll decide to invest more. But now teams know why they're making those decisions.

FinOps is the practice of bringing together Finance, Technology, and Business to master the unit economics of cloud for business advantage.

- It's a practice, not a prescription. You don't do it and finish it and move on
- FinOps is cross functional. The FinOps Team doesn't do it in a vacuum, it coordinates.
- FinOps is much like surfing, not like building a sandcastle. There are a lot of externalities which need to be accommodated
- It is entirely designed to break down silos, to start conversations.
- It's not about cost, it's about the Value obtained by each unit of cost.
- FinOps is not about saving money, it's about making money.
- We do it all to meet the business goals: moving at the speed our customers demand to make us competitive

## FinOps brings financial accountability to variable cloud spend with:

- A prescriptive model of actions, best practices and culture
- That enables distributed product, finance, and business teams
- To make decisions that increase business value

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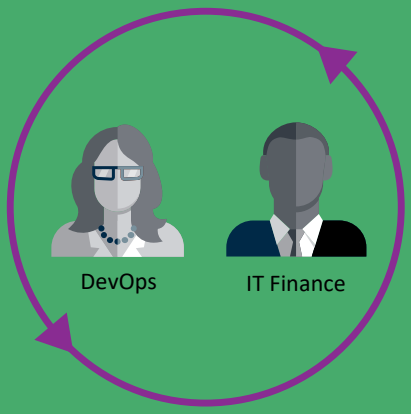
## FinOps: Changing the Way




**Model**

- Engineers and Finance acting as one
- Procurement is instant
- Agile experimentation, predictable cost and reasonable budgets
- Low cost of failure

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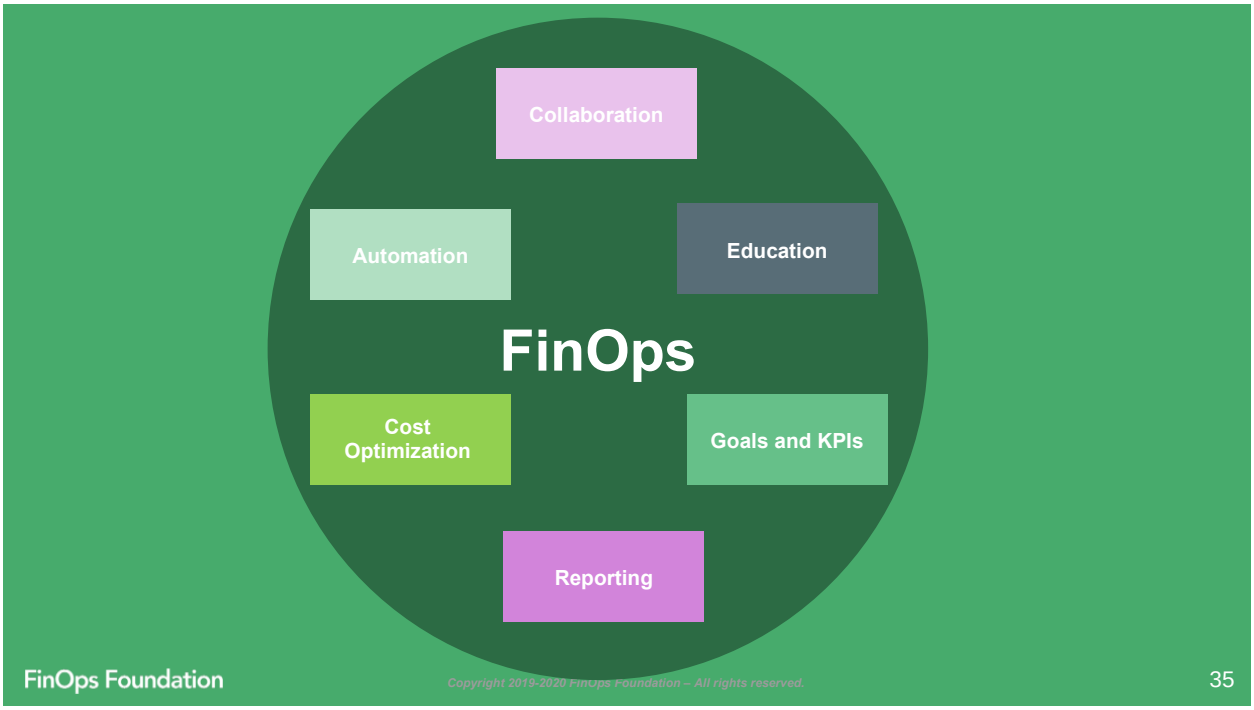
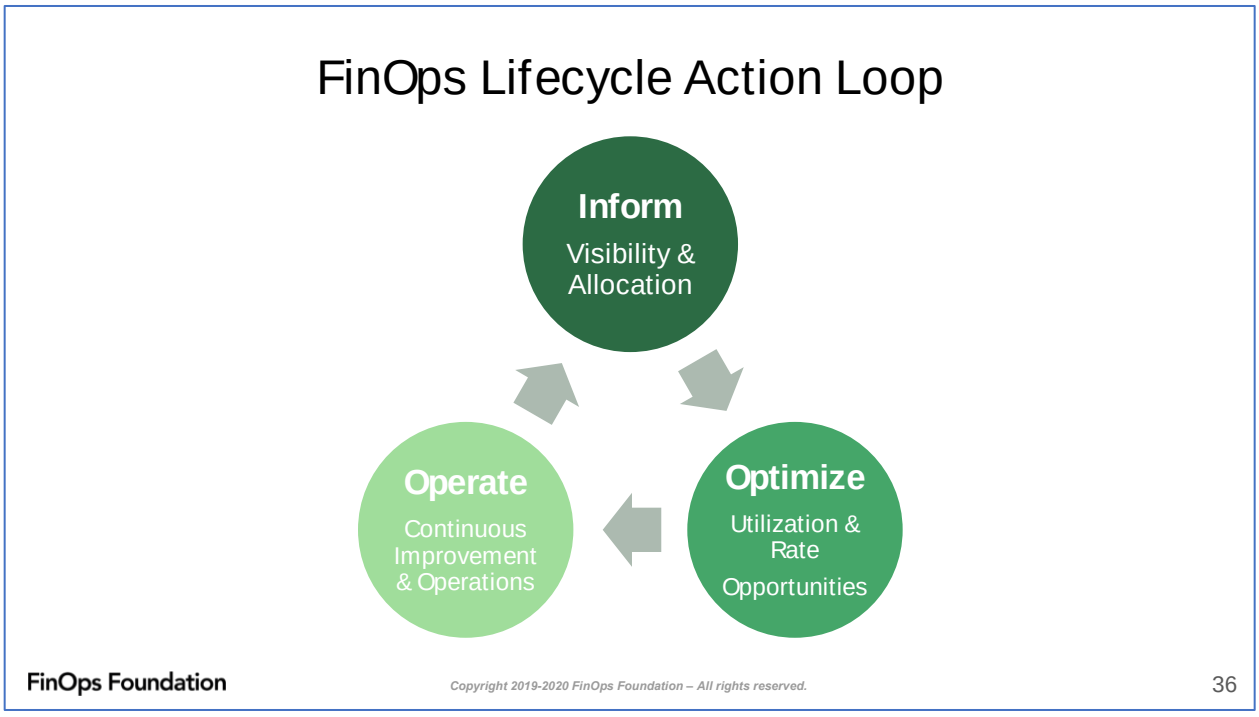
34

FinOps fundamentally changes the way IT, Finance and Business groups interact to accomplish the organization's goals.

And it's much more than simply cost savings. FinOps addresses the need to collaborate, to report, to educate, and to automate to help the company achieve value overall. Part of that is cost savings, but it's not the only, or most important part all the time.




FinOps is executed in a Lifecycle loop, a cyclical process that continually examines cloud use, seeks opportunities for optimization and builds them incrementally into the organization.

## FinOps Lifecycle Maturity

Crawl,

Walk,

Run

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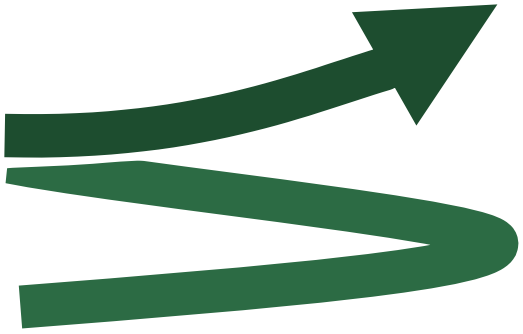
37

Implement changes during the FinOps action loop in an incremental Crawl, Walk, Run cadence. Building momentum over time like a flywheel. Exercise the lifecycle as frequently as possible.

## FinOps Lifecycle Flywheel Effect



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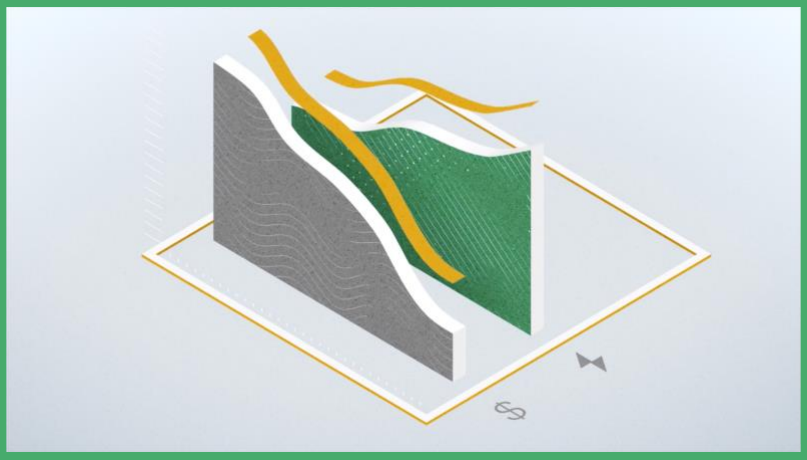
38

## FinOps Nirvana: drive better unit economics



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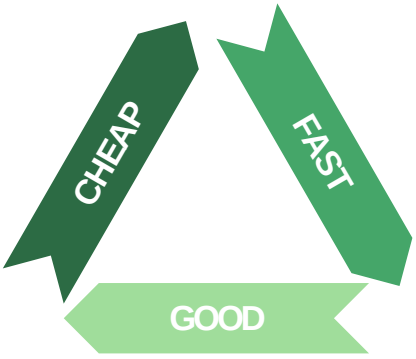
Ultimately driving toward the ability to look at cloud costs not as simply a cost, but as a driver of value, and a driver of innovation to deliver value more effectively to customers.

## Addressing Cloud Challenges

- Cloud introduces challenges that are multi-dimensional
  - Finance, Technology, Business
  - People, Process, Technology
  - Systems, Best Practices, Culture
- Cloud Demands Trade-offs
  - Quality
  - Speed
  - Cost




**The Iron Triangle**

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# FinOps and Other Methodologies

FinOps has an affinity to several other methodologies or frameworks used by many businesses today, including DevOps, Agile, TBM and AWS' Well-Architected Framework.

## FinOps and Technology Business Management (TBM)

**Complementary Approaches that vary in Scope, Speed, Scale & Skillset**

| TBM: Top Down | FinOps: Bottom Up |
|---|---|
| IT spend | Cloud spend |
| Monthly costs, quarterly trends | Hourly costs, daily trends |
| Labor, licenses, software, etc | Real-time infrastructure anomalies |
| Business Services | Microservices & Resource Costs |
| No domain specific optimizations | Prescriptive cloud-specific recommendations |
| Taxonomy: Towers, Cost Pools, Apps, Svcs | Flexible Taxonomy and allocation mapping |

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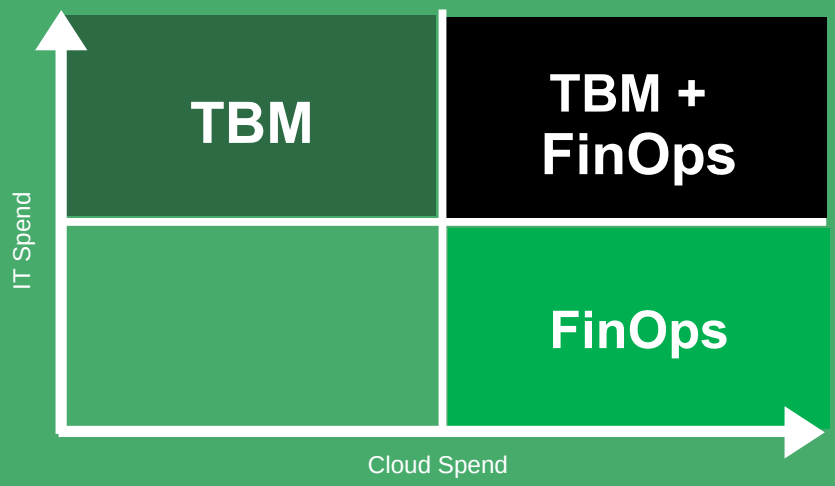
## When do Companies use FinOps vs. TBM?

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TBM and FinOps both strive to provide good, comprehensive information to make good, timely decisions and allow the business to perform tradeoffs to maximize business value. To have the data to talk about the value of services and accounts and not talk about the mechanics of either

GL accounts or Cloud accounts. Some think of TBM as more “top-down,” and FinOps as more “bottom-up” with respect to cloud costs.

They operate on a different scope, scale, speed and skillset, and each relies on slightly different skill sets, tools and capabilities.

Neither stands alone, they complement one another.

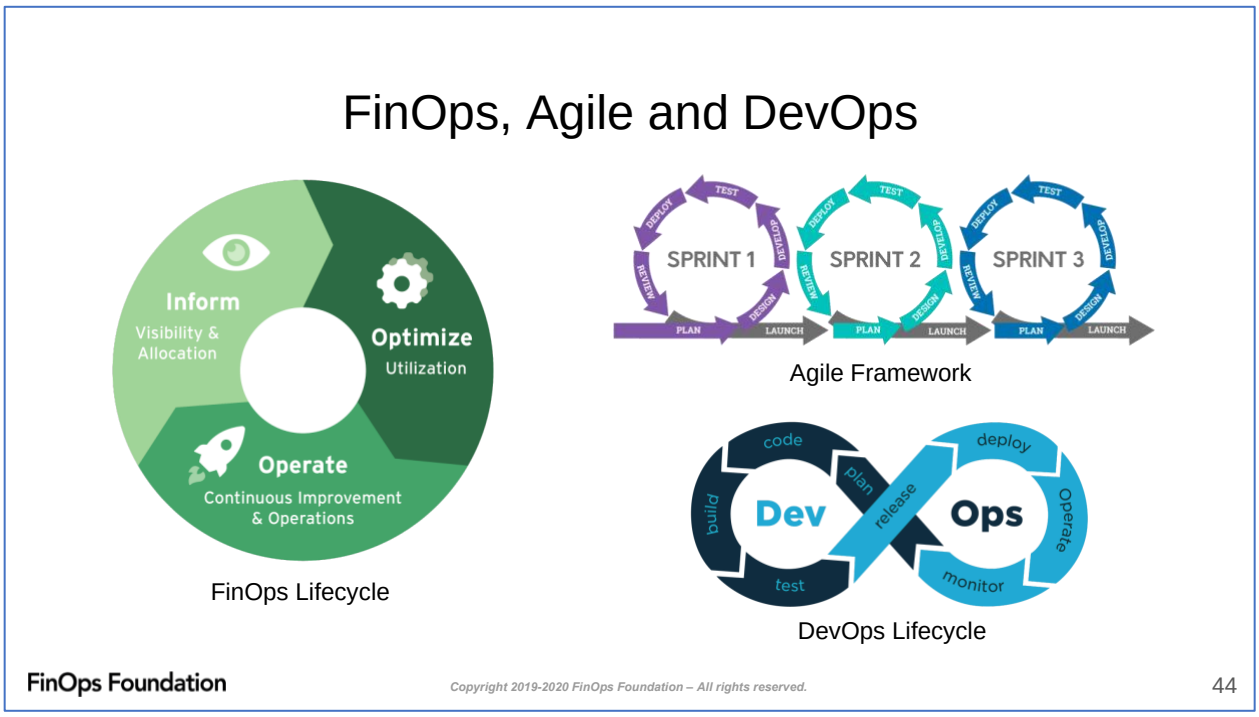
You can approach either from the standpoint of the other

A traditional IT company might have an excellent TBM Office and begin to incorporate a FinOps function as they adopt cloud

A cloud-native company might grow to the point where they need to expand what their FinOps team does to look more broadly at cost

TBM is broader and more complex for most companies, and can be thought of as an advanced topic, whereas FinOps can be done at small scale and because it provides insights that allow for direct cost savings of cloud usage, it should be done, even at a basic level, by anyone using cloud.

FinOps also has many similarities to methodologies like Agile and DevOps. They are all cyclical, continuously improving, flywheel processes which require collaboration, speed and agility while using a common framework and language to drive business value.

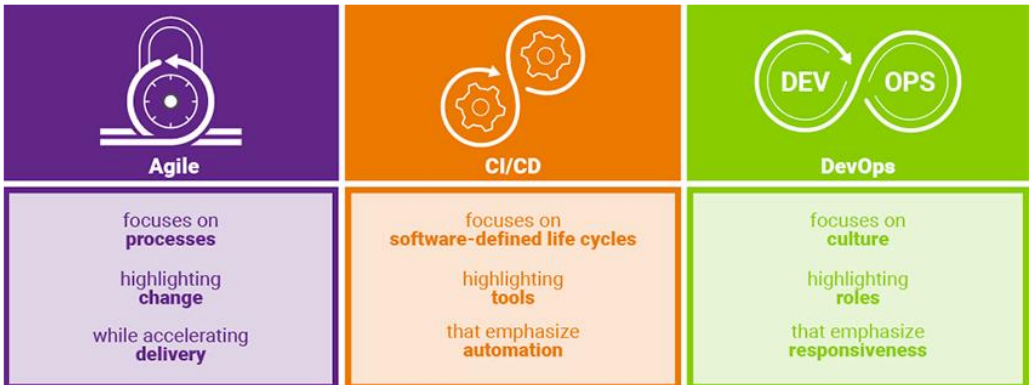


FinOps Lifecycle

Agile Framework

DevOps Lifecycle

# Agile, CI/CD, DevOps

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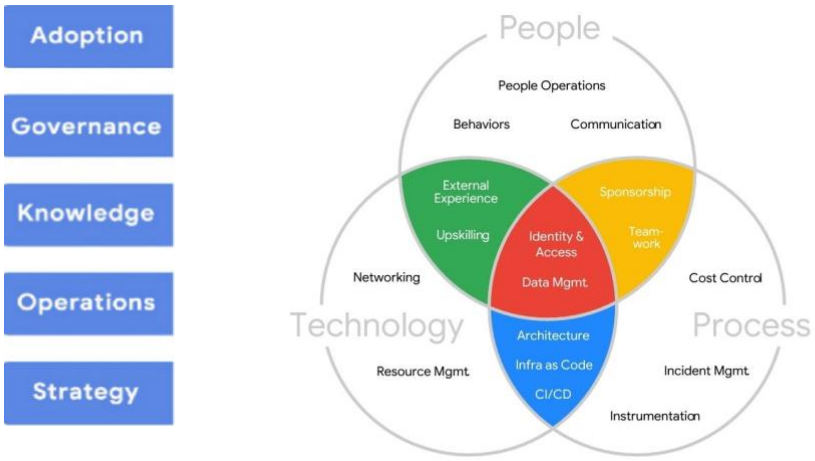
45

# Google Cloud Center of Excellence / Cloud Adoption Framework

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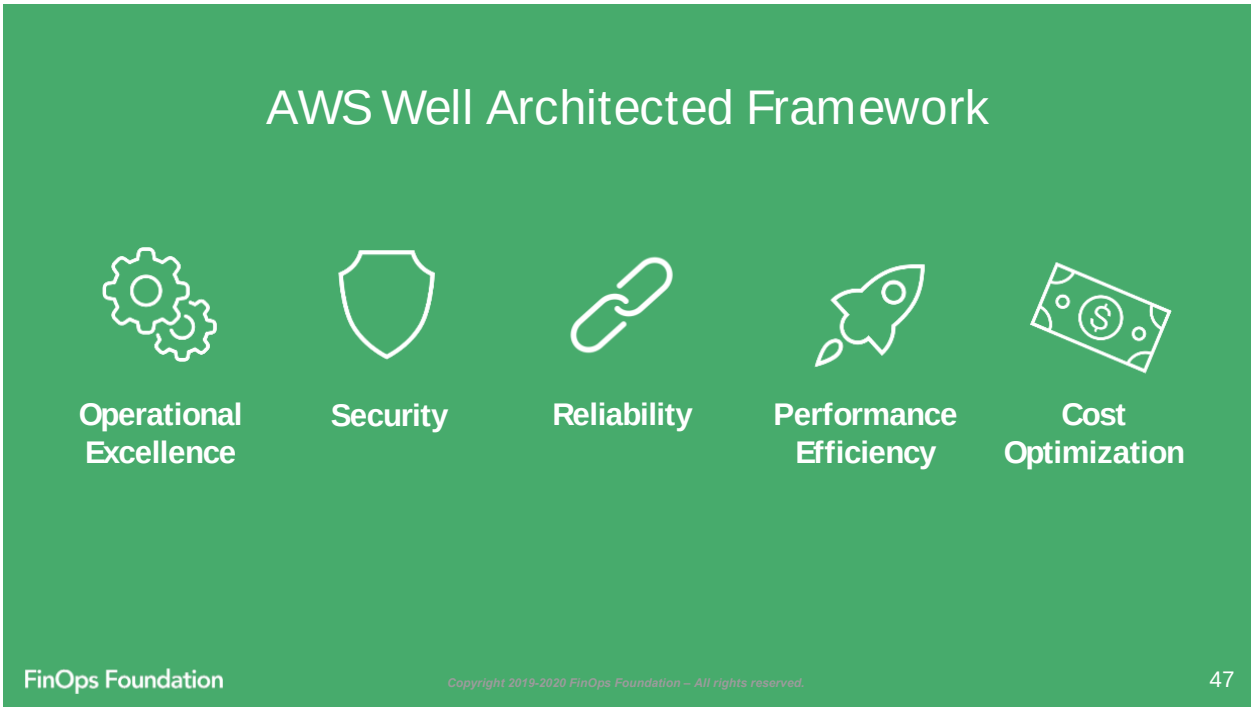
46

The AWS Well-Architected Framework is also a framework which cloud teams and vendors will use to frame capabilities and processes. FinOps supports the Cost Optimization pillar of the WAF, but also has clear ties to the others, all of which are required for a well architected public cloud solution.



# Activity 3: Principle Driven FinOps Practice

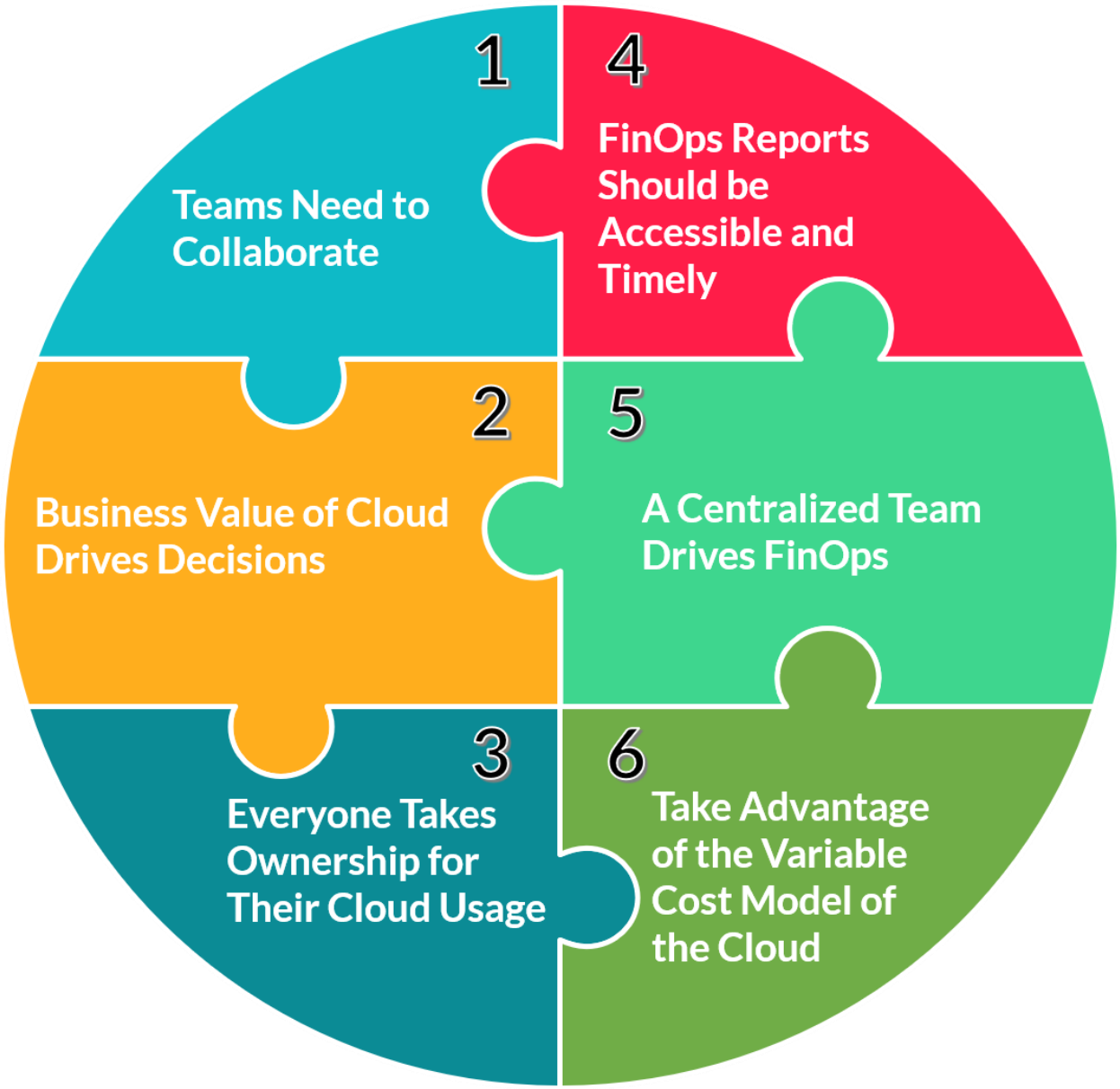
- Read the following brief business case for MadeUpCo (not a real company)
- You will not need to retain all these details, just use them as examples
- We will refer to this business case throughout the next sections
- Recently acquired by Private Equity firm who replaced the CIO. You're the FinOps lead.

## MadeUpCo Profile:

- MadeUpCo was formed in the 1980s as a regional Retail Furniture Business.
- Lines of Business (each with a VP of IT who reports to the CIO)
    - MadeUpCouch – original Retail Furniture Business, based in North Carolina
    - MadeUpCube – B2B office furniture company (acquired 2012) based in Chicago
    - MadeUpstagram – Interior Design shopping/sharing app (acquired 2015) based in SF
- Data centers:
    - Raleigh, North Carolina
    - Omaha, Nebraska (only used by MadeUpCube)
- They use the Cloud:
    - MadeUpstagram built in AWS, but integrates with systems in Raleigh data center
    - MadeUpCouch has several credit-card-paid AWS accounts and one Azure subscription, but nothing is running in production except O365
    - MadeUpCube is using O365, some SaaS HR, lifted-and-shifted some workloads to Azure
- Organization
    - MadeUpCouch has always thought of itself as the core of the company and refers to the other groups as its "divisions"
    - MadeUpCube and MadeUpstagram think of themselves as wholly owned subsidiaries and don't use "division" but call themselves Business Units (BUs)
- IT Funding
    - MadeUpCouch has been losing money and has overspent on IT the last 3 years, but it keeps a low profile and was budgeted at the same levels this year to help it get on track
    - MadeUpCube had a CIO prior to acquisition who's now the VP of IT. He does not typically work with or share information with other BUs
    - MadeUpstagram generates funding through subscription sales by designers and commissions on purchases, which is used to fund engineering groups. Cloud costs have been growing by 45% per year in the last 2 years. They pay their own cloud bills.
    - Corporate Finance pays other cloud bills, but does not do invoice reconciliation
    - MadeUpCouch has asked for special $2.2M of budget this year to build additional infrastructure in the Raleigh datacenter to build out systems that can't move to cloud
- Cloud use:
    - Normal for MadeUpstagram. They use AWS and buy Reserved Instances for Production workloads, with a coverage rate of about ~30% of their use of EC2. They also use extensive S3, Redshift, RDS, and about 20 other AWS services, most in production.
    - The VP of IT at MadeUpCouch has been promoting a multi-cloud strategy for the company with the new CIO
    - The new CIO is considering a Cloud First initiative across the company, and asking all of the Business Units to move all systems to the cloud out of corporate data centers by the end of next year, but not sure if they should choose Azure or AWS or both?

## Core Principles of FinOps

We believe we can only build successful practices when people, processes, and reporting are aligned to a set of FinOps core principles and values. Keep these FinOps core principles and values in mind and use them to help teams decide between the various options available to solve FinOps challenges. They will guide us along the best pathways to develop a successful FinOps practice within any organization.



## 1) Teams need to Collaborate

a) Finance and Technology teams work together in near-real time as the cloud operates on a per resource per second basis.
b) Teams work together to continuously improve for efficiency and innovation

## 2) Business value of cloud drives decisions

a) Unit economics and value-based metrics demonstrate business impact better than aggregate spend
b) Make conscious trade-off decisions between cost, quality and speed
c) Think of cloud as a driver of innovation

## 3) Everyone takes ownership for their cloud usage

a) Accountability of usage and cost is pushed to the edge
b) Individual feature and product teams are empowered to manage their own usage of cloud against their budget
c) Decentralize the decision making about resource usage and optimization
d) Technical teams must begin to consider cost as a new efficiency metric

## 4) FinOps reports should be accessible and timely

a) Process cost data as soon as it becomes available
b) Consistent cost visibility drives better cloud utilization
c) Fast feedback loops result in more efficient behavior
d) Visibility into cloud spend is provided to all levels of the org
e) Create, monitor, and improve real-time financial forecasting and planning
f) Trending and variance analysis help to understand why costs increased
g) Internal team benchmarking drives best practices and celebrates wins
h) Industry peer-level benchmarking determines how your company is performing

## 5) A centralized team drives FinOps

a) Centralized automation for FinOps reduces duplicated effort
b) Executive buy-in for FinOps and the practices, processes are required
c) Rate and discount optimization are centralized
d) Centrally govern and control Committed Use Discounts, Reserved Instances, and Volume/Custom Discounts with cloud providers
e) Remove the need for engineers and operations teams to think about rate negotiations, then stay focused on usage optimization

## 6) Take advantage of the variable cost model of the cloud

a) The variable cost model of the cloud should be viewed as an opportunity, not a risk
b) Just-in-time prediction, planning and purchasing of capacity
c) Agile iterative planning is preferred over static long-term plans
d) Make continuous small adjustments in cloud usage/optimization

# Building A FinOps Team

## Enact FinOps Principles with a FinOps Team

**FinOps Teams Do This:**

- Champion FinOps Principles
- Propagate Best Practices
- Coordinate FinOps across the organization
- Perform centralized FinOps functions on behalf of the company

**FinOps Team Structure:**

- Dedicated teams who perform FinOps functions full time
- Virtual teams who have FinOps responsibilities in addition to other jobs
- Aligned to other cloud and finance teams in the organization

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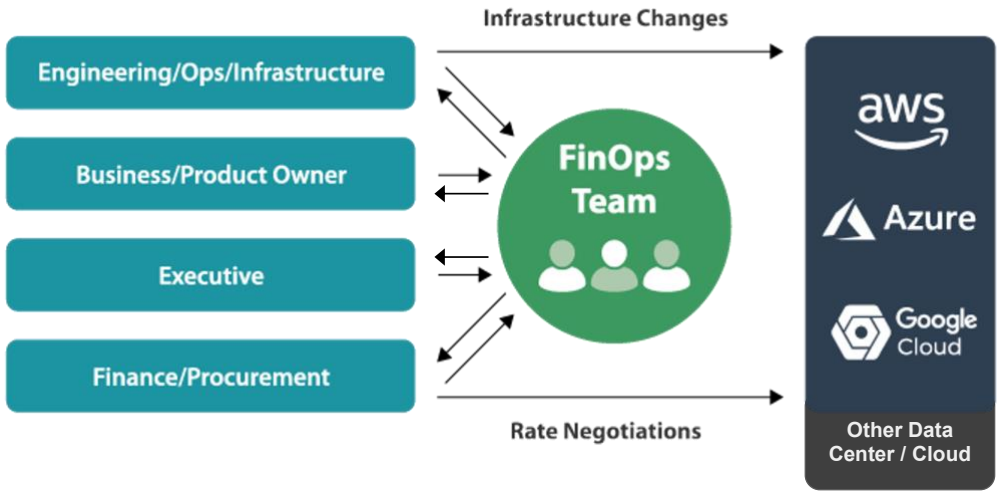
## FinOps Team




FinOps Foundation  63

The above diagram demonstrates how, for organizations operating on the FinOps model, a cross-functional team known as a Cloud Center of Excellence (CCoE) interacts with the rest of the business to manage the cloud strategy, governance, and best practices that the rest of the organization can leverage to transform the business using the cloud.

Individuals at every level and in every area of an organization can have a different role to play in the FinOps practice. This includes:

**Executives**

Executives like a VP/Head of Infrastructure, Head of Cloud Center of Excellence, CTO or CIO focus on driving accountability and building transparency, ensuring teams are being efficient and not exceeding budgets. Provide often-needed push to drive efficiency across teams and drive standardization and cost allocation efforts.

**FinOps Practitioners**

FinOps practitioners, such as an AWS FinOps Analyst, Director of Cloud Optimization, Manager of Cloud Operations or AWS Cost Optimization Data Analyst are focused on promoting FinOps practices across all organizations, promoting best practices and key learnings, conducting centralized FinOps functions like RI purchasing, and keeping the organization focused on cloud value

**Engineering and Operations**

Engineers and Ops team members, such as Lead Software Engineer, Principal Systems Engineer, Cloud Architect, Service Delivery Manager, Engineering Manager or Director of Platform Engineering, focus on efficient use of resources via rightsizing, container cost allocation, finding unused storage and compute, finding spending anomalies, etc.

**Finance and Procurement**

Finance and Procurement team members, including Technology Procurement Manager, Global Technology Procurement, Manager Cloud Cost Optimization, Financial planning and analyst manager, and Financial Business Advisor are focused on driving effective cost allocation, managing chargeback or showback to individual teams, driving budgeting and forecasting, reconciling invoices, negotiating with cloud providers and vendors, and managing the financing and amortization tracking of upfront cloud payments and other cloud costs.

# With FinOps, Accountability is Extended to the Edge

**Empower** feature and product teams to manage their own usage of cloud against their budget

FinOps Foundation



64

# FinOps ties to multiple Personas across an org

- Engineer or Product Developer
  - Usage, Daily/ Hourly, Specific Services, Single Application, App level KPIs
- Application or Product Owner
  - Usage and App Cost, Daily/ Weekly, All App services, App level KPIs
- Application / Product Budget Lead
  - Cost, Weekly/ Monthly, Multi-app, Budget compliance, Product level KPIs
- Portfolio Director/ VP in charge of multiple applications or Products
  - Cost, Monthly/ Qrtly Trending, Multi-App, Budgets across teams, Portfolio KPIs
- Finance Lead (at any level)
  - Cost, Monthly/ Qtrly Trending, Multi-Portfolio, Multi-Cloud, Budgets, Forecasts, Organizational KPIs
- CIO / CIO Finance
  - Cost, Quarter/ Annual, All portfolios, tying costs to overall IT spend/ costs on premises

FinOps Foundation



65

# Rate and Discount Optimization is Centralized

**Centrally govern & control** Committed Use Discounts, Reserved Instances, Savings Plans, and Volume/ Custom Discounts with Cloud Providers

FinOps Foundation



66

# Building a FinOps Team

FinOps Teams are as Diverse as the companies that use Cloud

- Who should be on a FinOps team? What roles should we look for?
- How many people on a FinOps Team?
- Where should the FinOps team report in the Org chart?
- What are the barriers to effectiveness?

FinOps Foundation



67

# Activity 4: FinOps Team Roles

- Go to Menti.com with your device of choice and use the code found on the screen to enter your responses
- Keep responses short (one to two words)
- You may answer more than once
- Feel free to repeat answers you see if you agree with them
- Remember do not share non-public information
- Use the space below to make notes during the discussion

## Question:

***What roles are needed for a FinOps team? (One/Two-word answers)***

_____

_____

_____

_____

_____

_____

# FinOps Team Roles – From FinOps.org calls

- CPA/ Finance Professionals
- Cloud Architects
- Technical Writer / Communication
- Financial Analysts
- Engineer / Automation Developer
- Educator / Trainer
- Evangelist
- Data Analyst
- Capacity Planner / Forecasting Specialist
- "FinOps Practitioners" (check LinkedIn or the Slack channel)

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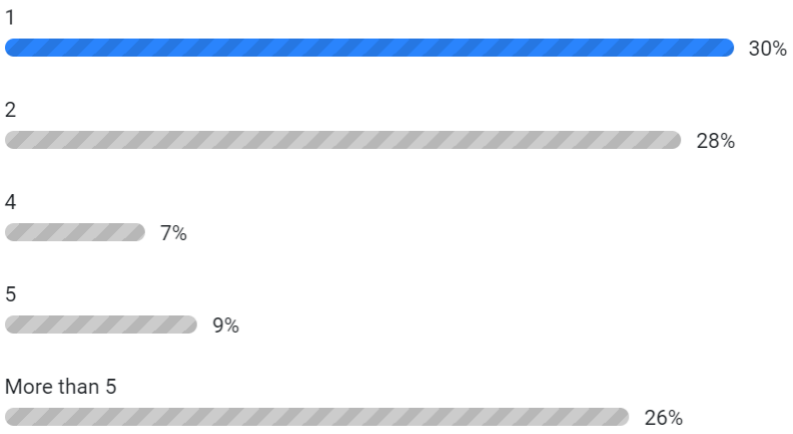
69

# Team Size

**How many people are on the team that performs the FinOps function in your organization? (include yourself)**

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70

## FinOps Teams - Where do they report?

- FinOps Teams tend to pop up where the "opportunity for optimization" is spotted
  - CIO
  - CFO
  - CTO
  - CEO
  - Procurement, IT Finance
- Strategic Initiatives - if cloud is new to traditional IT companies
- Operations - as Cloud becomes IT, FinOps will become operations
- Matrixed organizations are common - collaboration focus
- Understand FinOps relationship to all of these roles

FinOps Foundation  71

## FinOps Teams and Other "Offices"

- TBM Office (TBMO)
  - Well-functioning TBMO can be a good environment for a FinOps team function
  - Similar goals but different Scope, Scale, Speed, Skills
  - FinOps and TBMO may have different sponsors, executive focus
  - FinOps team and TBMO will need to work together, exchange data, coordinate activities, leverage one another
- Cloud Center of Excellence
  - Cloud Center of Excellence (CCoE) can be a good home for the FinOps function
  - CCoE usually broader in scope, may include Governance, Security, Policy, etc.
  - Similar goals, scale, speed, skills
  - Similar need to tie back to broader business value

FinOps Foundation  72

# Activity 5: FinOps Team Effectiveness

- Go to Menti.com with your device of choice and use the code found on the screen to enter your responses
- Keep responses short
- You may answer more than once
- Feel free to repeat answers you see if you agree with them
- Remember do not share non-public information
- Use the space below to make notes during the discussion

### Question:

***What are the main concerns your FinOps team faces (e.g. multi-cloud, RI Buying, skills, org design, oversight, training, cloud knowledge)?***

_____

_____

_____

_____

_____

_____

At its core, FinOps is a cultural practice. This operating model is the most efficient way for teams to manage their cloud costs. Using FinOps, teams can come together to deliver faster while gaining financial and operational control.

Distributed decision making coupled with the move to variable spending in cloud allows technology teams to efficiently partner with finance and business teams to make informed decisions that drive continual optimization. FinOps processes enable these teams to operate at high velocity while improving the unit economics of cloud. This shift enables and empowers teams at the edge and allows team members in every part of the business to participate in the process of increasing efficiency, optimizing utilization and reducing spend.

# FinOps Capabilities

### *Understand Fully Loaded Costs*

## FinOps Capabilities

FinOps Capabilities are ***WHAT*** the FinOps team does in its practice

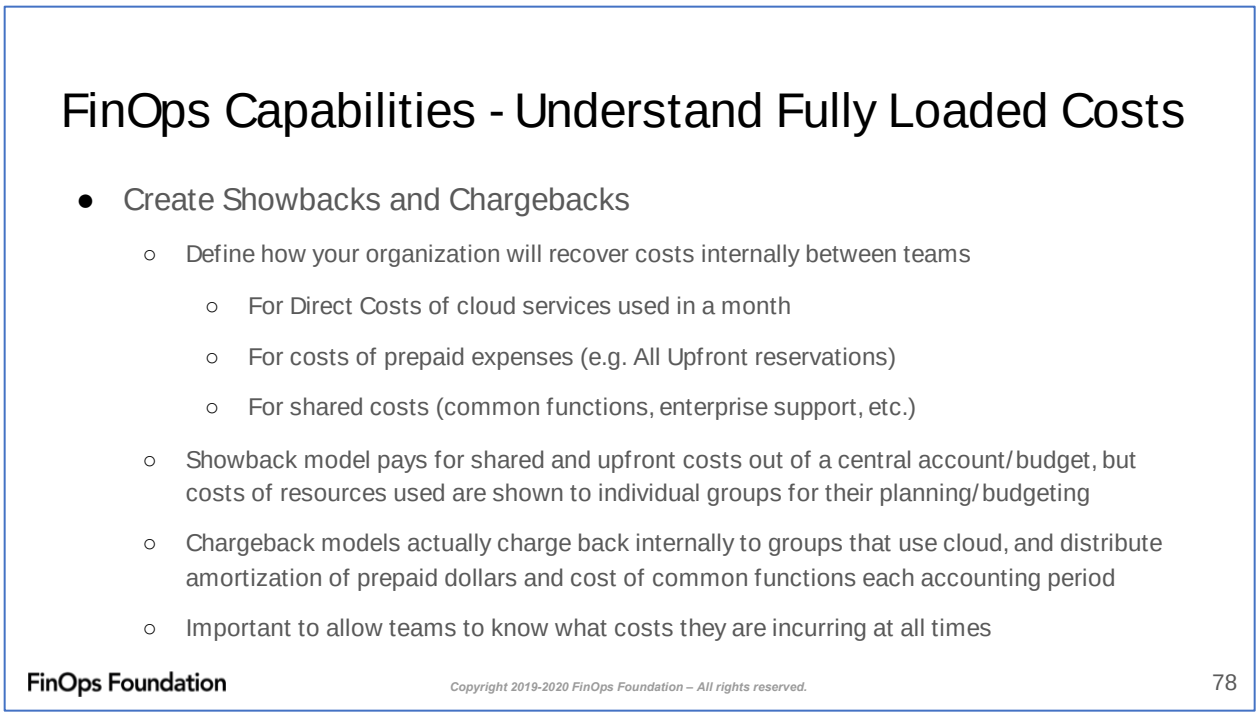
- Understand Fully Loaded Costs
- Enable Real-Time Decision Making
- Benchmark Performance
- Optimize Usage
- Optimize Rates
- Align Plans to the Business

FinOps Foundation  77

## FinOps Capabilities - Understand Fully Loaded Costs

- Map spending data to the business
  - Meaningful taxonomy of your costs
  - Organizational breakdown (by division, business unit, management hierarchy)
  - Functional Breakdown (by application)
  - By cost center, project ID, or other identifier (map to available taxonomy)
- Set tag strategy and compliance
  - What will be tagged in the Cloud, what will be tagged outside of the cloud
  - How to handle Untagged, Untaggable spending
  - How to handle tag compliance

FinOps Foundation  78

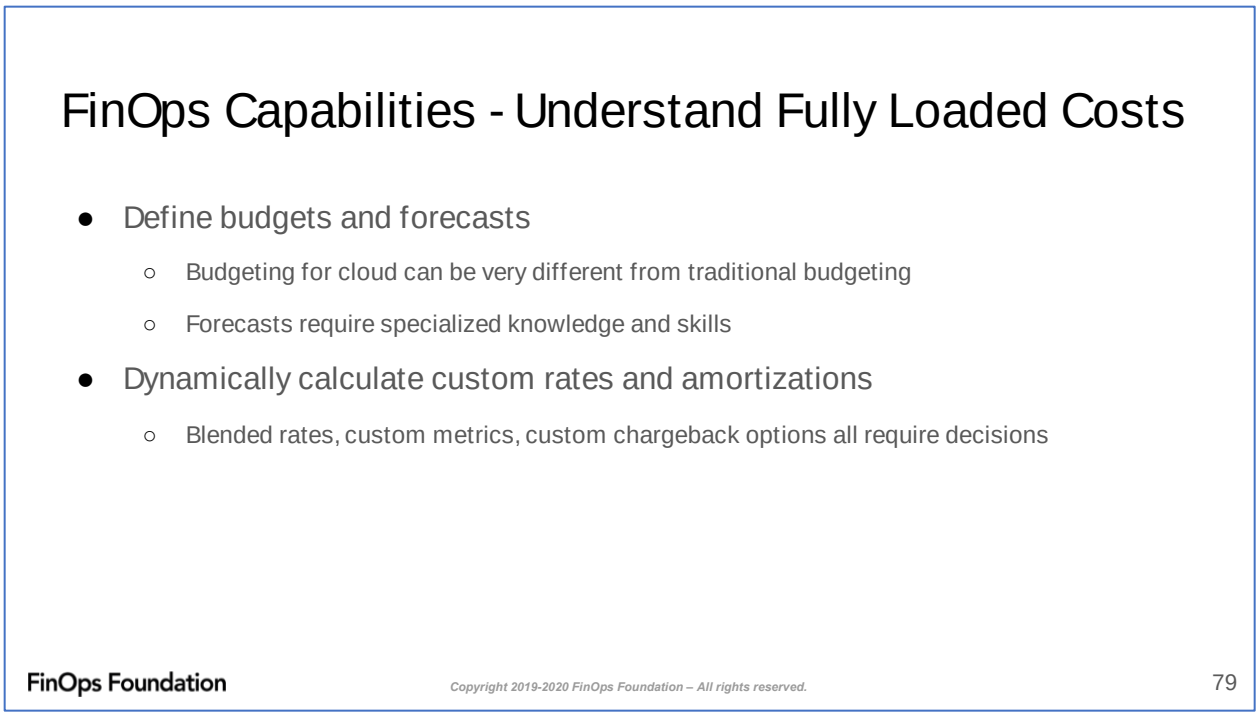



*Map spending data to the business (meaningful taxonomy)*

Before accurate chargeback can be implemented, spend data must be properly mapped to the organizational hierarchy by cost centers, applications and business units. Tags and accounts setup by engineering teams are often not aligned to the view of the world that finance teams need, nor do they include the proper roll-ups that executives require.

*Set tag strategy and compliance*

Tagging strategy is both an art and a science that we'll cover later. Even with a strong account hierarchy, it's critical to get early alignment on a supporting tag strategy to get more granular. Without this, tag definition is left to the masses and tag sprawl quickly makes them unusable.




*Create showbacks and chargebacks for Direct and Shared Costs*

As organizations adopt the FinOps model of pushing spend accountability to the edges of the organization, they are finding that chargeback and showback models are becoming increasingly important to drive ownership of spending and recover costs.

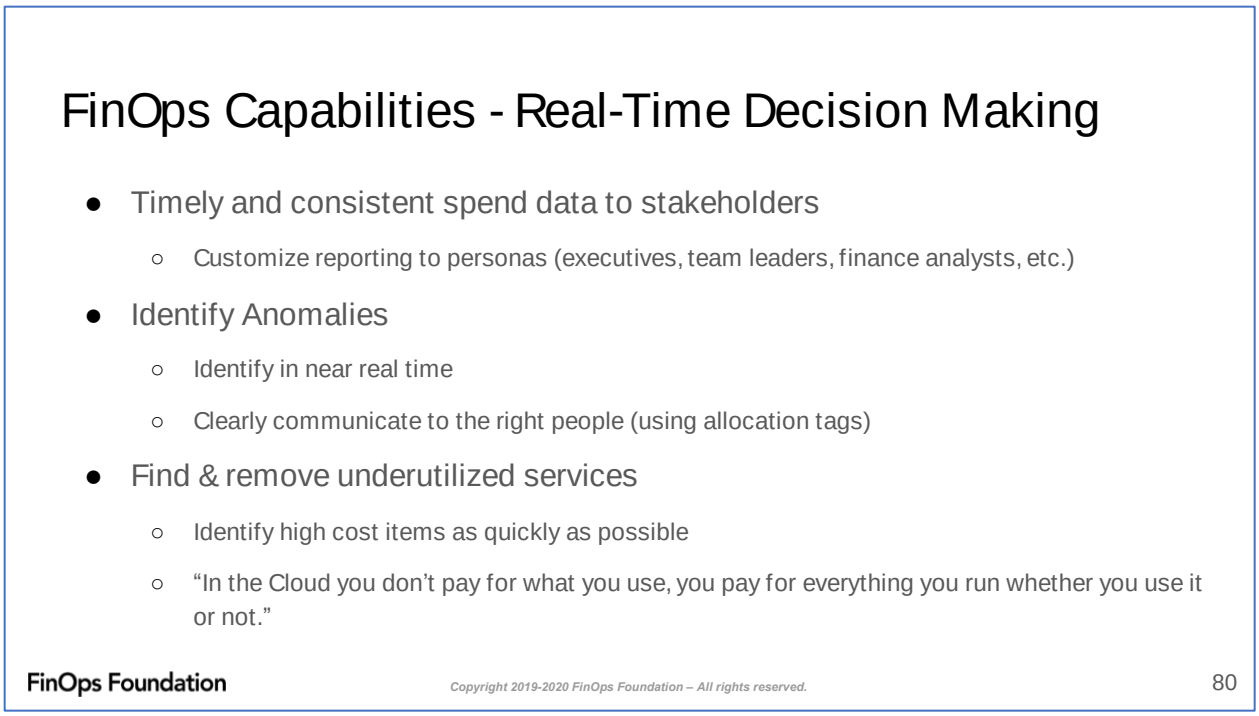
*Define budgets and forecasts*

Using the data that's available to them, a FinOps team should be able to generate forecasts of cloud usage for different projects and propose what budgets for different projects should look like. These budgets and forecasts should consider all aspects of a cloud architecture, including containers. Managing teams to budgets lets you know when to lean in with optimization or spend remediation help, they also enable a conversation about why spending has changed.

Forecasting of spend should be done for each team, service or workload based on fully loaded costs and properly allocated spending, with the ability to model changes to the forecast based on different inputs such as history and cost basis.

*Dynamically calculate custom rates and amortizations*

The wide variety of methods of reporting cost, the tracking upfront payments of reserved instances, and the wide variety of discounting models offered by cloud providers requires the FinOps team be able to accurately and effectively report usage to cloud teams in ways that include all relevant discounts, rate adjustments and amortization.




## *Enable Real-Time Decision Making*

### *Deliver timely and consistent daily spend data to stakeholders*

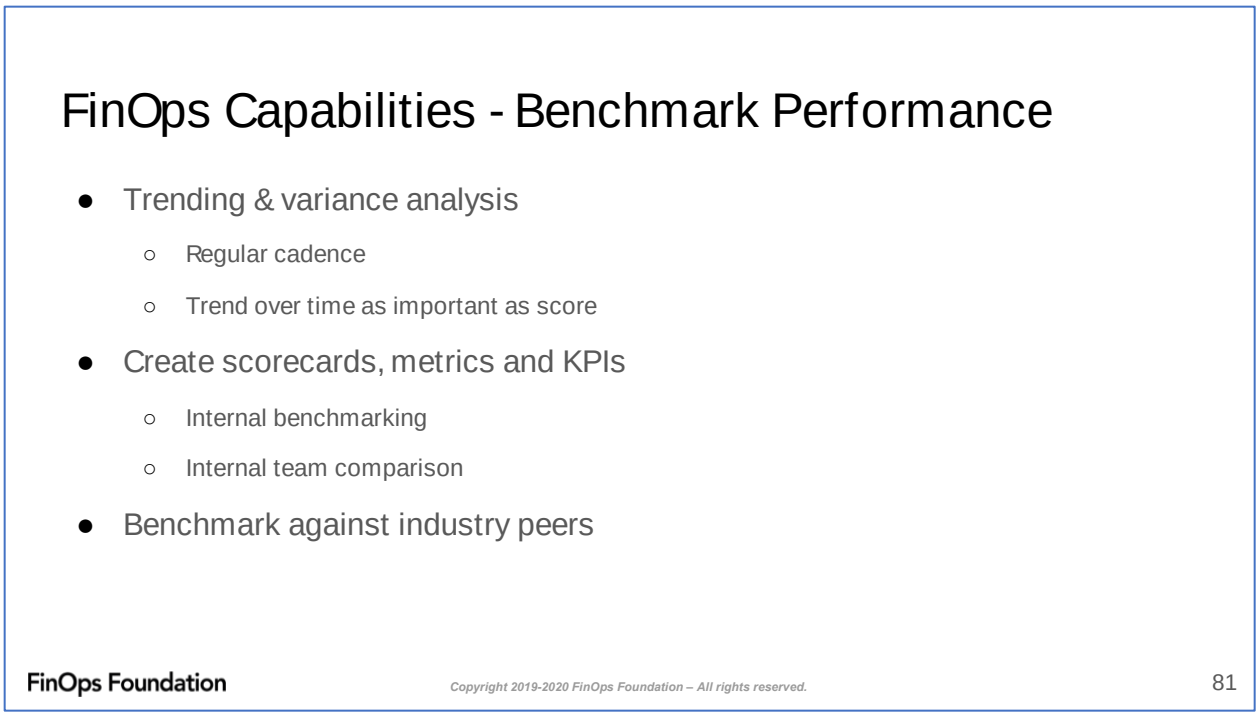
Stakeholders should be able to regularly see how they're tracking against their budgets. Daily or weekly visibility gives them a feedback loop that enables them to make the right decisions for the business. This creates a "Prius Effect" wherein just having access to spend and usage data often drives more efficient usage even without explicit direction to do so.

### *Identify anomalies*

Anomaly detection isn't just about identifying expense thresholds. It's also important to identify unusual spikes in usage. Given the dramatic rise in the variety of variably charged services available by cloud providers anomaly detection that watches for any deviations in spend help you find the needle in the haystack that may need quick remediation. It is critical to be able to do this in near-real-time, and not to rely on monthly bills to flag anomalies as much as 45 days after they occur. Automated platforms and tools should be considered to efficiently flag cost anomalies.

### *Find & remove underutilized services*

After teams can see their properly allocated spend and usage, they can start to identify unused resources across all major drivers of spend like compute, database, storage, or networking — and shut them down for immediate benefit and savings. Spot and eliminate waste.




## *Benchmark Performance*

### *Trending & variance analysis*

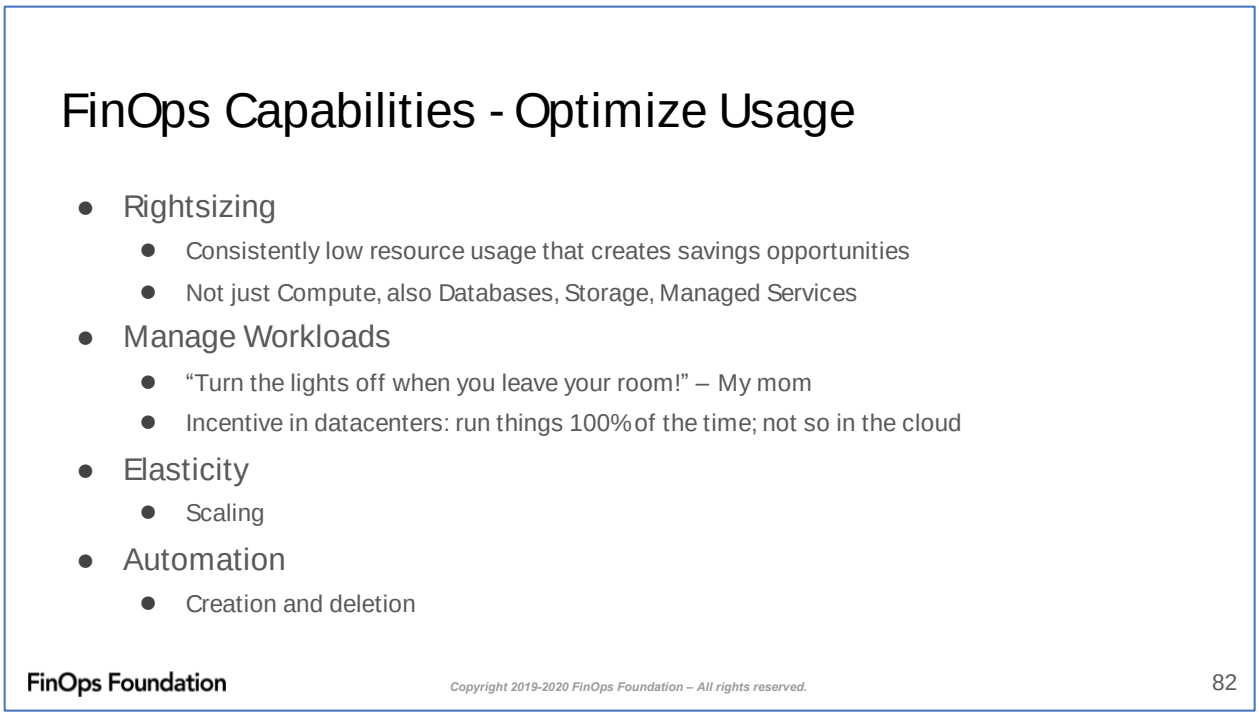
It is critical to be able to track cloud usage over time, and to track cloud cost against our spending forecasts over time. As we see variances in our trend lines we can then determine if we are controlling costs effectively or if we are forecasting effectively and the FinOps team can determine what actions to take to correct our action.

### *Create scorecards*

Scorecards allow cloud teams and executives to see how our cloud investments are performing on an ongoing basis. Establishing scorecards with clear goals around good behavior the FinOps team is promoting among the cloud teams helps all teams understand how they are doing and drives positive results.

### *Benchmark against industry peers*

Building on the concept of internal scorecards, more advanced FinOps teams extend their benchmarking to make comparisons of other industry peer-level spend data to identify efficiency compared to others with a normalized set of spend characteristics.




*Rightsizing*

Match the workload to the resource.

Balance standardization and customization in making decisions on instance types and sizes.

Rightsizing is more common in lift & shift migrations to the cloud, as analogs to on-premises virtual machines are sometimes difficult to match. Adjustments after watching full cycles of operation in the cloud allow technical teams to size appropriately to the workload.

Rightsizing is the most collaborative of FinOps processes in that it requires an analysis of the performance of the running resources in the cloud, an assessment of the value of changing from one resource size/type to another, and technical inputs on the feasibility and difficulty of doing so.

Unlike RI purchasing, Rightsizing requires changes to running resources, and can have implications to the health and operation of the company’s systems. This should not discourage you from doing it, only ensure that you approach each rightsizing opportunity carefully.

Rightsizing opportunities should always be viewed as an opportunity for discussion with the FinOps team, not as ironclad cost savings. Don’t do an excessive amount of work estimating cost impacts of an instance family change, for example, until technical team members have validated that the change is possible given the application running on that instance.

***Manage Workloads***

Workload management suggests that whenever you pay for a variable cost resource by the second/minute/hour, you should only run that resource while you are using it.

Whenever creating resources in the cloud, consider when they can be turned off. All cloud providers and many third-party tools provide companies with the capability to turn off resources when not in use to save cost.

Typically, this applies more to development and testing environments, which are not used for large parts of the week.

Some applications and systems cannot tolerate this turn-on, turn-off process. Look to minimize the size of the resources running them to reduce cost.

Some environments, like a testing environment that would be used to troubleshoot production problems, might be too critical or potentially critical to turn off. Remember, there are no hard and fast rules here. The FinOps team can make explicit tradeoff decisions between cost, speed and quality, and there may be very legitimate reasons to leave an environment on all the time because the cost is acceptable given the potential cost of not having the environment running when a production incident hits.

***Automation***

Automation allows for consistent creation of resources and consistent termination of resources.

Automation in reporting helps to take some human error out of the processes involved in FinOps and leverages the capabilities of the team.

Automated processes are more consistent, and consistently followed. It is often difficult to set up automation without understanding the key processes completely. The FinOps team, with its cross-functional mindset is an excellent place to develop this understanding.

# Activity 6: What to do first?

- Log into Menti.com
- Answer the question posed

## Question:

***What is the first thing you should do to save the most money?***

_____

_____

_____

_____

_____

## FinOps Capabilities - Strategy to Optimize Usage

- Avoid 100%
  - Get rid of things you aren't using at all
  - Get rid of things you no longer need (backups, snapshots, pilot environments)
  - Turn things off when you don't need to use them (weekends, nights, non-testing periods)
- Save 50%
  - Buy Committed Use , Reservations, or Savings Plan (Commit to using the resource at current size)
- Save 25%
  - Rightsize as items cross cost savings thresholds
  - Job Jar. Rightsizing is a great story for the last few points of a sprint
- Save between 1% and 100%
  - Re-architect applications or individual services to Containers or Serverless
  - Use cloud-native services as analogs to commercial licensed products

FinOps Foundation  85

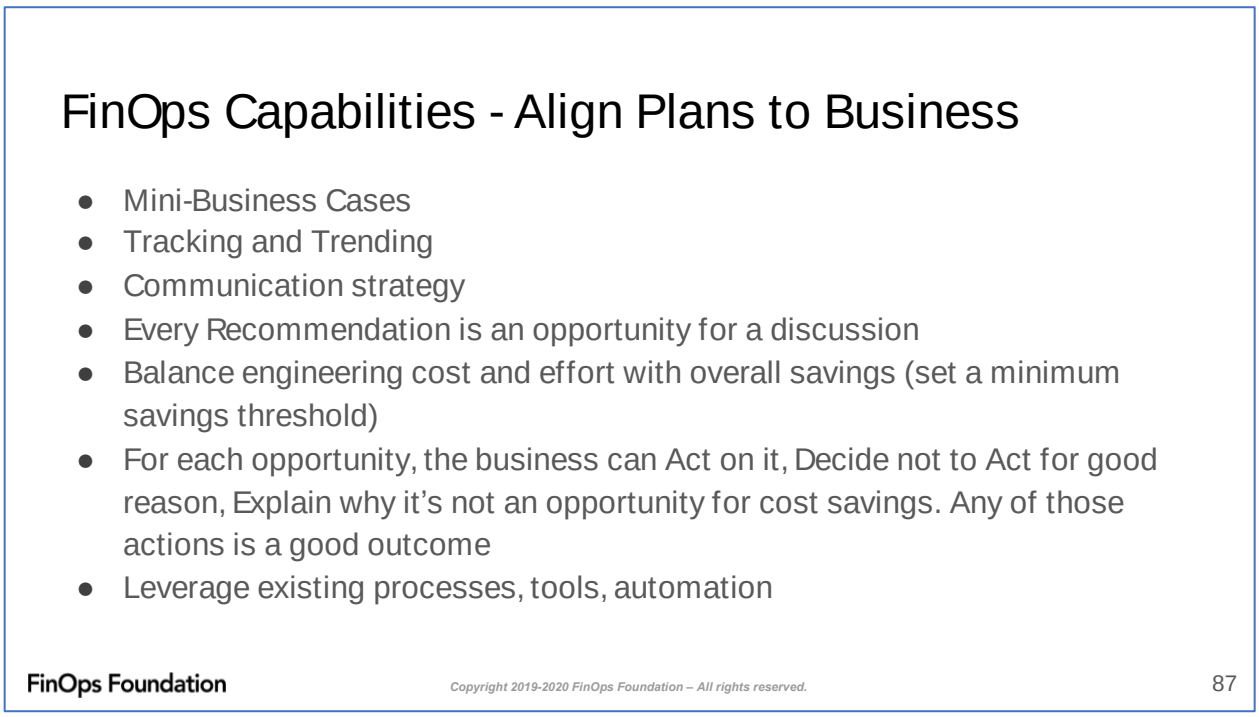
### *Optimize Rates*

## FinOps Capabilities - Optimize Rates

- Balance use of various rate types
  - On-Demand/ Full Price
  - Reserved/ Committed/ SavingPlan Capacity
  - Spot, Pre-emptible or Instant market
- As term and upfront fees increase, discount goes up and flexibility goes down
  - Increase your term, reduce your flexibility when you are more sure of what you will use
- Pre-purchased Capacity is handled differently across vendors
  - Reserved Instances, Committed Use Discounts, Savings Plans
- Custom and Volume Discounts / Sustained Usage
- Licensing
  - Marketplace
  - OS Licenses
  - Licensed Software vs. Cloud Native Options

FinOps Foundation  86

***Align Plans to the Business***




# Motivations and Common Language

When we build a common understanding of each other's positions and create empathy and a common language, we can begin to work together to solve the challenges created by the cloud. This section provides you with an understanding of the common FinOps language.

Various members of the FinOps Team bring a variety of motivations, experiences and points of view to the FinOps team, just as members of the various teams FinOps supports do. Someone with a Finance background may bring that perspective to the discussion, just as somone with a cloud developer background brings a different perspective. FinOps teams should understand upfront that this dynamic will occur, and recognize that this diversity of motivation and perspective will make the FinOps team more effective going forward.

Always consider the perspectives and motivations of the various people and groups in your organization in your decision making, and talk about them openly and explicitly. Like other cognitive biases, it is difficult for an individual to step outside of his or her own perspective, but working together, the FinOps team can help the organization take these into account to make the best decisions possible.

## Collaboration in the FinOps Team

Members of the FinOps Team come with a variety of

- Backgrounds
- Points of View
- Motivations
- Experiences
- Biases
- Vocabularies
- Expertise


FinOps Foundation



90

# Activity 7: Motivations

- Join one of the Breakout groups
- You will be assigned a role as a group, Finance, IT or Business, at random
- Remember do not share non-public information
- Use the space below to make notes during the discussion

### Question:

***Thinking about your group's role specifically, what Hopes, and Fears do you have regarding being part of the FinOps team managing your usage of Cloud?***

_____

_____

_____

_____

_____

## Finance Terminology

While finance, procurement and accounting teams are often puzzled by the new vocabulary found in the cloud world, many technical resources find the language of finance to be as much of a challenge.

Weighted Average Cost of Capital, Net Present Value, and Amortization are key concepts a FinOps team will use to get the best value for the company out of reserved instance purchasing, for example, but technical teams often making the decisions struggle to understand these concepts, much less the tax, reporting or business metric impacts of cloud spending.

Finance teams should bring their deeper understanding of Finance concepts to the FinOps team and help the organization understand the Finance impacts of decisions at every stage

## Software Development and IT Terminology

Technology teams must recognize that the business and finance professionals with whom they will interact in the FinOps process may not have the intuitive understanding of technology they have. Enterprise Architecture, DevOps, SecOps, application migration, virtualization, network and capacity management, and other key IT concepts that will be impacted by Cloud may be foreign concepts to other FinOps team members.

IT teams should help others to understand basic development processes, tools and concepts, and look for points of intersection where architecture decisions might have important trade-offs later in the process.

## Business Terminology

Executives and mission leaders within a business adopting cloud can be overwhelmed with the terminology and intricacy of the details, often presented in response to requests to just “make something work.”

Translating from broad business objectives to detailed plans has always been a challenge for any business and is only made more apparent in a fast-paced, cloud-based environment. Business leaders should strive to develop a higher baseline of understanding with other FinOps team members, and to remain engaged to bring the customer or business objective viewpoint to decisions being made.

As stated in the FinOps Principles, all work the FinOps team does to optimize cloud use is done to meet the overall goals of the business, and direct participation from management in the FinOps team is imperative to keeping this “true north” ideal in sight.

## Commercial Cloud Provider Terminology

Every cloud vendor strives to differentiate its offerings with compelling and recognizable service names. Some do better than others. But the ultimate result is often a jumble of new vocabulary that is confusing to anyone without a good foundation in cloud.

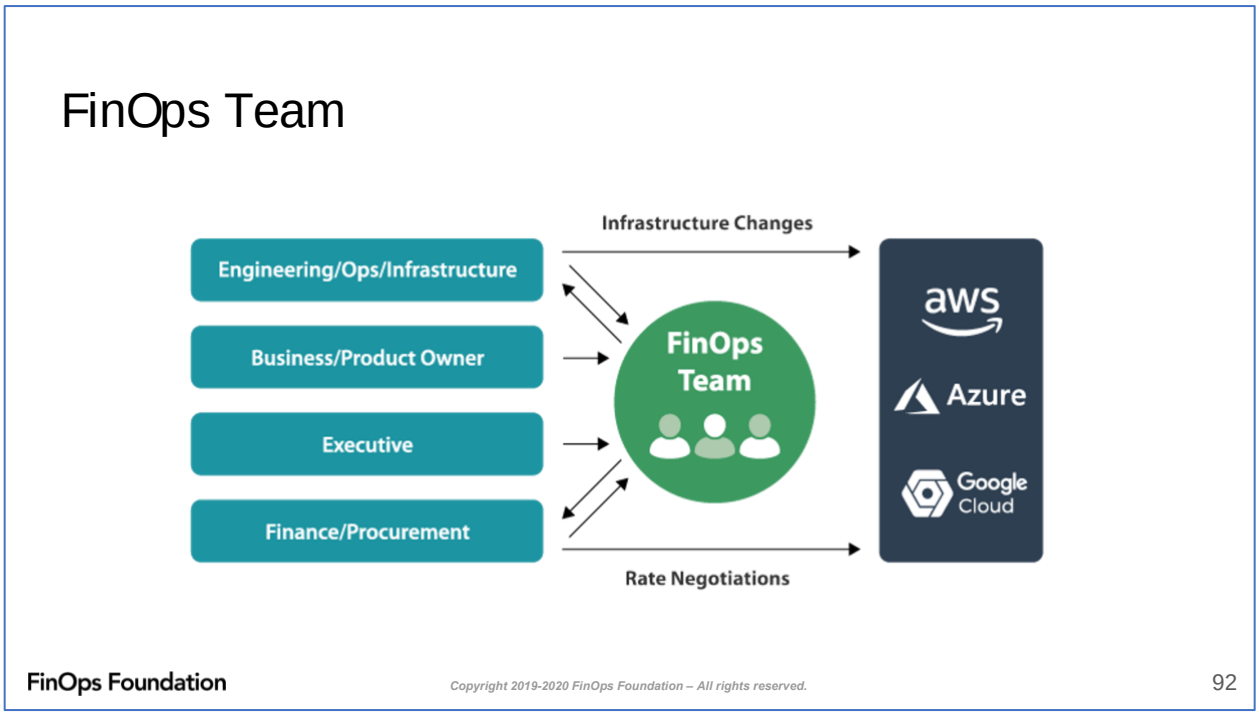
For any organization moving significantly to cloud, it is important to establish a baseline understanding among any key staff who will be supporting the FinOps practice in the vocabulary of the cloud vendors used.

Consider taking Practitioner level courses, offered by all major vendors, or establishing a training process internally to allow staff to learn and ask questions in a low-stress environment.

## FinOps Terminology

FinOps itself brings new vocabulary and concepts to the table. Organizations embracing a FinOps practice will talk in detail about unit economics, and the Inform, Optimize, Operate lifecycle. You'll say Crawl, Walk, Run a lot.

Don't let a new elite vocabulary only accessible to the in-crowd develop, use the FinOps team to encourage a culture where every team uses terms that are well understood, or makes the effort to ensure everyone knows what the implications of any loaded term might be.



## Common Language

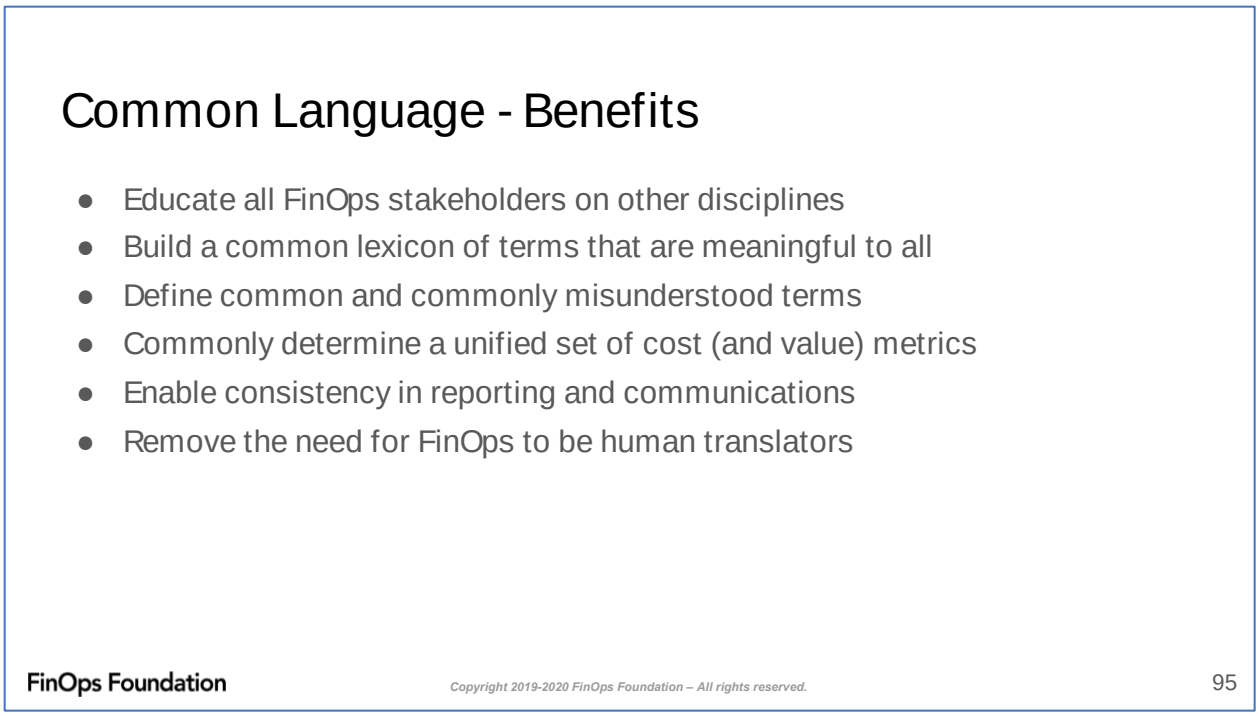
- Discipline vocabulary
  - Finance (NPV, Amortization, Capex/ Opex, EBITDA, WACC, Balance Sheet, COGS)
  - Engineering / IT (DevOps, Lift & Shift, Workload)
  - Product / Business (Agile, Sprint, MVP, User Stories)
- FinOps vocabulary
  - Inform (Crawl, Walk Run, Iron Triangle, Tags, Personas, Showback, Chargeback)
  - Optimize (Rightsizing, Usage, Rate, Anomaly, MDCO, OKR)
  - Operate (Automation, Integration, Unit Economics, Containers)
  - Financial (Blended Rates, Reservations, ISF, Convertible, Upfront charges)
- Cloud vocabulary
  - AWS (Payer/ Linked Accounts, EC2, S3, Regions, Availability Zone, RDS, RIs, Savings Plans)
  - Azure (Enrollments, Subscriptions, VMs, Blob Storage
  - GCP (Projects, Folders, Compute Engine, CUD, SUD)

FinOps Foundation  93

## Finance & Accounting in Particular

- Finance teams and the CFO have a Fiduciary Responsibility
- Key Concepts they will be interested in:
  - Prepaid Expensses (any upfront payments)
  - Current Period / Accounting Period benefit
  - Cash vs. Amortized costs
  - Capital expenses vs. Operating Expenses
- Key Finance/ Accounting Terms FinOps teams should know
  - Balance Sheet & Income Statement
  - General Ledger, Accounts Payable, Accounts Receivable
  - Capitalization
  - Cost of Good Sold (COGS)
  - Depreciation
  - Generally Accepted Accounting Principles (GAAP)
  - Inventory

FinOps Foundation  94



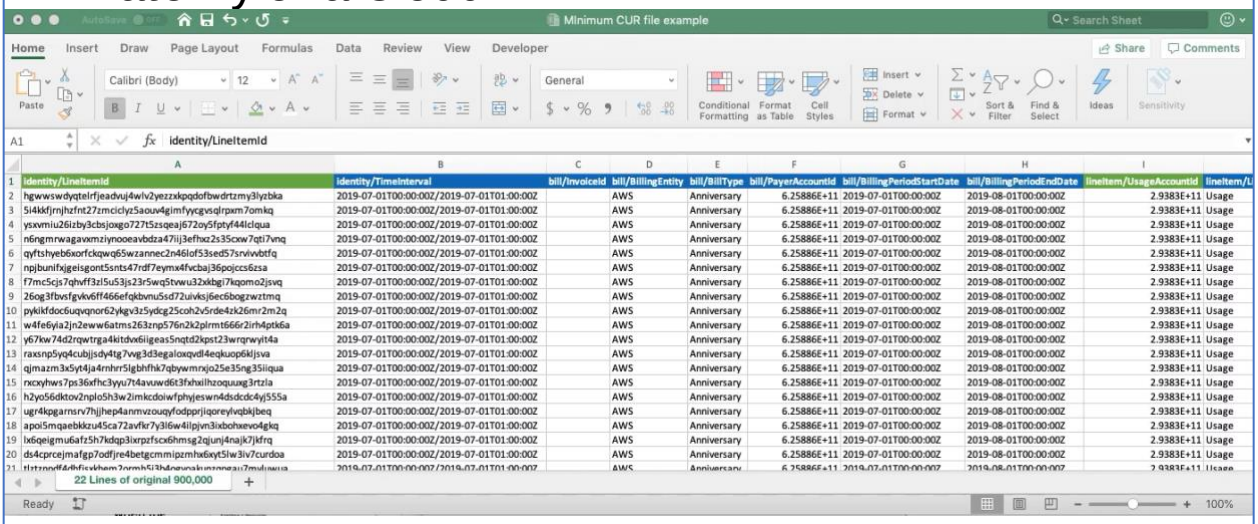

The glossary at the end of this workbook contains definitions to many common terms a FinOps team might use, hear, or promote.

Consider producing and publishing a common terms publication within your company to identify the terms your teams should be familiar with. This can be usefully posted on an internal collaboration page or FinOps team page on the intranet.

# Anatomy of a Cloud Bill

Imagine being the Billing clerk getting a bill for $10,000 that is 900,000 lines long. What to do?

## Anatomy of a Cloud Bill




- 22 lines of a 900,000 line file



Now that you understand the Common Language of FinOps, nowhere is that common understanding more important than in managing the cloud bill.

## Anatomy of a Cloud Bill

- Raw Cloud Data
  - Unfit for ~~Human~~ Excel Consumption
- Attributes Identify the dimensions of cost
  - Region, Instance ID, Item descriptions, Date/ Time, Tags/ Metadata, etc.
- And the metrics of cost
  - Time running or Usage Quantity
  - Rate (s)
- Basic Equation
  - Time or Usage x Rate = Cost
- Levers for Action
  - time= Optimize Usage is decentralized (Principle 3)
  - rate = Optimize Rates is centralized (Principle 5)

The movie shown in the workshop represents 22 lines of a 900,000 line cost and usage report from one of the cloud vendors. It has over 200 columns and can have millions of lines detailing usage over a month in excrutiating detail.

Gaining meaningful insights from that detail is daunting, and requires the skill of the FinOps team to work out with the help of automated tools that fit your business' needs.

## Anatomy of a Bill

- By contrast, this version of the Invoice Summarizes an entire month in 2 pages
- This is too little data

- Find the right tools and Systems to allow you to get the data you need at the right level of detail to make the real time decisions you need to make

| PO Number | Account ID | Invoice No | Statement Date | Payment Due Date |
|---|---|---|---|---|
| [redacted] | [redacted] | [redacted] | 05/03/2019 | 06/02/2019 |

Billing Period: April 1 - April 30, 2019

| Service Name | Amount Due |
|---|---|
| Amazon Comprehend | $3 [redacted] |
| AWS Transfer for SFTP | $6[redacted] |
| AWS Secrets Manager | $4[redacted] |
| Amazon SimpleDB | $([redacted] |
| Amazon QuickSight | $7[redacted] |
| Amazon CloudSearch | $2[redacted] |
| AWS IoT | $3 [redacted] |
| AWS Direct Connect | $1[redacted] |
| Alexa for Business | $1[redacted] |
| Amazon Neptune | $0 [redacted] |
| Amazon Transcribe | $0.[redacted] |
| Amazon Redshift | $5,8[redacted] |
| AmazonCloudWatch | $5[redacted] |
| AWS Elemental MediaStore | $([redacted] |
| Amazon Athena | $1[redacted] |
| AWS Database Migration Service | $1,[redacted] |
| Amazon Lex | $4[redacted] |
| Amazon GuardDuty | $3,[redacted] |
| Amazon Kinesis Video Streams | $0.[redacted] |

FinOps Foundation

## Anatomy of the Bill By Vendor (always evolving)

- AWS
  - Invoices + Internal Tool data
  - CUR File (replaces DBR, CAR files from earlier) – most mature of the three
- Azure
  - Invoices + Internal Tool Data
  - Azure Billing file – Daily data, notably excludes List Cost, Amortization, Prepaid RI costs, Specific Resource information, utilization data
- GCP
  - Invoices – most summarized
  - GCP Billing data – Daily data, notably excludes specific resource information

FinOps Foundation  102

# What Have You Learned So Far?

In each of the following sections write what you've learned within each topic. By writing what you've learned, you'll commit to memory what was impactful for you, thus preparing you for the Certification Exam.

## What is FinOps

## FinOps Principles

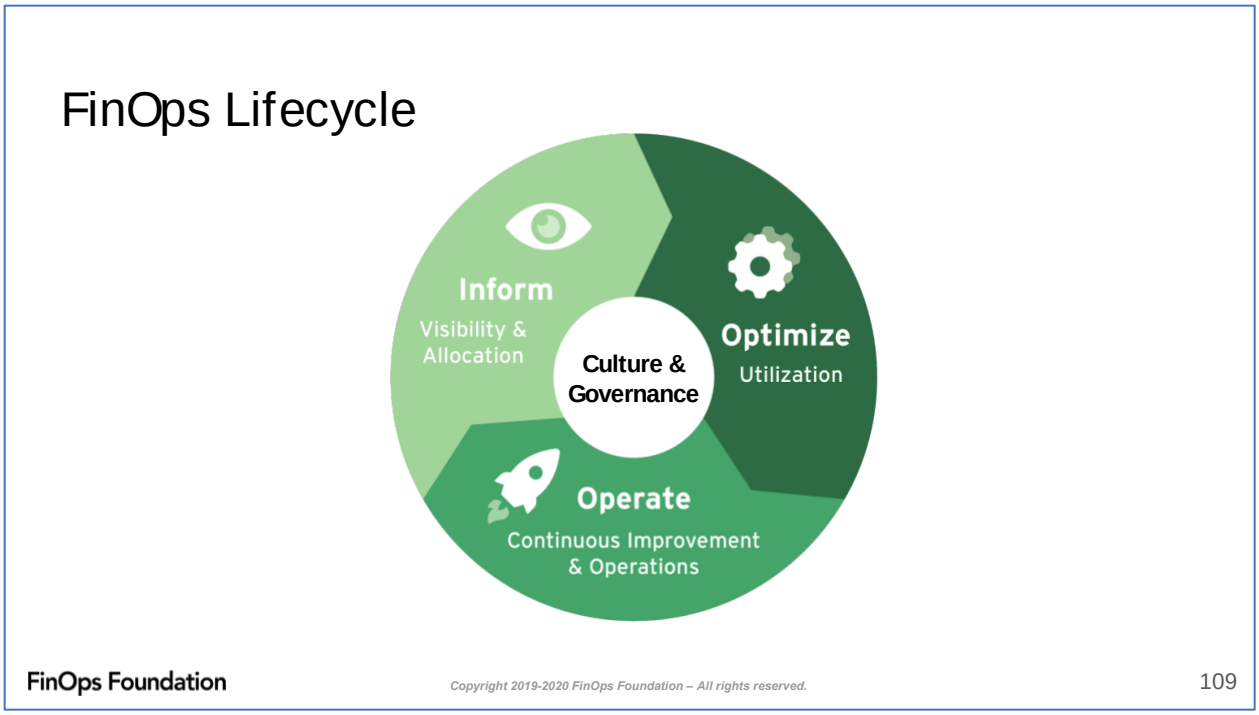
## The FinOps Team

## FinOps Capabilities

## Common Language, Common Goals

## Anatomy of a Cloud Bill

# FinOps Lifecycle




The FinOps journey consists of three iterative phases — Inform, Optimize, Operate.

**Inform** delivers visibility for allocation and for creating shared accountability by showing teams what they're spending and why. In the Inform Phase, we create and use the tags/labels, account hierarchy and other taxonomy we have created to allocate all costs in order to get an accurate, consistent, and near-real time view of our current cloud usage.

**Optimize** empowers teams to define the right optimization actions based on goals, like rightsizing or improving reserved instance coverage.

**Operate** takes action to reach those shared IT, finance and business goals, and to focus and scale operational efforts through continuous improvement

## Inform
Visibility & Allocation

**UNDERSTAND FULLY LOADED COSTS**
- Visibility into IT spend
- Granular cost allocation
- Team-level budgets & tracking

**UNDERSTAND FULLY LOADED COSTS**
- Trending & variance analysis
- Internal team benchmarking
- Industry peer-level benchmarking

## Optimize
Utilization

**REAL-TIME DECISION MAKING**
- Remove underutilized services
- Automation of resources
- Understand if resources are under or over-provisioned

**PREDICT, PLAN & PURCHASE CAPACITY**
- Rightsizing instances & services
- Centralized RI buying process
- Comparing pricing

## Operate
Continuous Improvement & Operations

**IT, FINANCE & LOB COLLABORATION**
- Finance moves at the speed of IT
- Continuously improve for efficiency & innovation
- Defined governance & controls for cloud usage

***Crawl, Walk, Run***

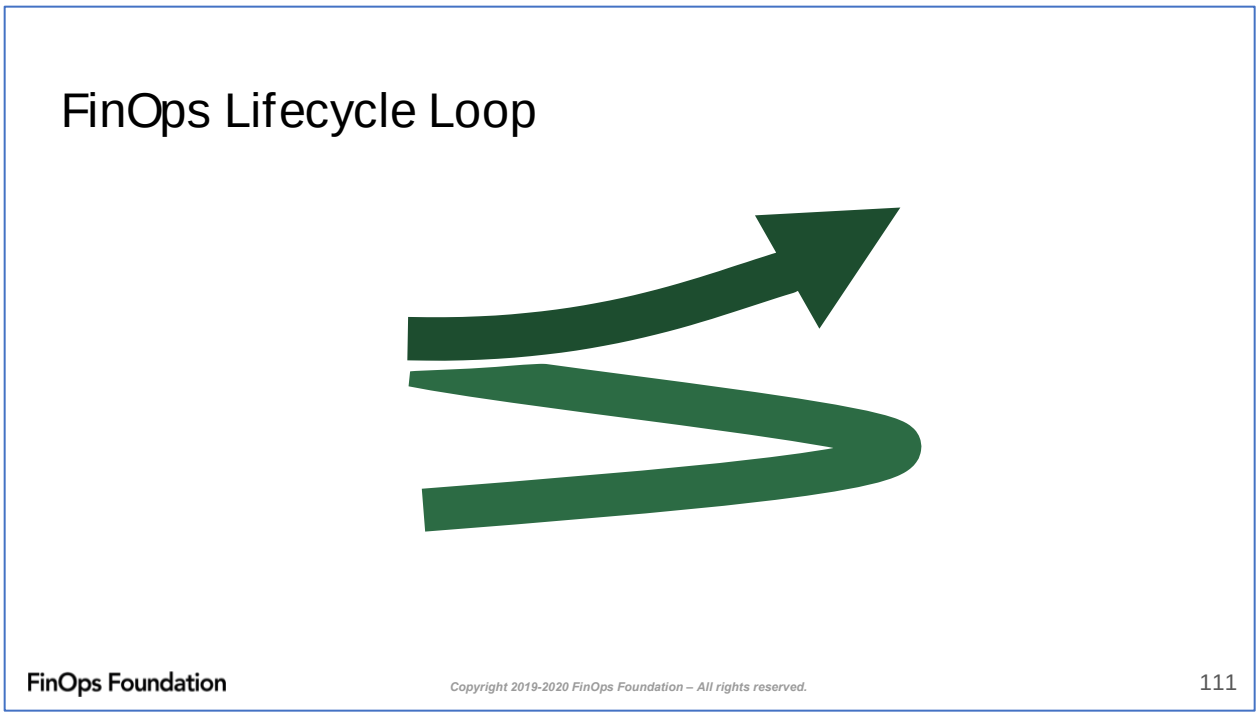
The lifecycle is inherently a loop. The most successful companies take a crawl, walk, run approach and get a little better each time they go through it. Move incrementally, measuring as you go, there is no exact science to speak of. Crawl-Walk-Run reflects the iterative nature of the FinOps practice.


Start with a crawl approach in each phase — don't try to do everything at once. Involve all your cross functional teams early and often so they can learn with you. Constantly look for opportunities to refine your processes as you exercise the FinOps lifecycle.

Not every company needs to be completely mature in every FinOps practice. As an organization, prioritize those capabilities that provide you with the most value and focus on maturing those. There is no problem with having a "crawl" level of maturity in a capability that is serving your company well.

The most critical thing you can do is to provide your teams with granular, real-time visibility into their spending. Before you can do anything else, you need to fully load and allocate your costs factoring in your custom rates, filling allocation gaps, distributing shared costs, re-mapping the spend to your organizational structure and factoring in amortizations

This may sound like a lot of work, but it's an easy process to get started and incremental small wins will keep momentum going on the team as you mature.




FinOps is described as a lifecycle, a continuous process which allows FinOps teams to build the "muscle memory" of performing each of the tasks in the FinOps Capabilities, in accord with the FinOps Principles, in rapid repetition. Teams will improve as they exercise this lifecycle, and should have a goal of exercising the FinOps lifecycle as quickly and as often as possible.

By going through the lifecycle continuously and improving each time, you will advance in those capabilities you find most valuable.

## The Inform Phase

This is the first phase in the FinOps journey, empowering organizations and teams with visibility, allocation, benchmarking, budgeting and forecasting. The on-demand and elastic nature of cloud, along with customized pricing and discounts, makes it necessary for accurate and timely visibility for intelligent decisions.

Accurate allocation of cloud spend based on tags, accounts or business mappings enable accurate chargeback and showback. Business and financial stakeholders also want to ensure they are driving ROI while staying within budget and accurately forecasting spend, avoiding surprises. Benchmarking as a cohort and against teams provides organizations with the necessary metrics to develop a high performing team.

## Inform Phase

In the Inform Phase, we create and use the tags/labels, account hierarchy and other taxonomy we have created to allocate all costs in order to get a near-real time view of our current cloud usage

- Across the enterprise
- For subsets of the enterprise
- For specific projects or accounts
- For granular resource usage

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114

## Inform Phase

Work to establish trust in the numbers and to consistently report cloud cost data with all groups.

- Transparency and the feedback loop
- Anomaly Detection
- Benchmarking teams performance
- Cost allocation
- Accounts, Taxonomy, Tags/Labels
- Forecasting Spend and Budgets

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115

## Inform Phase - Transparency & Feedback

- Daily (or Periodic) Usage Feedback
- Clean, accurate, consistent data, simply presented
- Common language and cost metrics
- Automation of reporting can help
- Report by Persona
  - Groups of people with different needs / focuses / scopes
- Report on variety of views of data
  - Direct Monthly Costs (Cash basis, supports invoice reconciliation)
  - Prepaid Costs (Amortized basis)
  - Special Project View (report by Project, Strategic Initiative, R&D Program, etc.)

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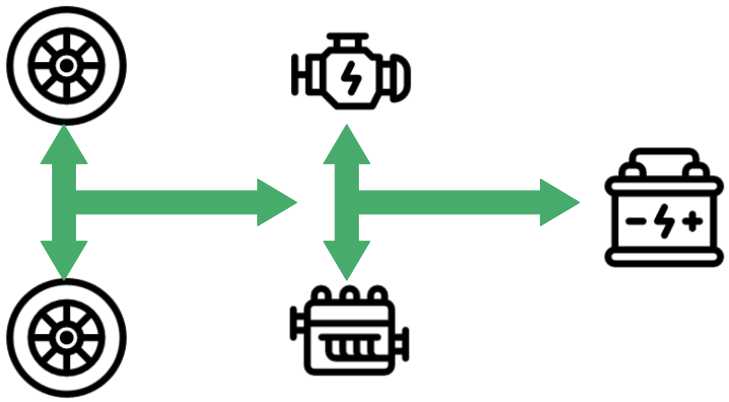
## Inform Phase - The Prius Effect



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In the FinOps book the authors cover something called “The Prius Effect.”

In the Prius, and other electric cars, the driver is given instant feedback on when they are using power from the engine, using gas, or when they are regenerating or charging.

There is no light on the dash that says “Drive economically!” It is just the natural inclination of drivers to attempt to stay in the green zone.

And this effect will stay with you even when you drive in gas cars shortly after being in an electric, but it slowly wears off. This is not to say that you can't go hyper fast and powerful in an electric vehicle. Anyone who has driven a full-power Tesla knows this.

The point is that with continuous feedback, when you need to use all the power at your disposal you can make a conscious decision to do so and the car will support it. But for normal conditions, the continuous feedback provided on usage tends to drive responsible behavior.

So it is with Cloud. FinOps teams should strive to provide continuous, simple, clean feedback to users of cloud to keep them driving economically.

## Inform Phase - Anomaly Detection

- Distributed permission to create resources commits the company to spending
- Mistakes happen
- Anomaly detection is crucial to any large-scale cloud operation
- In addition to security and operational monitoring, cost monitoring can provide crucial early warning signs
- Choose tools that meet your needs
- Consider various alerting schemes
  - Alert on $$ thresholds
  - Alert on StDev thresholds
  - Alert on specific views/subsets of spending
- Alert quickly, automate alerting to email/monitoring/ticketing systems

FinOps Foundation  118

# Inform Phase - Benchmarking

- Develop KPIs that make sense for your teams
  - Consistent reporting
  - Fair Cost allocation
  - Consistent and transparent cost metrics
- Trending & Variance Analysis
  - Performance over time is as important as the numbers
  - Save and Consistently evaluate behavior trends
  - Measure performance of FinOps Team, DevOps teams, Cloud use overall





# Inform Phase - Benchmarking

- Benchmark between teams
  - Use the KPIs to measure over time consistently
  - Gamification of cost optimization may occur
- Benchmarking with other cloud users
  - FinOps Foundation
- Involve management
  - You will get the behavior your metrics promote
  - Continuous improvements in metrics also required
  - Good central FinOps team role

# Inform Phase - Cost Allocation

- Central or Consolidated payment
  - A central group pays for shared services, RI upfront payments, cloud infrastructure, etc.
  - Development teams only pay for direct cloud costs, with any discounts (RIs, etc.) applied
  - Invoice can be split up by Account
- Showback
  - Individual Development teams see their direct cloud costs
  - Development teams are shown their portion of shared costs, infrastructure and amortized RI costs, for budgeting purposes
- Chargeback
  - Shared services, infrastructure costs, RI upfront payments, and all other charges are apportioned out to the development teams in addition to their direct cloud costs
  - A combination of accounts, amortization schedules, tags and other tools may be used to produce chargeback reporting





# Inform Phase - Cost Allocation

- Chargeback may not typically be done in traditional data center IT
- Sunk costs are rarely billed or tracked for efficient use
- Cloud cost can change and be tracked more easily and should be managed daily
- Ideally all direct and indirect costs should be allocated to the cost center budgeting for them

**Crawl:** Split the invoice up
**Walk:** Generate reports of direct costs with amortization of RIs
**Run:** Direct and shared costs, amortization tied to business results of each cost center

# Inform Phase - Cost Allocation

Special Cases, How do you handle in your business:

- Network Costs
- Monitoring and management
- Marketplace charges
- Taxes (by Service, including Marketplace?)
- Support charges
- Upfront reservation charges
- Discounts and Credits

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123

# Inform Phase - Capex/ Opex

Cloud proponents often present the change from Capex to Opex as a benefit. But is it always?

- Building a new application with Opex instead of Capex?
- Increasing Operating Expenses?
- Decreasing Capital Expenses?
- Exchanging traditional Capex for Opex?

Unique Business Situations Matter

- Internal cost of capital, and overall corporate capital structure
- Public vs private
- Metric reporting and audit compliance
- Your competitive landscape
- Planning, budgeting and accounting processes in place

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124

## Inform Phase – Capitalizing All-Upfront $$$

- Wait, I thought Capitalizing things was bad…
- Is this Capitalizing or Depreciating or Amortizing?
- Most Companies consider Upfront RI/SP/CUD Payments as ***Prepaid Expenses***
- What are your tax laws?
- What is your company's position on amortizing prepaid expenses?
- Are there lower/upper limits on capitalization?
- What does your finance department, CFO think?
- How about your auditors?
- Why don't you ask them?
- Why are you being so vague?





## Inform Phase - Accounts, Taxonomy, Tags

- Accounts
  - One each for Test, Dev, Prod?
  - One account with Test, Dev, Prod in it?
  - Is it the same for AWS, Azure and GCP?
- Taxonomy
  - Divisions / Business Units / Portfolios / VPs
  - Cost Centers / Project Codes / Project IDs
  - Look to create bridges to other cost Taxonomies in use (e.g. TBM)
- Tags, Labels
  - Resource Tags
  - Account / Group Tags
  - Business Rule / Synthetic Tags

## Inform Phase - Tags

- Resource Tags
  - Assigned in the Cloud Service Provider environment
  - Ideally in script at creation time, or via SDK/CLI, or via third party tool
  - Information specific to the resource or required at the resource level
- Account / Group Tags
  - Assigned to Account/Subscription/Resource Group/Project within the CSP or in 3rd party tools
  - Ideally as part of Account creation process, or via other means
  - Information that applies to all charges in the account
- Business Rule / Synthetic Tags
  - Assigned via business logic by 3rd party tools or cost management applications
  - Apply to more complex subsets of usage/cost or require logic trees to determine correct tag
  - May be automated via a lookup table, CMDB or other chart of accounts

FinOps Foundation  127

# Activity 8: Tagging

- Log into Menti.com
- Answer the questions as presented
- Discuss liberally

## Inform Phase - Tagging Readout

- Too little tagging is problematic, so is too much
- Some Tags are not necessary for understanding spending
- Consider the workload to tag (engineers, FinOps Team, platform engineers)
- Think about untaggable things
- Governance Policy for Tagging

**Crawl:** Tag at the Resource / Resource Group level
**Walk:** Tag Resources, and Account level to catch untaggable costs
**Run:** Tag across Cloud providers, across account boundaries, automatically tag, create tags according to custom business logic

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## Inform Phase - Forecasting and Budgeting

- Forecasting and budgeting for cloud spend can be very different than traditional IT budgeting
- Speed of change makes forecasting more challenging
- Budgets are tools, need not be official, can be stretch/ safe/ internal

**Crawl:** Forecast based on manual estimates or last year + models
**Walk:** Forecast based on past usage at an application or environment scale
**Run:** Granular forecasting by service with daily tracking and updating to actuals, including discounts, amortization and shared cost

FinOps Foundation  130

# The Optimize Phase

Once organizations and teams are empowered, they need to optimize their cloud footprint. Cloud providers offer multiple levers to optimize. On-demand capacity is the most expensive. To encourage advanced reservation planning and increased commitment, cloud providers offer discounts for commitments which typically involves complex calculations for making reservations (Reserved Instances (RI) / Committed Use Discounts (CUD – Google Cloud).

In addition, teams and organizations can optimize the environment by rightsizing and turning off any wasteful use of resources. Mini-business cases pull together the costs, expected savings and benefits of making changes to optimize, and establish goals and metrics which create the basis for action.

# Optimize Phase - Goals, Metrics, Targets

- Goal #1: Good Cost Allocation
- Cost Savings can be a goal, shouldn't be only goal
  - Focus on the value achieved per unit, not dollars
- Establish goals using the Iron Triangle as a guide
  - Cost, Quality and Time must be balanced in goal setting
- Set Objectives & Key Results (OKRs) or KPIs
- Make Targets achievable, actionable, clear
  - Crawl, Walk, Run
  - Let's try to get to 30% this time, and 40% next time...
- Revisit on each cycle to be certain the organization is achieving the right outcomes
- Align to bonus, organizational KPI targets






# Optimize Phase – Goals, Metrics, Targets

Creating KPIs and Objectives

- What behavior do we want to promote with our KPIs?
- What KPIs mesh with our organization's goals?
- Whose actions are KPIs intended to measure?

Sample KPIs

- Reservation Coverage rate (Cost or Usage?)
- Reservation Utilization rate
- Optimization Opportunities as a percent of spending
- Spot/ Low Priority as a percent of compute

## Optimize Phase - Optimize Candidates

- Avoid 100%
  - Get rid of or turn off things you aren't using
- Save 50%
  - Buy RIs for things that you are using correctly
- Save 25%
  - Rightsize things you're not using correctly
- Save between 0% and 100%
  - Use different things to do the same job

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## Optimize Phase - Optimize Candidates

- Turn off/turn on for dev, test, sbx environments
- Storage policies to deprecate storage over time to cheaper tiers
- Instance size changes, instance family changes, node changes
- License substitution (e.g. removal of RHEL, MS EC2 instance usage allowing better RI flex)
- EC2 Instance Family modernization (r3 -> r5)
- Service substitution (e.g. DB on EC2 vs. RDS, AWS Backup or Glacier vs. EFS to store backup files, native networking vs. Cisco ASR licenses)
- Maturing of use (start our EKS cluster with m5, determine c5 are better later)
- Move to Containers, expand use of Containers
- Move to Serverless (individual services, whole applications)

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# Optimize Phase – Workload Management

- Workload management (i.e. turning things off)
- Does not work for some workloads!!!
- Always done in consultation with engineering and platform teams
- Automate when possible

**Crawl:** manually turn off resources when you're not using them
**Walk:** schedule turn off of resources on a schedule (weekends, overnights, etc.)
**Run:** Identify and auto-terminate resources identified not to be running and without scheduled turn-off times

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138

# Optimize Usage - Rightsizing

- "Every Optimization Target is an Opportunity for a Discussion" (Capability 1)
- Where to start
  - Unattached and idle resources
  - Storage types and classes
  - Ultra low utilization
  - Old generation instances
- Maintain monthly cadence with Development Teams
  - Identify Opportunities for Rightsizing throughout the month
  - Everyone should look for Rightsizing opportunities (Capability 3)
- **It is as important to confirm good workload match as it is to identify changes**
- Maintain regular cadence with Architecture and Platform teams
- Planned architecture changes / platform changes
- Verify continued use of services and resources, watch out for trials and tests

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139

# Optimize Phase - Rightsizing Cadence

- Optimization and RI purchasing exist with “coopetition”
  - Don’t purchase RIs for resources you might Rightsize
  - Don’t Rightsize without checking RI coverage impacts
- Perform both sets of activities on their own cadence
  - Time based
  - Metric based
  - Opportunity based
- Touchpoints with the other process at key decision points and prior to detailed analysis
- FinOps can give Development Teams timely information for them to take action while allowing them to work optimization into their sprints

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# Optimize Phase - Optimize Rates

- Optimizing Rates is the job of the centralized FinOps team
- Reserved Instance/ Committed Use purchasing is the primary lever
- Managing pricing discounts
- Use of Spot/ Pre-emptible instances

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## Optimize Phase - Reservation Purchasing

- Reservations, Savings Plans, and Commitments discount On-Demand costs
- Reserved Capacity (Reservations, SPs, CUDs)
  - FinOps team buys (with input from the Engineering Teams)
  - Reservations are like Coupons
  - Lots of decisions to make
    - Convertible/ Standard (Flexibility needed?)
    - Region/ Zone (Reserved Capacity need?)
    - All-Upfront/ Partial/ No-upfront (What's your internal cost of capital?)
    - Coverage Target (Don't shoot for 100%, don't settle for 20%)
- Chargeback approach for RI cash outlays and benefits

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## Optimize Phase – Reservation Examples

- AWS
  - RIs available for EC2, RDS, Redshift, Elasticache, ElasticSearch and DynamoDB
  - Savings Plans now available for EC2 or Compute (+Fargate+Lambda) more flexible than RIs
  - 1 or 3 year terms
  - EC2 reservations can be purchased Convertible or Standard
  - All, Partial or No upfront options for each with varying discounts
- Azure
  - Reservations available for Compute, CosmosDB, Databricks, others added regularly
  - 1 or 3 year terms
  - All upfront only for most reservations
  - Performed as Contract Actions traditionally
- GCP
  - Committed Use discounts (CUD) available for dollars spent on Compute

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# Optimize Phase - Reservation Purchasing

## Setting a Waterline for Reserved Coverage

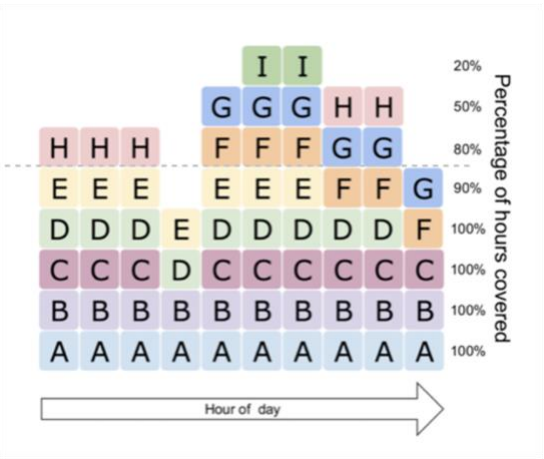
Example of Reservation application (simplified):

Every block represents an individual instance and the hour it ran (assume all instances are the same)

If this ten hour block is repeated over and over for a year, and we purchased:

- 4 RIs, they would each have 100% utilization
- a 5th RI would have 90% utilization
- a 6th would have 80% utilization, etc.

Unused reservation time is called Vacancy or Reservation Wastage

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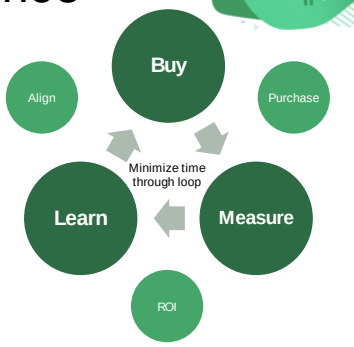
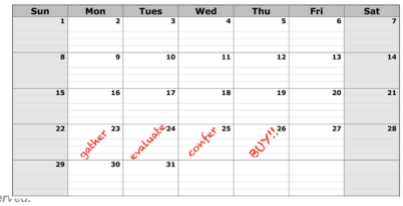
144

# Optimize Phase - Reservation Cadence

## Regular Monthly Cadence

- Appoint a person to own reservation purchases (ideally a tech-minded finance person)
- Regular, small and non-controversial purchases
- Buy reservations iteratively on a schedule that you hold to
- Proactively perform Modifications and Exchanges

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145

# Activity 9: Optimization Challenge

- Break out into Meeting rooms
- Random breakout pattern
- Share or discuss an optimization challenge you have faced or are facing.
- As a group: Pick one or two cases
- How would you put together a business case for this?
- What costs would you include?
- What are the options?
- How will you decide what the best option is?
- What blockers, mitigating conditions are there?
- 20 minutes for this discussion (additional time pending schedule)

***Put together a business case as a group, for one of the Optimization Challenges discussed.***

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# Optimize Phase - Spot Market

- Spot Market available on all three major CSPs
  - AWS Spot Instances, recent enhancements
  - GCP Preemptible VMs
  - Azure Low Priority VMs, Spot VMs
- Provides “spare” capacity for sale at deep discounts
- Many limitations and restrictions on use
- Can be pulled at any time on very short notice
- Usually priced 70-80% lower than On-Demand rates
- Not appropriate for all workloads
- Some applications
  - Dev boxes, test boxes, trials, short-cycle jobs, stateless taskers

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147

# Optimize Phase - Discounting

- Discounting will be similar regardless of vendor or type
- Commitment to the cloud provider - dollars and time
- Cloud providers want predictability (the same as your private data centers, but with more scale)
- Discounts will always be higher in exchange for more
  - Dollars spent/committed
  - Time committed
  - Flexibility given up
- It is important to be able to forecast your demand and understand what commitments you can make to any discount or reservation

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148

## Optimize Phase - Discounting

- The benefits of discounting can be distributed in many ways
  - How actual benefits are applied to various instances and services
  - To strategic initiatives preferentially
  - Divided by overall cloud spend among groups
  - Preserved to fund common platform or FinOps functions
  - Distributed evenly using various “blended rate” methodologies
- Chargeback/Showback strategy will determine much of this
- Use common cost metrics (list cost, adjusted cost, amortized cost, blended cost, etc.) to keep Optimize business cases consistent

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149

## Optimize Phase - Volume Discounts

- Time Based Volume Discounts (Sustained Use)
- Usage Based Volume Discounts

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150

# Optimize Phase - Build Business Cases

"Never bring a business case to a discussion fight"

- Business cases should:
  - Be as simple as they can be for the item being described
  - Have something for everyone (business, technology, finance)
  - Be clear and concise
  - Have achievable and actionable goals and targets
  - Be measurable
  - Be generally agreed upon before time is spent drafting the details

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151

# Optimize Phase - Build Business Cases

- Cloud Business Cases == Data Science
- Cadence
  - Gather/ Report
  - Analyze
  - Document
- Save your source data and your work

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152

# The Operate Phase

Organizations start to continuously evaluate business objectives and the metrics they are tracking against those objectives, and how they are trending. Measure business alignment on speed, quality and cost.

## Entering the Operate Phase

- In the Optimize Phase we set the goals and measured the impact of meeting them.
- The Operate Phase is where we take action to achieve the goals and the company's internal processes are engaged
- The business may
  - Choose to perform an optimization plan
  - Table it for a later time Backlog
  - Decide not to implement it for a good reason
  - Determine that it is infeasible to action - minimize
- Any of these outcomes is positive if transparently communicated

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Organizational success is only possible if the organization builds a culture of FinOps which involves a FinOps function built around business, financial and operational stakeholders who also define the appropriate governance.

## Operate Phase

In the Operate Phase we define the process, the workflow and the responsibility for enacting the options we picked during Optimize.

- Align to business goals / Communications
- Metrics-Driven Cost Optimization (MDCO)
- Automation
- Containers / Shared Environments
- Managing to Unit Economics

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156

## Operate Phase - Aligning Teams

- Carrot vs the stick approach
- Working with bad citizens (Shameback)
- Importance of executive mandate (Elevator Pitch?)
- How to get teams to actually make change
- Tracking teams

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157

# Activity 10: Fightsizing

- Listen to the scenarios presented by the facilitators
- Identify opportunities to improve these scenarios
- Use the space below to make notes during the discussion

### Scenario 1:

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### Scenario 2:

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### Scenario 3:

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# Operate Phase - Aligning Teams

- What governance and enforcement permissions should you set?
- Aligning shared goals between IT, Finance and the Business
- Finding the balance between Cost Optimization vs Business Product Development: being too focused on growth vs too focused on cost
- Minimizing time through the loop

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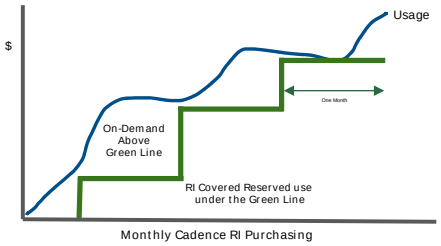
159

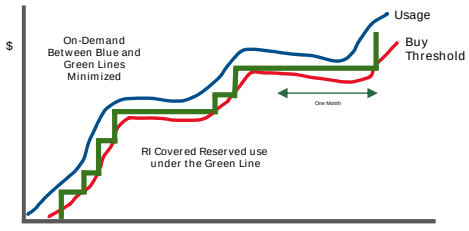
# Optimize Phase - Reservation Cadence

## Metrics-Driven Cost Optimization (MDCO)

- Set thresholds for action (when to buy more, when to stop buying)
- Dollar savings or time coverage
- Automate reporting
- Automate action
- Automate record keeping
- Adjust as needed based on Rightsizing opportunities




Monthly Cadence RI Purchasing




MDCO RI Purchasing

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160

## Operate Phase - Automation

- Follow the processes defined using tools that work in your business
- Ticketing systems, Monitoring systems, Configuration management systems, workflow systems, CI/CD pipeline automation tools, all can provide ways to automate parts of your FinOps process
- Technology-based workflow automation people make great FinOps team members

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161

## Operate Phase - Containers/ Shared Env

Container use, Serverless and Shared Environments create particular challenges for FinOps Operations

- New layers of activity, tracking, control
- Evolving technology
- Immature understanding of cost, control and pricing
- Additional communication and coordination required

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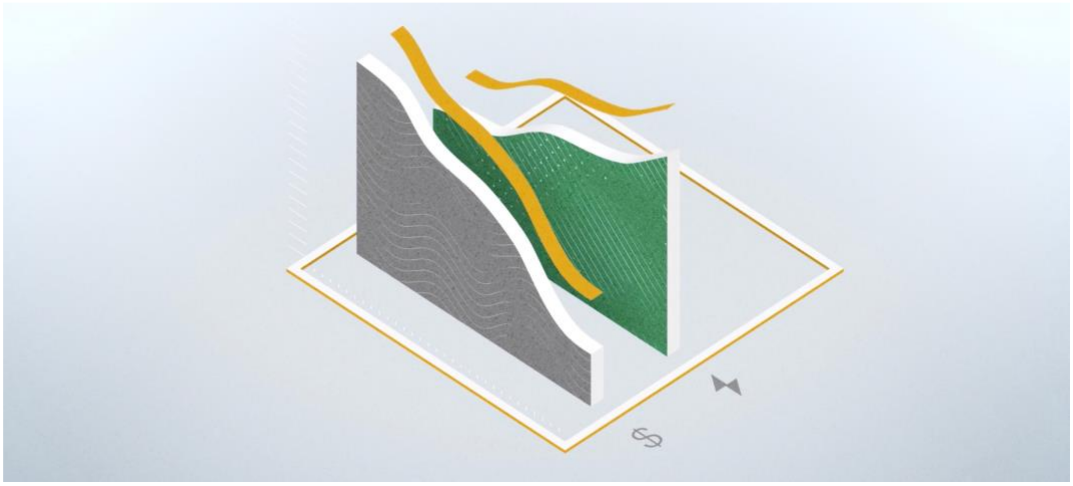
162

# Operate Phase - Unit Economics



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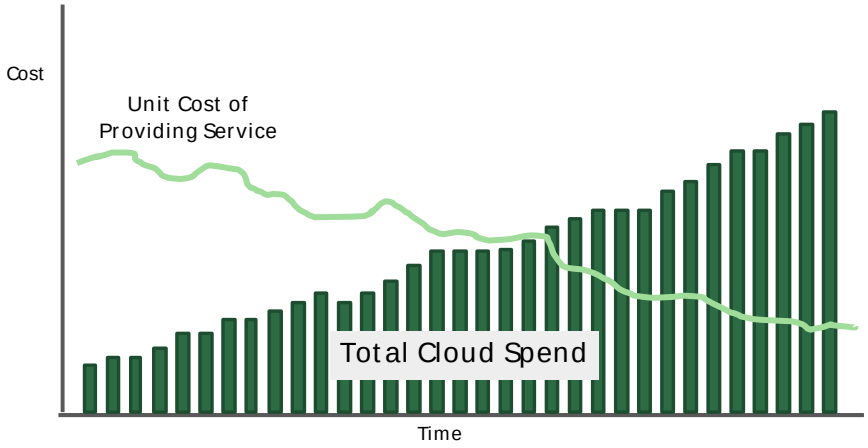
163

# Operate Phase - Unit Economics Done Right

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164

## Operate Phase - Unit Economics

- The ultimate goal of FinOps is to track costs back to business benefits
- It's not dollars spent on cloud, it's dollars spent per reservation, per available seat mile, per ticket, per customer transaction, per million active users
- Never lose sight of that goal
- Challenge the business to look at cloud IT costs like this: They could most likely never do it before
- Think back: Why did you adopted FinOps in the first place?

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165

## Operate Phase - Getting Started

- Creating a culture of accountability
  - What can you do quickly?
  - Who does what?
  - Who is looking at what, who is reporting what
- Identifying FinOps Champions
- Use your resources (TAMs, Account Teams, Trainers, etc.)
- Spread the word
- What should we work on first?
- Things you need to do daily, monthly, quarterly, annual, etc.

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166

## Pathway to Success

Consider the steps you might take in your organization to establish a FinOps function or mindset.

### Step 1 - Alignment

If you've come to the FinOps Certification Workshop with additional individuals from your organization, meet with them to align yourselves. Discuss what you learned, what was impactful, for you as individuals, and how your organization can benefit from FinOps. Share what you've written in your Self-Assessment and Reflection exercise on the previous page.

If you visited the workshop alone and were asked to attend by your manager, meet with them. Concentrate your meeting on what you've written in your Self-Assessment and Reflection exercise.

### Step 2 – Elevator Pitch (Why FinOps)

Did someone direct you to attend the FinOps Certification Workshop? If so, this is where and when your elevator pitch (you should have previously written it) will be instrumental. Your elevator pitch can be used for maximum impact within your organization to help others understand why adopting FinOps is critical.

Deliver your elevator pitch in a meeting with who directed you to attend the workshop and with other relevant individuals. Assure the attendees of this meeting are individuals who can make decisions on adopting FinOps. If you weren't directed to attend the workshop, meet with your managers to discuss Why FinOps.

This meeting can be a 30-minute meeting on Why FinOps and how FinOps will benefit your organization.

### Step 3 – Establish Buy-In

During your meeting in Step 2 (previous page), your goal is to establish buy-in. You want the individual(s) you are meeting with to understand what FinOps can achieve for your organization. Within the meeting they should understand why adopting a FinOps strategy is important. Your #1 goal of this meeting is for the attendees to say, *"When and how can we begin adopting FinOps"?* Now that you've completed the FinOps Certification Workshop and are now a Certified FinOps Practioneer, you're well equipped to lead the adoption in your organization.

### Step 4 – Build Your Team

Who within your organization should be on your FinOps Team? Is oversight needed? Who leads the team? How often should you meet? Consider this step to build a "dream team" of

individuals within your organization who will contribute their expertise in Finance, Business, and/or IT to build a cohesive and effective FinOps team.

Once you've determined who should be on your FinOps team, begin having conversations with these individuals concentrating on what FinOps can do for your organization. With a small number of these individuals you may need to begin your conversations using Steps 1 – 3 above in order to gain support, participation, and commitment.

### Step 5 – Set Objectives & Goals

Now that the key players within your organization are ready to begin adopting FinOps, it's time to begin setting realistic and achievable goals, if you have not previously done so.

### Step 6 – Strategy

You have your Objectives and Goals? Now it's time to frame what your strategy is to achieve the objectives which will lead to the achievement of your organization's goals.

# Activity 11: Elevator Operator Pitch

- Work independently or in small groups to discuss what specific activities you will work to drive within your company in the Operate phase
- Discuss challenges you will face and how to overcome them
- Develop an “elevator pitch” to talk to someone not familiar with FinOps about the actions you will be proposing
- Document your notes below
- Make your Pitch specific, use names, use projects, use real goals
- Tie it to your organization and your team

### *So what does this FinOps thing mean for us?*

# What Have You Learned So Far?

In each of the following sections write what you've learned within each topic. By writing what you've learned, you'll commit to memory what was impactful for you, thus preparing you for the Certification Exam.

## The Inform Phase

## The Optimize Phase

## The Operate Phase

# Self-Assessment and Reflection

Now that you've completed the Certification Workshop, it is time for to reflect upon the impact of what you've learned. Consider what expertise, experience, and knowledge you'll bring to your organization once you've returned.

## Accountability

Once you've written in this section you should share your thoughts and ideas with your peers with special emphasis on aligning with individuals present at the workshop from your organization.

**What's Your Elevator Pitch for FinOps?**

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**How Will You Use the FinOps Principles?**

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## Where is Your Organization now?

## Where Do YOU want to Go?

## How Will You Get There?

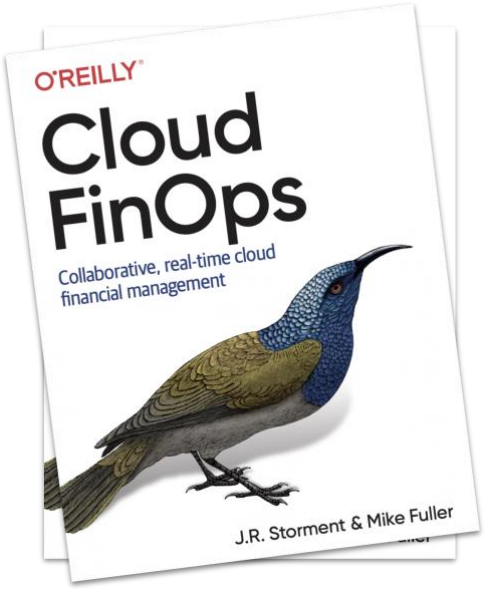
# After the FinOps Certification Workshop

You may take the FinOps Practitioner Certification Exam immediately after the workshop. The link to the course will be shown in the workshop. A passing grade is a 75%, you may take the examination only once. Please contact the  Please contact the workshop coordinator if you require a retake.

The exam is not currently proctored, but will be in the future. You will receive no formal certificate or certification number at this time. In the future there may be more official licensure and if so you will be added to that program at that time.

***Connect with Your Peers***

Continue your learning by interacting with your peers and from the FinOps experts. Join the FinOps slack channel for advisory support, continued learning, and community.

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174

# Lexicon of FinOps Workshop

Consider using some of the below terminology to begin a lexicon for your organization.

## Business Terminology

- **Cloud Center of Excellence (CCOE)** - Many companies refer to their FinOps team as a Cloud Center of Excellence or a Cloud Business Office.

- **FinOps** - FinOps is the practice of bringing together Finance, Business and Technology to master the unit economics of cloud for competitive advantage.

- **CSP** - Cloud Service Provider - a provider of public cloud services. Examples include Amazon Web Services (AWS), Microsoft Azure, or Google Compute Platform (GCP)

- **Objectives & Key Results (OKR)** – a goal system used by Google and other tech companies originally to create alignment and engagement in a business around measurable goals.

## Public Cloud Terminology

- **Account (AWS)** - AWS services are housed within an Account. Accounts can be Master Payer accounts which contain billing data or Linked Accounts which do not. AWS Organizations and other services can be used to manage Accounts within AWS. Many AWS services can span Account boundaries.

- **AURI, PURI, NURI** - All Upfront Reserved Instance, Partial Upfront Reserved Instance and No Upfront Reserved Instance. Some people use these acronyms when referring to reserved instances, in case you hear them.

- **Availability Zone (AZ)** - sub-units of a Region, there are typically multiple AZs per Region. AZs are made up of multiple physical data centers but can generally be thought of as being very closely situated from a network latency and performance perspective. Terminology varies among CSPs.

- **Blob Storage (Azure)** - Azure's object storage solution

- **Cloud Storage Buckets (GCP)** - GCP's object storage solution

- **Compute (Azure)** - Azure's virtual computer cloud offering

- **Compute Engine (GCP)** - GCP's virtual computer cloud offering

- **Console, Dashboard, Portal** - Accessing cloud resources is done through types of online site provided by each CSP. Azure calls theirs the Azure Portal (Subscription Portal, Enrollment Portal, etc.), AWS calls theirs the AWS Console, and GCP calls theirs the GCP Dashboard

- **Convertible / Standard** - AWS terms referring to the ability to convert RIs for some resources to different specifications. Standard RIs cannot be converted or changed for their entire term. Convertibility reduces the discount offered by AWS. Azure and GCP also allow some flexibility in specific ways to their reservations using slightly different language

- **EC2 (AWS)** - Elastic Compute Cloud - AWS' virtual computer cloud offering

- **IAM** - Identity and Access Management - helpfully the way that all three cloud providers refer to their system of granting and governing permissions within their cloud platforms

- I**nstance Type, Family, Generation, Size (AWS)** - Instance is usually AWS specific and generally refers to a specific EC2 virtual machine. AWS supports a variety of instance families, designated by letter, an instance Generation designated by a number and optionally other letters, and instance sizes which follow a structure of nano, micro, small, medium, large, xlarge, 2xlarge, etc. The Instance type includes the entire designation, such as m5a.16xlarge which would be an "m" family, 5th generation, "a" for AMD chipset, 16xlarge sized instance. Azure also has virtual machines which they call VMs which have families, generation and size designators. GCP calls these machine types and has a more flexible size designation scheme.

- **Metadata, Tags, Labels** - Tags are metadata attached to a specific instance, bucket, resource group, account or other resource running in a cloud environment. AWS and Azure refer to these as Tags, while GCP refers to them as Labels. They are meant to provide contextual information about the resource. Tags can be created with the resource in most cases or added after the fact manually or systematically. Tags are useful for identifying the type of resource, the environment it supports (Dev, Prod, Test, etc.) the owner, the cost center, the operational parameters, etc. Tags can be queried or accessed in a wide variety of ways and can be used to drive automation, divide costs, or for other important purposes. Most large cloud-using organizations will at some point establish governance policies around tag use and require specific tags be used on all resources.

- **Project (GCP)** - GCP services are housed within GCP Projects

- **Region** - A discrete geographic area made up of smaller units which in most cloud provider parlance can be thought of as one contiguous "data center" from a network latency, pricing, and service availability perspective. Generally, data transfer within a region is free, services are consistent within the region. Terminology varies among the

various CSPs. Regions are generally guaranteed to be more than a minimum distance from one another to satisfy disaster recovery requirements.

- **Resource** - A general name for a virtual cloud service or services.

- **Resource Group (Azure)** - Azure services are additionally required to exist within a Resource Group, which is treated with permissions and policies, tagged, etc. affecting all resources within it.

- **RI - Reserved Instance** - a commitment to use a cloud resource, usually of a specific type, location and size, for some period of time, usually 1 or 3 years, in exchange for a discounted rate.

- **S3 (AWS)** - Simple Storage Service - AWS' object storage solution

- **Subscription (Azure)** - Azure services are housed within Subscriptions. Azure Subscriptions roll up billing data to an Enrollment or Contract level which serves as the Master Payer analog to AWS.

## Software Development & Operations Terminology

- **Agile** - a method of project management, used primarily for software development characterized by division of tasks to short phases of work (into sprints) and frequent reassessment of priorities and plans. Generally, leads to development of products or software incrementally beginning with a minimum viable product and then continually enhancing it from a backlog of requirements gleaned from user stories (requests)

- **Backlog** - in an Agile project, the list of work to be done in the future, generally grouped into Epics (major feature or workstreams) and User Stories (specific requirements or requests) from which the contents of a specific Sprint can be developed. Backlog prioritization is constantly going on as new requests are added, and sprints deliver on the items in the backlog

- **DevOps** - a set of practices that intends to break down traditional silos between developers and operators of computer systems, allowing combined teams to collaborate and deliver software in a more consistent, efficient and automated fashion.

- **Enterprise Architecture** - EA or Enterprise Architecture groups are traditionally tasked with outlining the structure of the systems an enterprise will build and maintain to achieve its business goals. Like physical architects, they provide the blueprints for how the various systems should be put together, the "materials" or software concepts that should be used to build them, and how the end results should look.

- **Epic** - in Agile, an epic is typically a grouping of User Stories all related to a specific large feature or workstream.

- **Lean** - adapted from efficient manufacturing processes, Lean software development is an umbrella term for using Agile and other methodologies to deliver incremental value as efficiently as possible.

- **Lift & Shift** – a method of migration involving moving an application as currently architected and built from one environment (an on-premises data center) to another (usually a public cloud). Lift & Shift migrations can usually be done more quickly as they often do not require substantial change to the application code or configuration. However, because they do not modify applications to use cloud native services, they tend to create situations where the cloud system is more expensive or difficult to run than the on-premises system had been. Lift & Shift migrations are typically used when time pressure to close a data center or other need outweighs the cost and quality issues that can ensue and should always plan a period of remediation in the cloud or target environment afterwards to address issues.

- **On-Premises (or On-Prem, but NOT on-premise)** – term used to refer to company owned or company-controlled data center space. Usually used to differentiate from public cloud environments where application migrations are targeting workloads. Most companies have an extensive On-premises infrastructure built over many years when they begin using the cloud, and there are often difficulties using systems, infrastructure or processes developed for the on-premises environment in the public cloud.

- **Rightsizing** - Rightsizing is a form of optimization where measurements are taken over time to assess the periodic requirements of a workload running in the cloud, and to match it to a virtual resource which is sized to run it efficiently with a minimum of waste. It is important to measure actual workload demand in small increments rather than using average load figures to be sure that workloads requiring larger instances for peak demand are accommodated. Rightsizing can be used as a technique to save cost but must always involve technology oversight as well.

- **Sprint** - a short interval of work in an Agile project, usually a week or two weeks but sometimes more or less, during which time an agreed-upon amount of work will be delivered

- **User Story** - in Agile, user stories typically illustrate a desire or requirement for the software to fulfill.

- **Workload** – a generic name for an application or software system running on a computing or other platform. In a traditional website, there might be a web server, an application server and a database server, each running on an individual hardware-based

server, or virtual machine in my data center. Each of those three elements of the application would be a workload running on that virtual server. If that website were moved to AWS, there might be an EC2 instance for each of the three servers, sized appropriately to the amount of computing, memory, data storage, and network required for the web server, application server and database server.

## Finance & Accounting Terms

- **Amortization** - retiring a payment of capital gradually over time on a schedule which reflects the benefits the capital provides in each period. An upfront RI payment can be amortized over the useful lifetime (1 or 3 years) of the RI itself. Like depreciation, amortization typically applies to retirement of cash payments, where depreciation tends to apply to physical capital equipment

- **Balance Sheet** - A statement of financial position of the business on a specific date which indicates the value of all assets and liabilities as of that date, including the retained value of any undepreciated or unamortized capitalizable items. A company purchasing a 3-year RI at the beginning of a year would show that RI with ⅔ of its original value on the Balance Sheet on the last day of that year

- **Capex - Capital Expenditure** - the purchase of a capitalizable asset, such as a building or equipment meant to provide value over a long term and thus to be depreciated or amortized over that term. Purchasing a data center and using it over 30 years is considered a Capital Expenditure while paying to run a virtual server in the cloud for this month is not

- **Capitalization** - the ability to treat an investment or outlay as a capital item which will be depreciated or amortized in future periods

- **Cost Allocation** - In FinOps, the ability to identify and allocate costs to the appropriate cost categories in use by a customer. Ideally direct costs (the cost of resources running in my accounts), amortized costs (the amortization of prepaid costs paid upfront for RIs applied in my accounts), and shared costs (my share of common services accounts run by others on my behalf) can be allocated to individual budgeting categories for a clear view of the entire cost of running my application or workload in the cloud.

- **Depreciation** - retiring the cost of an asset gradually over time on a schedule which reflects the provision of benefits. Often this reflects the decrease in value of an asset over time due to wear and tear, decay or usefulness because of continued use in out periods.

- **EBITDA** - Earnings Before Interest, Taxes, Depreciation, and Amortization, an assessment of the earnings expected when subtracting only the cost of goods sold from the revenue achieved. Tracking the prepaid expense of a 3-year all-upfront Reserved Instance as a cash outlay that can be amortized over 3 years would affect EBITDA differently than if the resources were purchased using cash at on-demand rates.

- **Fixed Cost** - A cost which does not change with changes in business volume. The cost of a data center building mortgage is a fixed cost in that it does not vary regardless of whether there it is supporting 1 web server or 1,000,000 web servers driving the company's revenue.

- **Income Statement (sometimes referred to as a P&L statement)**- a statement showing the company's net profit or loss over a period of time (a month, a quarter, a year, etc.) The income statement would show expenses and amortization incurred during the period, so in year two of a 3-year RI, the amortization for the second year would show up as an expense against earnings in the period covered.

- **NPV** - Net Present Value - An assessment used to calculate the long-term profitability of a project made by adding together all the revenue it can be expected to achieve over its whole life and deducting all the costs involved, discounting both future costs and revenue at an appropriate rate. In a cloud business case, the net present value of all the cash flows of a no-upfront RI might be compared to the current cash value of the all-upfront RI for determining which is better for the business.

- **Opex** - Operating Expenditure - a category of business expense made in a specific accounting period which provide benefits only in that accounting period. Purchasing on demand cloud services is considered an Operating Expenditure. Operating expenditures require no long-term tracking of depreciation or amortization but are subtracted from earnings in the period incurred.

- **ROI** - Return on Investment - the amount of profit from an investment made, usually expressed as a percentage of the original total cost invested. In a cloud rightsizing business case, the ROI might be calculated as the savings in cloud expenditure expected less the engineering and other costs required to take the rightsizing action.

- **Variable Cost** - a cost which varies according to the business volume it supports. A company hosting websites would need to pay for more computers to host more websites, and so that cost per website is a variable cost.

- **Upfront Charge** - Reserved instances or service reservations in general can typically be purchased with a full upfront payment (All Upfront), a partial upfront payment plus a reduced periodic charge (Partial-upfront) or with no upfront charge (No-Upfront). The upfront charge may be amortized over the life of the RI. AWS allows all three models for

some service reservations and only Partial for others. Azure has historically only offered VM Reservations as All-Upfront, and GCP doesn't typically require upfront charges on reserved discounts. Upfront charges might be treated as Prepaid Expenses on the Balance Sheet (check with your accountants!)

- **Unit Economics** - the ability to directly compare my overall cost to the overall business benefit I am creating on a per unit basis. For example, if I understand that the overall cost of running my website infrastructure is $5,000,000 per month and is able to support 10,000,000 paid hosted web pages, then I can track a Webpage/$ metric of "2" which indicates how efficiently I run my service. Any future modifications to my cloud infrastructure can then be expressed in terms of the Webpage/$ metric to determine if they are helping or hurting, and opportunities for cost savings can be expressed in terms of how they impact Webpages/$.

- **WACC** - Weighted Average Cost of Capital - the rate the company is expected to pay on average to all its securities holders to finance the operation of the business. Importantly this is set by the external market (what the market is willing to pay for various forms of the company's securities) not by management. The WACC, sometimes called the ICC or Internal Cost of Capital, represents the internal cost of cash and can be used in a business cases to compare the rates of return of an investment (such as an all-upfront RI payment) to determine if it is better to use cash, borrow cash, or forego the investment.