Deloitte.

Preparing For the Next Global Event, How to Weaponize Cloud Computing Today Capitalize on a Quickly Changing World

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Agenda

- What happened, and what we learned.

- Use of technology as a disruptive force.

- Where to now?

- Emerging best practices...moving to complex and agile cloud deployments.

What happened, and what we learned.

General Cloud Computing Market Changes Since Early 2020 (New Normal)

Key Changes in the Market

- Focus on mass migrations vs. incremental migrations

- Reduced focus on net-new development

- Increased use of MSPs and co-locations

- Focus on core security and SecOps services

- Focus on ops planning, ops tools, and playbooks

- Renewed interest in outsourcing to MSPs for speed

- Moderate growth of IoT and edge computing

- Focus on use of native databases
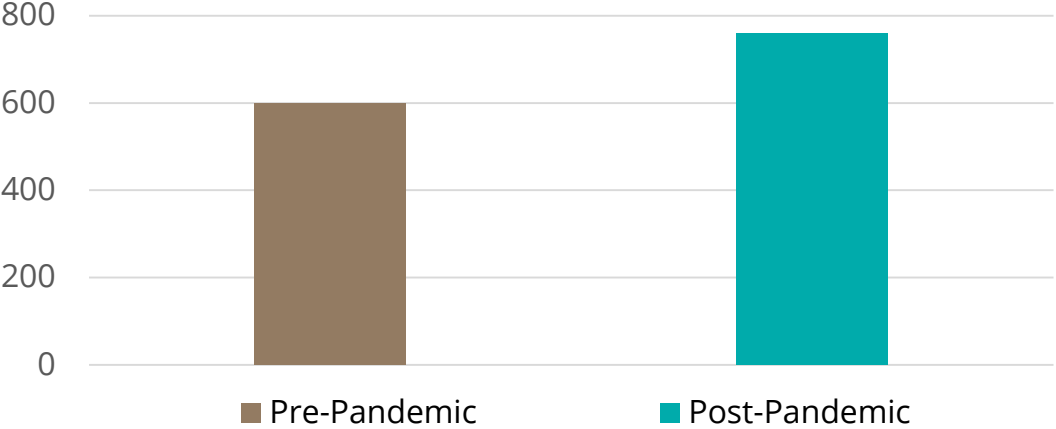
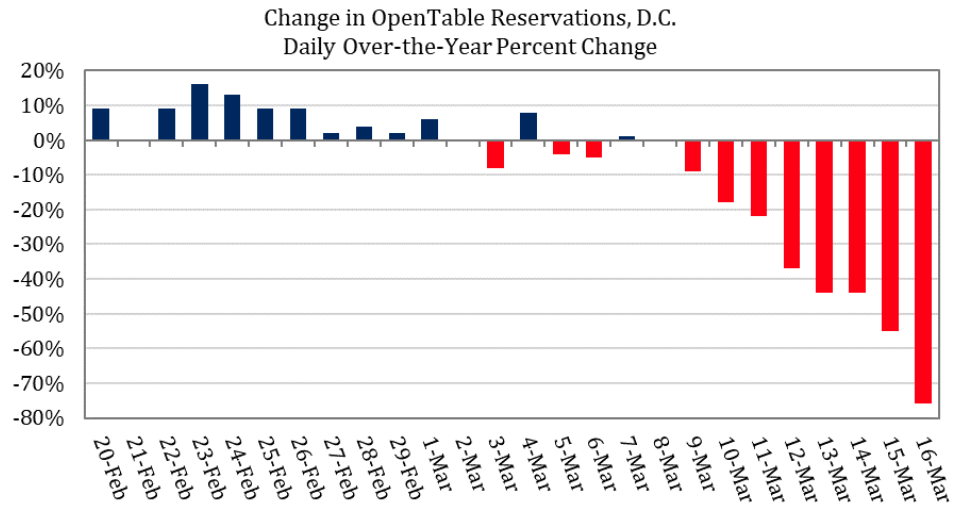Gross acceleration over 2 year recovery/adjustment period (non-SaaS)

Source: Deloitte perspective based on several sources such as analyst input, clients, thought leadership trends, etc.

COVID impact on Cloud Market Acceleration
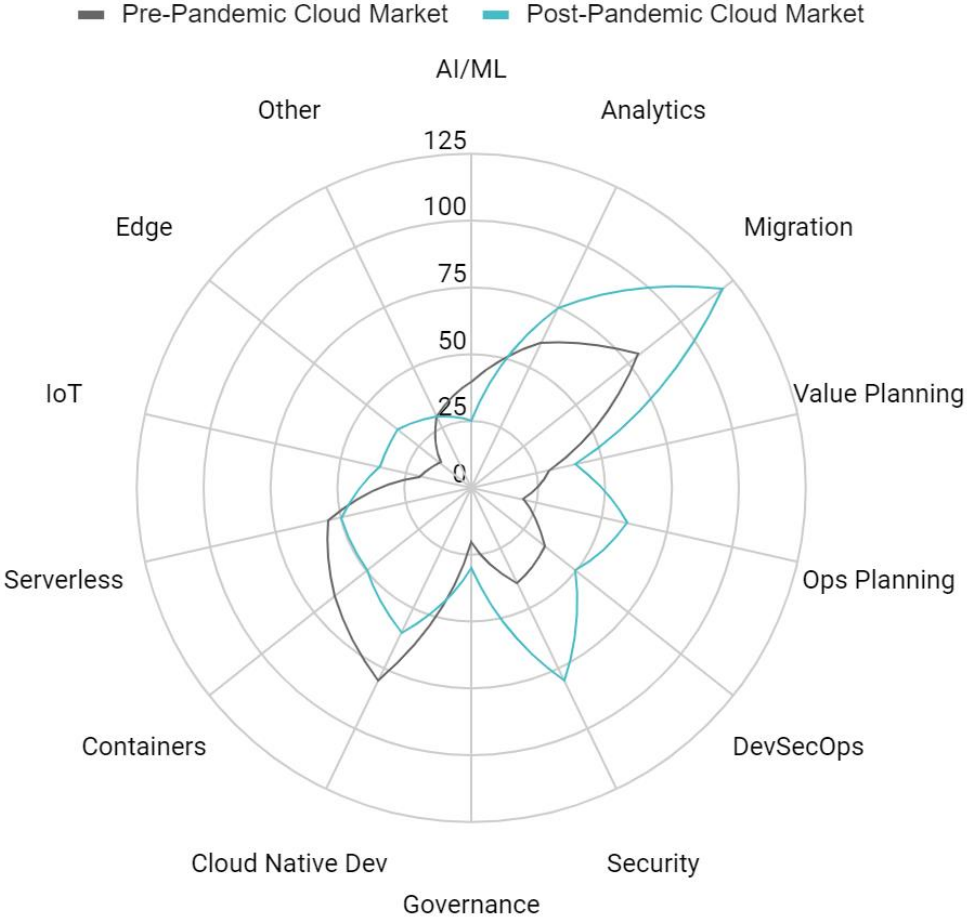
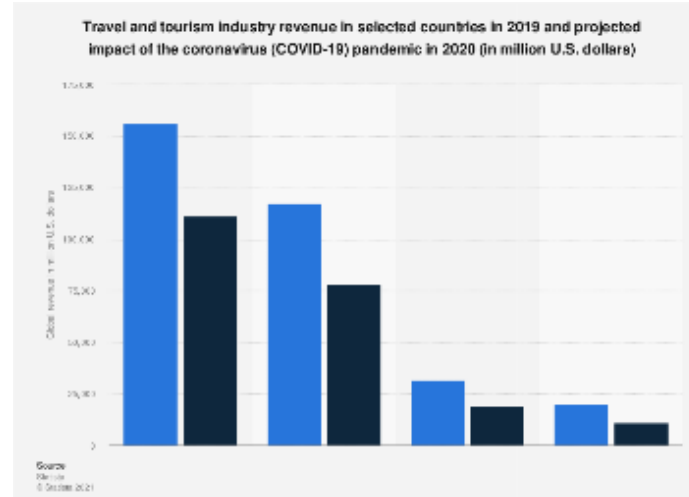— Pre-Pandemic Cloud Market   — Post-Pandemic Cloud Market

Source: Deloitte perspective based on several sources such as analyst input, clients, thought leadership trends, etc.

Mixed Bag of Pandemic Disruption

Change in OpenTable Reservations, D.C.
Daily Over-the-Year Percent Change

Sources: OpenTable

Travel and tourism industry revenue in selected countries in 2019 and projected impact of the coronavirus (COVID-19) pandemic in 2020 (in million U.S. dollars)

The COVID-19 delivery boom
The four top U.S. food-delivery apps saw revenue rise $3 billion collectively in the second and third quarters, as the coronavirus pandemic required shelter-in-place restrictions.

Q2 2019
Q3 2019
Q2 2020
Q3 2020

DOORDASH   Uber Eats   GRUBHUB   Postmates

Source: SEC filings

Global music streaming revenue and streaming's share of total industry revenue

How much your revenue **increased** during the pandemic?

- 0–20%
- 20–40%
- 40–60%
- 60–80%
- 80–100%
- More than 100%

27.6%
22.4%
1.7%
5.2%
12.1%
31%
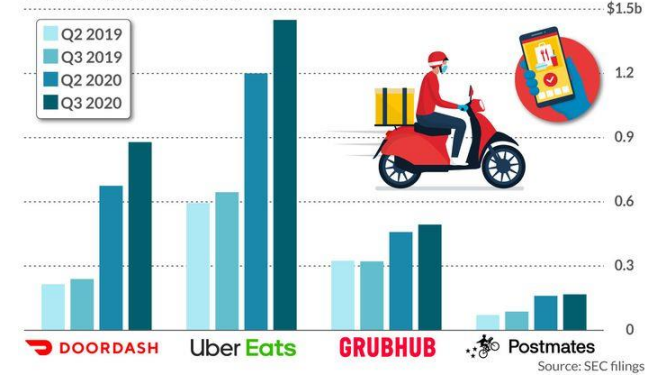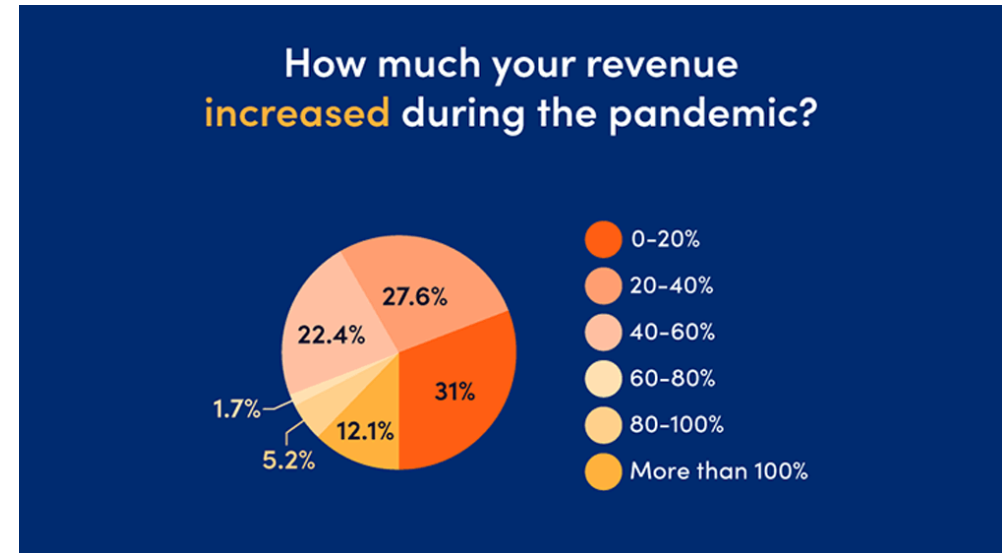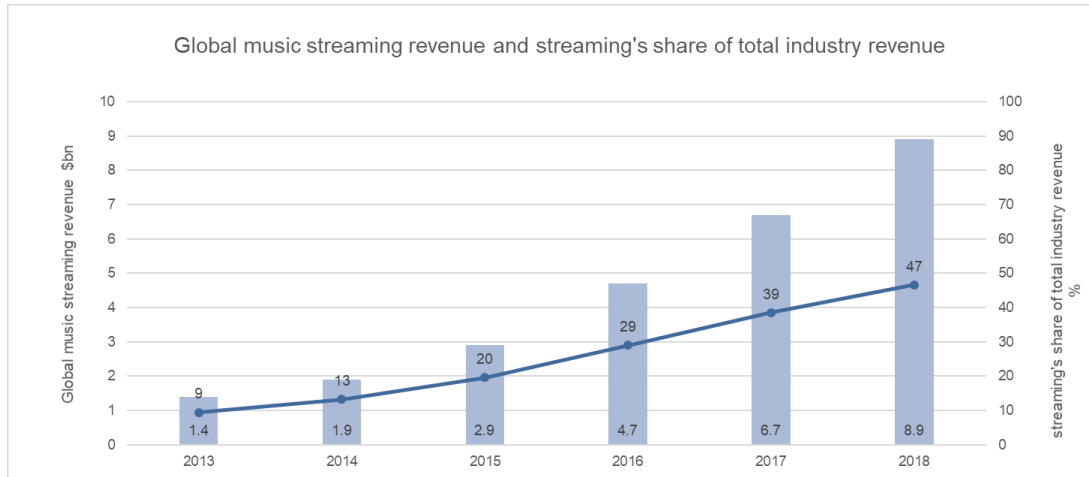
ROI further out than we thought

ROI Return
Begins

Maintenance

Cloud Computing
Value Curve

Expansion

Migration
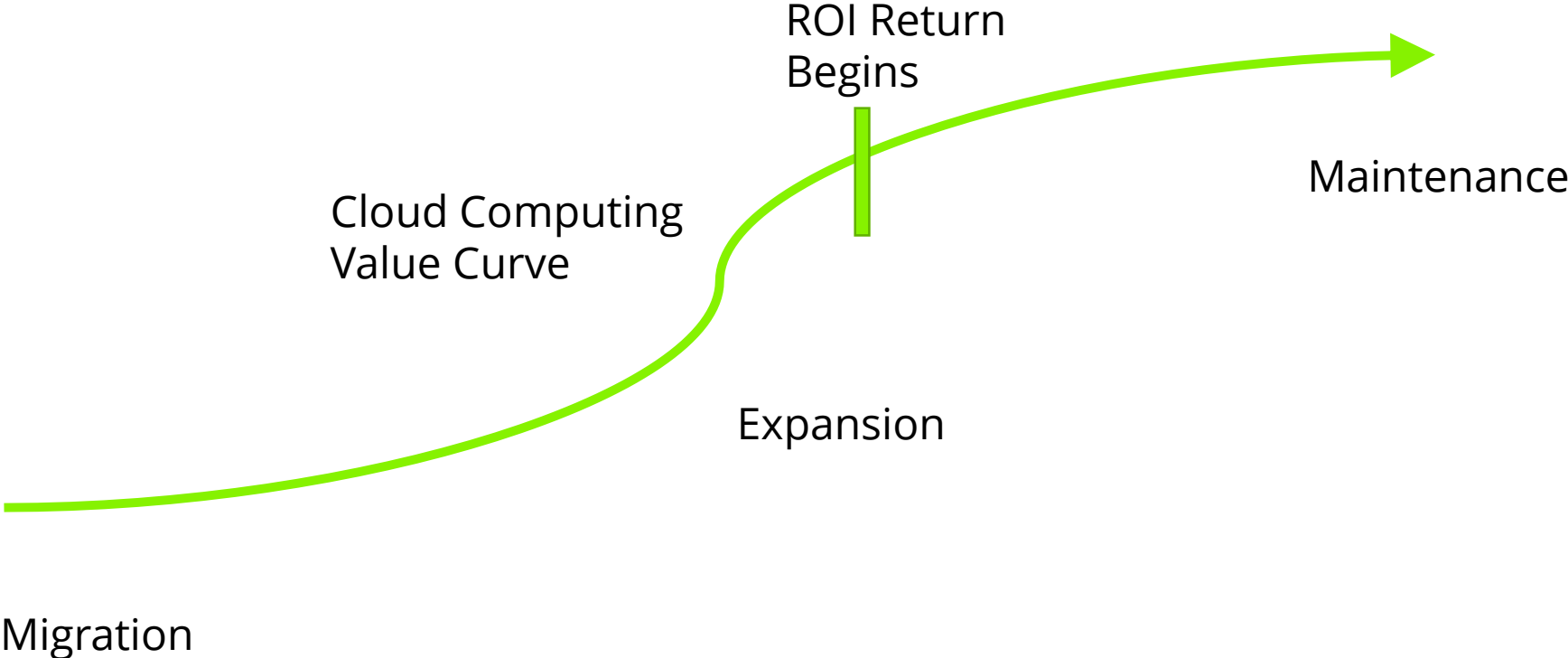
Innovation becomes the new gold rush

Business Innovation

Maintenance

Expansion

Migration
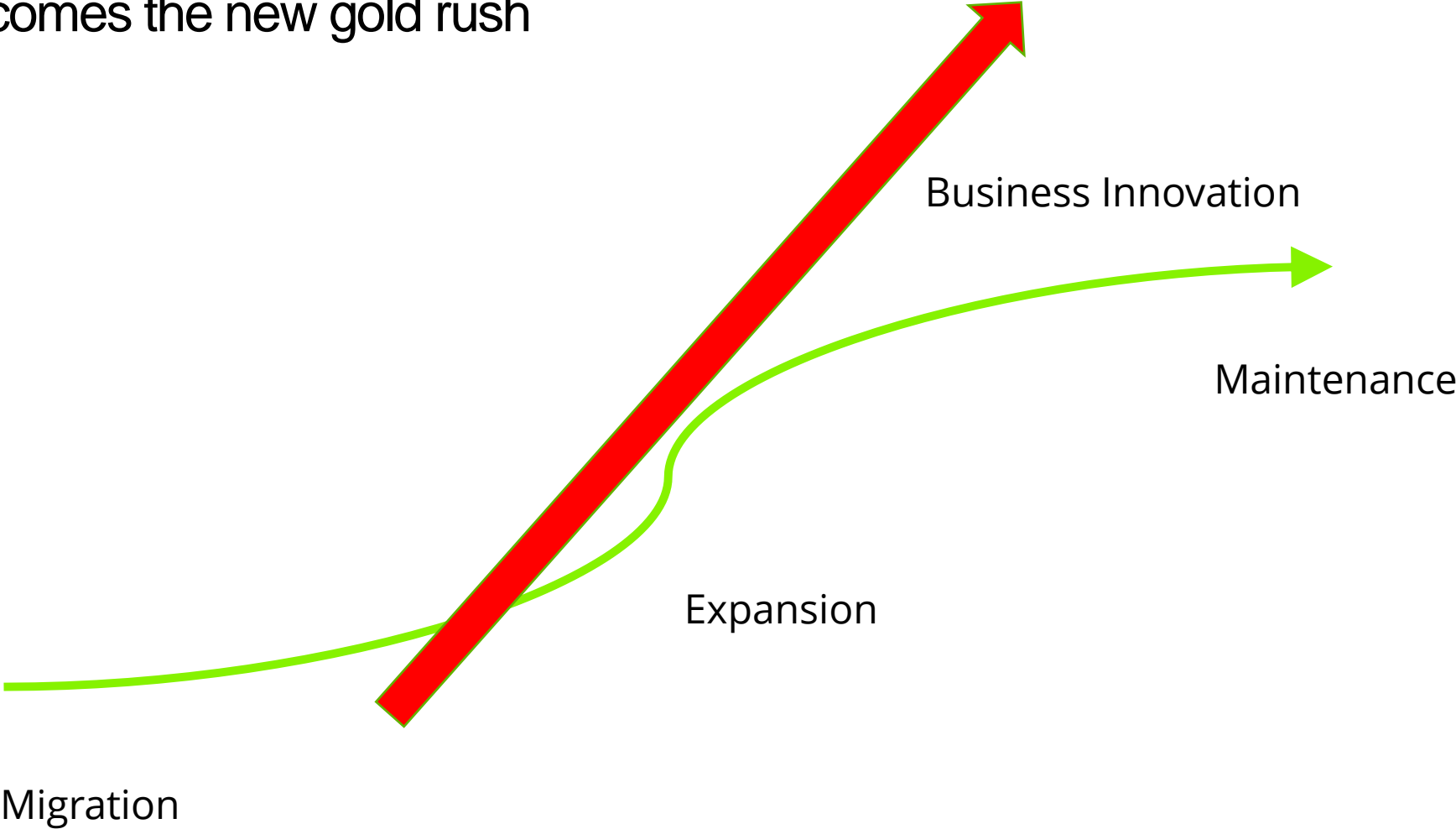
Cloud adoption is a journey for all ...

Clients may be at different stages in their cloud journey based on organization capability and readiness levels; each client is unique

Prerequisites

Executive Sponsorship
Create Cloud Core Team
Explore Cloud Layers

Develop Cloud Strategy

Define Guiding Principles
Define IT Criteria's
Secure Cloud Implementations
Setup Program Governance
Build an Exit Strategy
Benchmark your current environment
Engage business, application, infrastructure and security owners

Financials

Application Assessment
Build PoC
Create a Forecast
Perform Financial Analysis (IaaS,SaaS,)

Design new environment

Outline Roadmap
Design Security Architecture
Develop DR capabilities
Develop Reference Architecture

Foundation Build

Target Application Architecture
Migration Execution Architecture
Order Cloud Services
Network Migration
Pilot

! ● **Move Apps to Cloud**

Migration

Setup target infrastructure
Migration Plan
Follow change Management Process

Integration

Application Integration
Infrastructure Integration
Operation Integration

Testing

Test and validate migrated workload
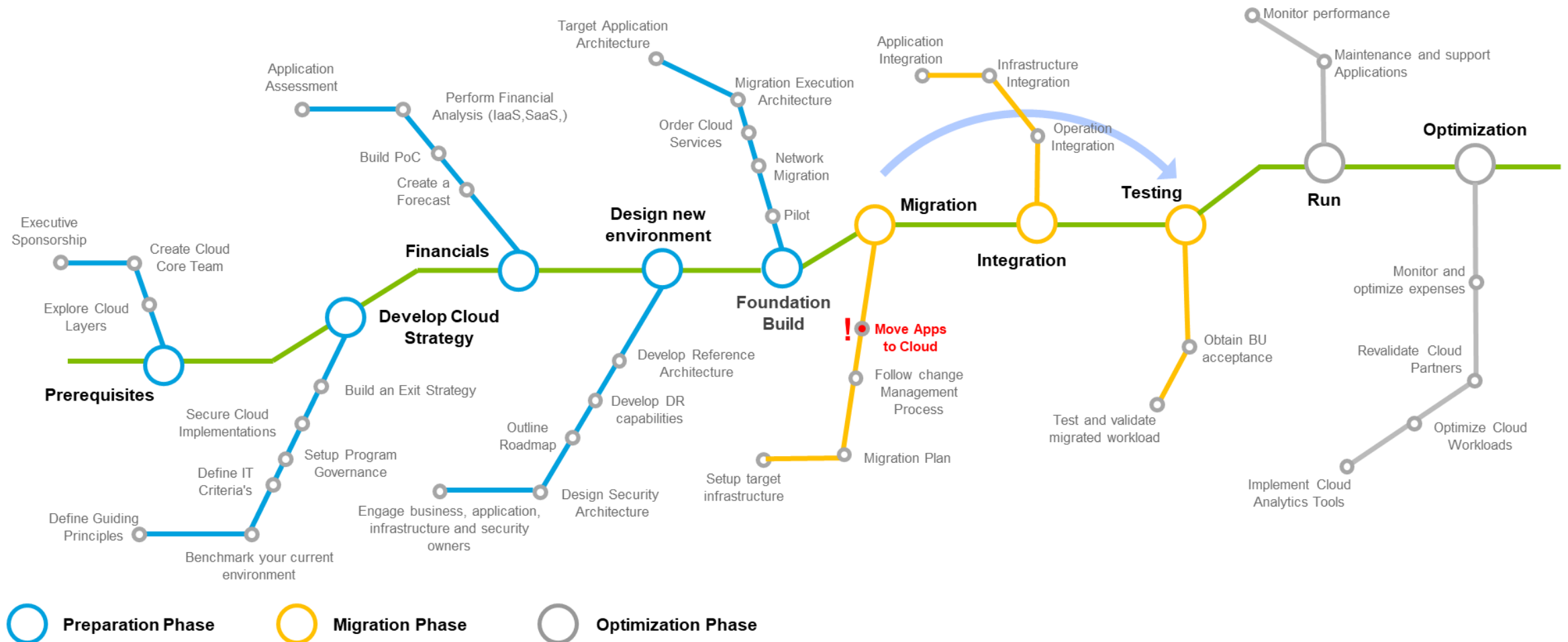Obtain BU acceptance

Run

Monitor performance
Maintenance and support Applications

Optimization

Monitor and optimize expenses
Revalidate Cloud Partners
Optimize Cloud Workloads
Implement Cloud Analytics Tools

○ **Preparation Phase**   ○ **Migration Phase**   ○ **Optimization Phase**

Use of technology as a disruptive force.

It's not complex...oh wait.
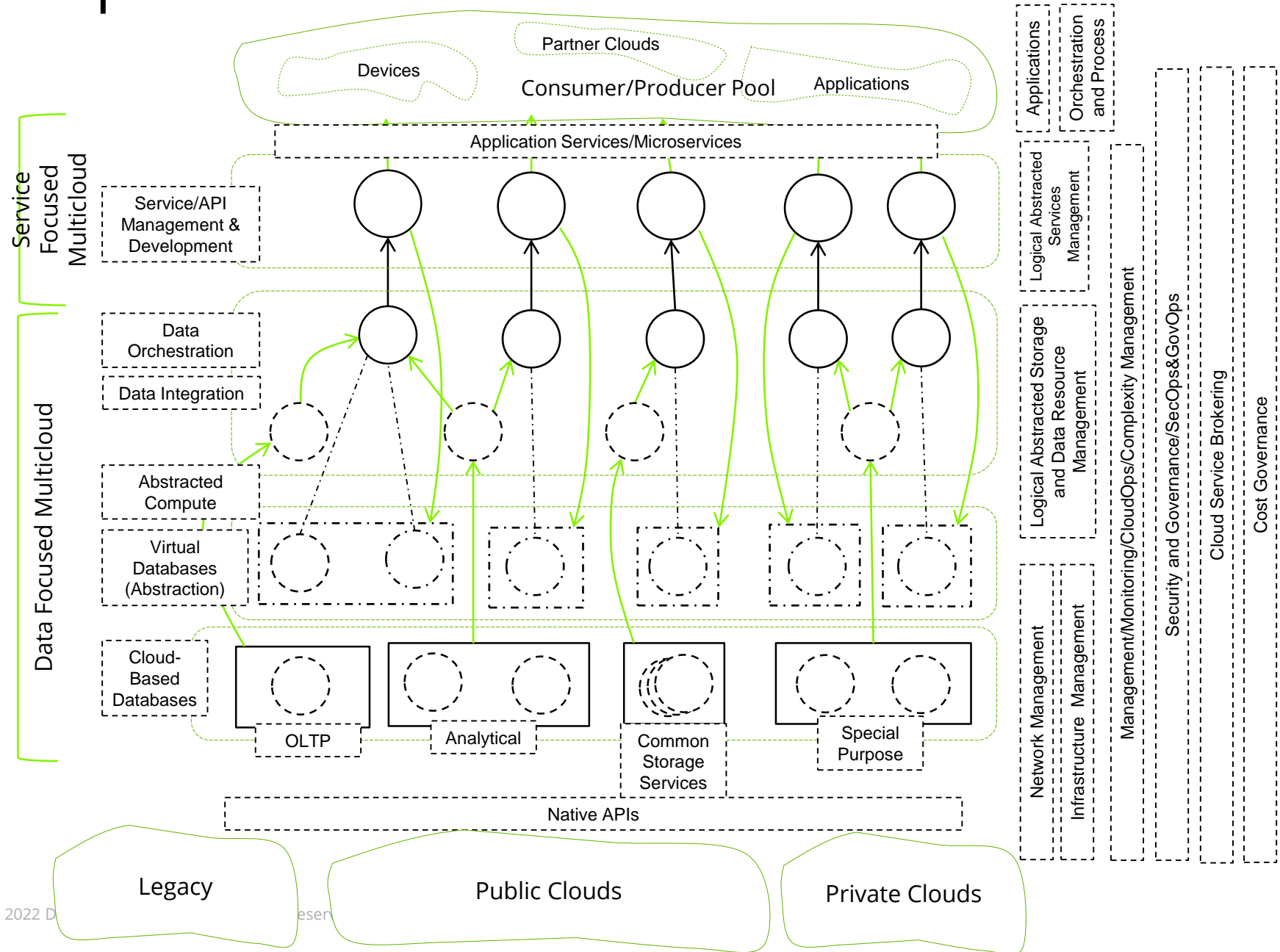
Mindset shift to cloud computing

THE NEW NORMAL...

$175B

Estimated 2018 global spend on cloud services

NOT JUST IN IT...

29%

of IT spend occurs outside of the IT department

WITH ROOM TO GROW...

By 2025

80% of enterprises will have shut down their traditional data center

Data Center & **Cloud** workload comparison

100%

50%

0%

2006

2016

2021
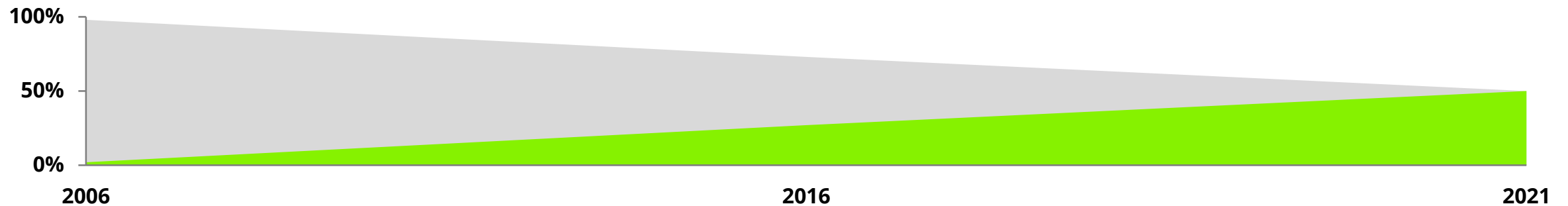
Sources:
1: Gartner Global Cloud Services Spend Update, Q2 2018
2: Gartner 'Prepare for the Death of the Data Center", May 2018
3: Deloitte internal market research

Traditional systems becoming more cost effective

Storage Growth

Traditional On Premises
Storage Pricing

Cloud Storage Pricing

2010

Today

Cloud is not only about costs…

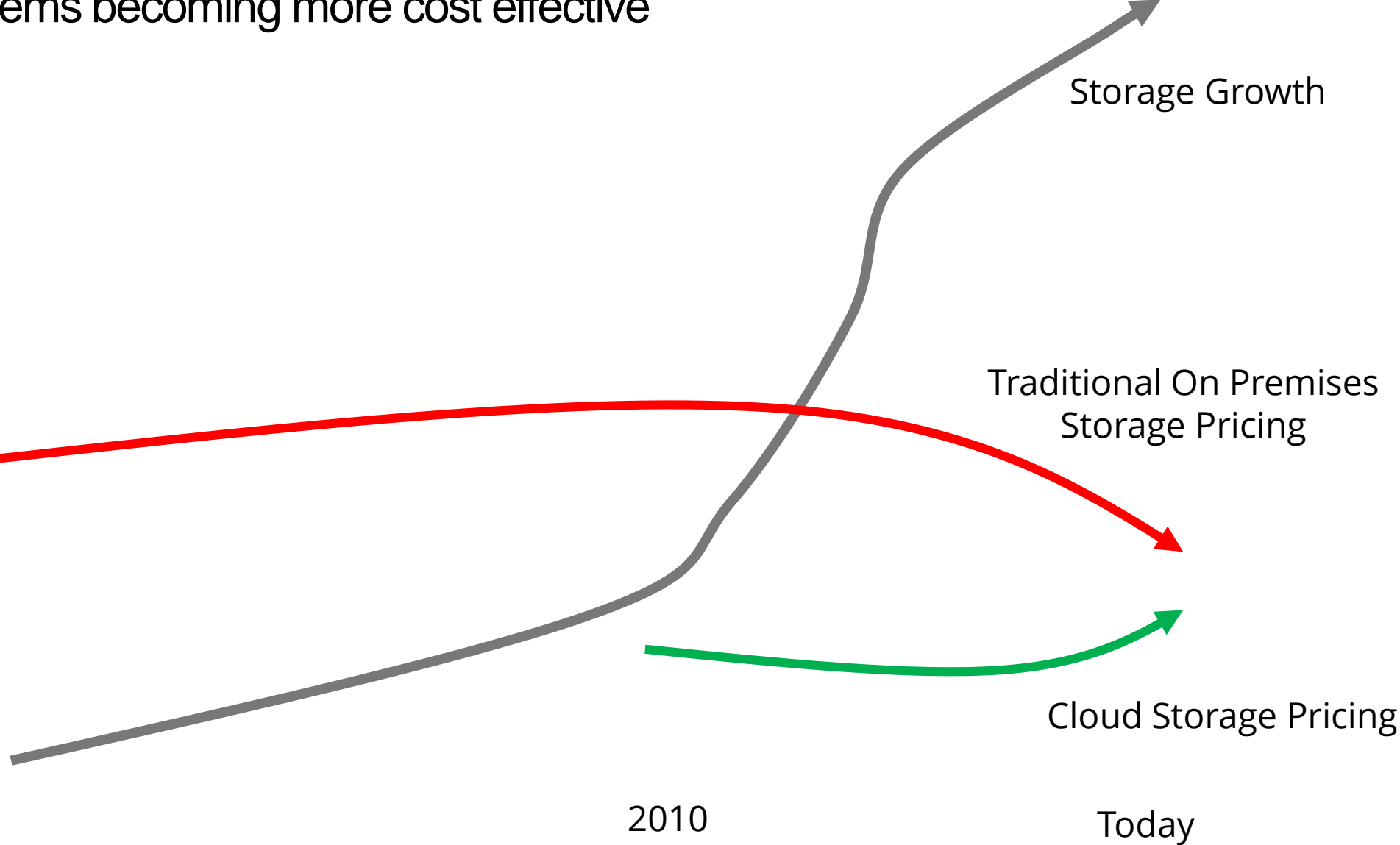| **The way we historically talked to our clients about the cloud…**	Cloud computing is the vehicle that IT organizations are using to optimize cost structures

The main benefits we used to highlight when positioning cloud to our clients…

1   Avoid large, upfront capital expenditures

2   Pay-as-you-go, pay for what you use

3   Minimal maintenance (data center) fees

» **Cloud, as we define it, is a much broader play that enables benefits inside and outside of IT, and reimagining every aspect of the IT function**

A better lens for understanding cloud benefits

Organizations that embrace the cloud realize benefits across both IT and the business.

STRATEGIC

- Sets the groundwork for a flexible, nimble organization
- Serves as a catalyst for innovation
- Reduces burden of entry and levels the playing field
- **Talent acquisition, retention**

BUSINESS

- Business agility / speed to market
- **Change multiplier effect**
- Rapid scalability
- Refocus resources on the core business

ECONOMIC

- Variable spend; move to OpEx
- **Pay-as-you-go, pay-as-you-grow**
- Cost avoidance, reduced leakage, cost reduction

How is this impacting the way IT does its job?

Cloud has become an enabler to address the disruptive shifts that are impacting IT

Disruptive shifts in IT

Cloud-enabled solutions are changing how IT builds, procures, and maintains system applications and support functions

Agile and **DevSecOps** are transforming traditional workflows and becoming the new normal of increased collaboration across IT and with the business

Rapid advances continue in **process automation**, self-service, and **cognitive / AI**

Talent is increasingly sourced from **the open economy** (beyond managed service to gig & crowd)

Exponential proliferation of technologies are requiring **greater tech fluency** across the enterprise, not just in the IT function

Org & talent implications

How will the **work** of IT shift as cloud, automation, AI and cognitive rebalance how humans and machines work together in the tech ecosystem?

How will IT reimagine and recompose its **workforce** (FTEs, managed service and other contractors, gig, crowd) so it can continuously access the *right talent* with the *right skills* at the *right price*?

How should the physical and virtual **workplace** change so IT can maximize collaboration for quality and speed?

How will the IT **leadership** team enable the culture to embrace ways of working that are truly digital?

What will IT's future **operating model** look like? Thinner? More tightly integrated with the business?

Where to now?

Emerging Cloud Use Cases are relevant across organizations

Customer Centricity

Fit
Using image recognition, machine learning, and analytics to customize recommendations upon preference and fitting of individuals

AD Tech Optimization
Leveraging customer data to customize and personalize individual shopping experience

Cross Channel Marketing
Using predictive analytics and customer purchase history to define potential cross-sell opportunities for new products

Technology Transformation

Containers, APIs & Micro-Services
Exposing data and services through APIs and micro-services to enable faster and easier access to data

Data Center Transformation
Moving physical / on-premise data centers onto public and hybrid Cloud platforms

Security & Regulatory

Risk Controls
Establishing GCP controls & responsibilities to address cyber risks

Risk Management
Leveraging scalability of Cloud to improve risk management e.g., Running Value at Risk figures

Supply Chain

Inventory Planning
Leveraging analytics data to feed predictive models & identify supply chain risks and recommend effective delivery options

Data Exchange
Developing data exchange platform for manufacturers and retailers to share insights, align on goals, and identify opportunities

Placement Strategy
Leveraging geo-spatial analytics, maps, location strategy, and sensors to identify layouts / locations that are more attractive

Big Techs

Chatbots
Leveraging Chatbots' Cloud-based systems as messaging platforms to support customer interactions

Payments
Facilitating real-time account transfers, cross border payments, and ability to extract value from payment data on Cloud

Reimagining Workforce

Employee performance
Using Cloud-based AI algorithms to advise sales teams real-time on the sequencing of product offers to increase likelihood of closing a deal

Human Capital Management
Leveraging Cloud-based financial and human capital management solutions for planning & budgeting

Progress the maturity model

Often times clients focus on immediate workload lift and shift. Successful clients, however, invest in scaling that with a well defined automation, governance, sourcing and operations strategy

Capabilities

1. Foundational Cloud

Cloud 1.0

- Establish cloud strategy
- Enable foundational capabilities, cloud adoption at project level
- Encourage investments in people and skills
- Alter processes to align with DevOps

2. Transformative

Cloud 2.0

- Hybrid cloud architecture
- Enable cloud adoption at entire organization level
- Mass migration
- Focused cloud COE
- Processes altered to breakdown organization silos for mass DevOps and agile adoption
- Continuous Delivery and manage IT Operations as a code

3. Innovative

Cloud 3.0

- Multi cloud architecture
- Quick prototyping capabilities using innovation lab
- Drive new business model and digital transformations
- Continuous innovation and product experimentation
- Predictive resource management

4. Exponential

Cloud 4.0

- Fog and edge computing architecture
- Zero touch IT operations
- Cognitive and self healing infrastructure
- Exponential technologies of AI, ML, IoT, VR/AR
- Redefining value stream and business models E.g. touchless airport check-in experience, Sensor based claims processing

...and organizations are at different levels of cloud maturity...

Cloud journey is inextricably tied to an organization's maturity level across different cloud capability areas

Cloud Maturity Levels - Overview

Level 4: Optimizing Cloud @Scale

Organization is all-in/mature adopter of public cloud at scale and is now looking to operate more effectively and efficiently

Level 3: Moving to Cloud @Scale

Organization has completed a first move towards public cloud and is looking to establish @scale migration capabilities

Level 2: Ready for Cloud Move

Organization has established minimum viable cloud and conducted a series of POCs; is ready for first material cloud move

Level 1: Initiating a Cloud Journey

Organization has no cloud footprint and is looking for a long term vision for how it should adopt public cloud

Initiating a Cloud Journey

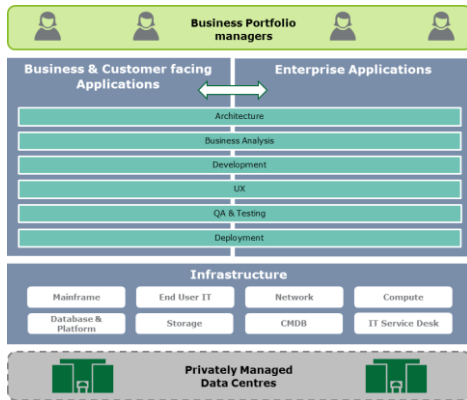- Good understanding of IT infrastructure footprint
- High level direction and shape of cloud adoption and transformation is known
- Path to cloud adoption over the next 3-5 years has been defined
- Cost saving opportunities from cloud have been identified

Ready for First Cloud Move

- Initial business use cases for cloud adoption are identified
- Cloud reference architecture & foundational services required have been finalized
- On-premise vs. cloud costs have been analyzed
- Minimum Viable Cloud (MVC) infrastructure has been established

Moving to Cloud @Scale

- Migration path for cloud candidates has been determined
- Repeatable @scale cloud migration capability has been achieved
- Organizational and operational changes to manage cloud footprint are in place
- Cloud chargeback model and reporting system have been established

Optimizing Cloud @Scale

- On-Going reviews of cloud for optimization opportunities are done
- Roadmaps for enhancing cloud features have been created
- Infrastructure for Hybrid and Multi-Cloud in-place
- Cost optimization opportunities, save levers using multi-cloud set up have been determined

Evolving IT OpModel

As a result, CIOs are evolving their operating model from service delivery to partnered value creation.

The Project Based Model

The Product Based Model

The Evolved Product Based Model

- Focused on **delivering projects to time and budget** as per the annual plan
- Business interactions focused on **change delivery**
- Resources **managed by skillset / discipline**
- Continued focus on cost reduction through **centralization and outsourcing**
- IT seen primarily as a **tech implementer**
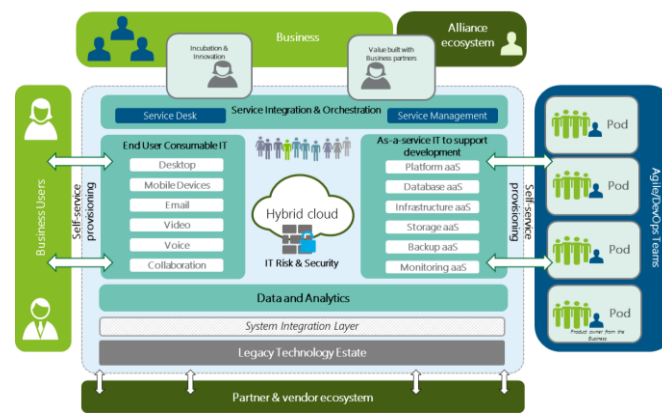
- Focused on **measuring and delivering value** in response to market demand
- **Business intimacy** is a priority at all levels
- Multi-skilled workforce organized around **multidisciplinary teams**
- Increased **automation and self-service** to enable speed / reduce cost
- **IT as a co-creator with the business** in ideating solutions

- Focused on **being the marketplace disruptor**
- Business and IT **on the same team**
- **Polyglot workforce** that can be deployed anywhere (no more specialization)
- Maturing to "**No Ops**" through adoption of **latest cloud offerings**
- Tech fluency from the board down, with **technology influencing business strategy**
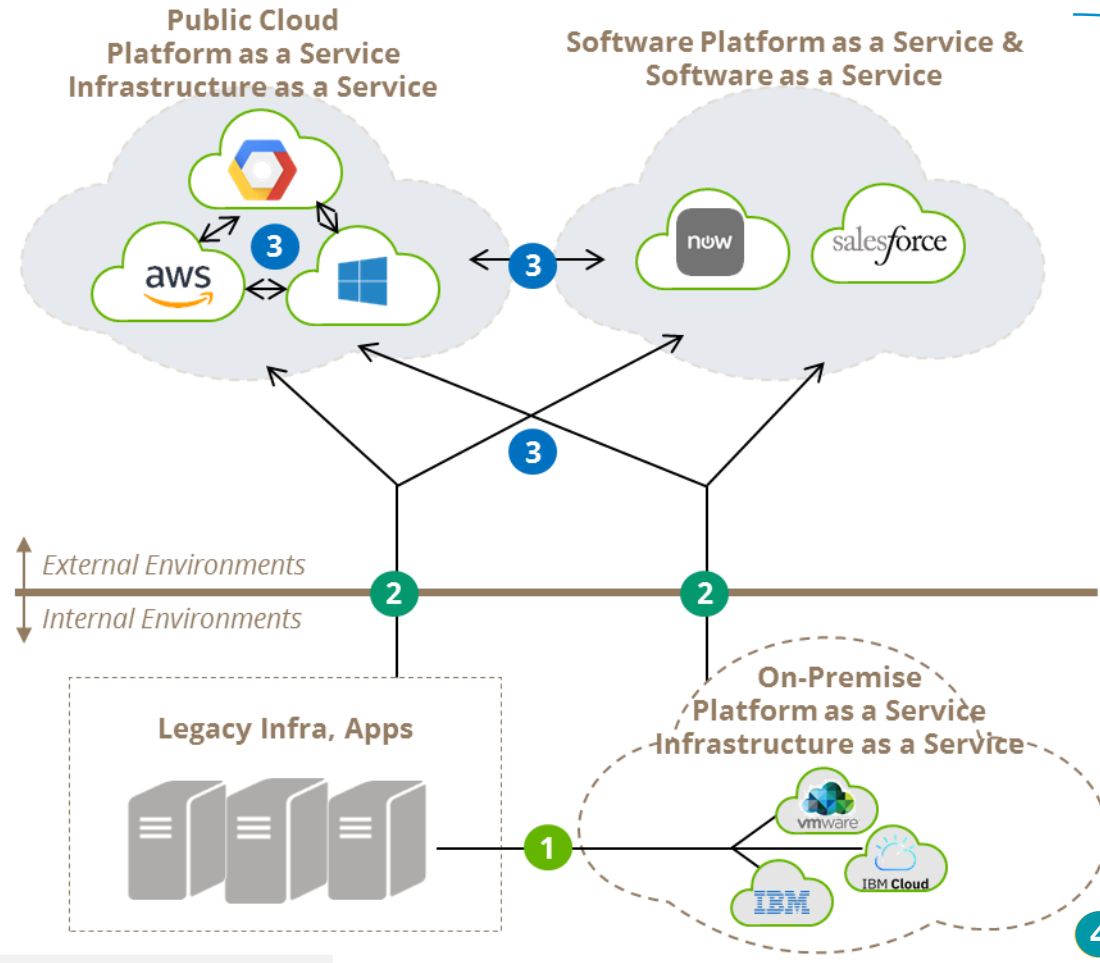
So how are we positioning ourselves in the marketplace to ride this wave?

Emerging best practices…moving to complex and agile cloud deployments.

Key Considerations & Best Practices

There are different flavors of multi-cloud based on the specific needs of your business

Illustrative Multi-Cloud Environment

1 Connecting Legacy Data Centers to Private Clouds

- Increased communication load on legacy infrastructure
- Complex integration architecture – mainly point-to-point
- Transition from monolithic or service oriented architecture to micro services architecture

2 Connecting Internal & External Infrastructure

- Implementation of multi layered security and access controls / link encryption
- Dynamic management (policy driven) of routing,, quality of service, performance
- Storage and data management, esp. online and transactional data

3 Connecting Multiple Cloud End-Points

- Multi-nodal service management capabilities with exponential growth in end points
- Additional points of failure, increased issue complexity drives increased MTTR
- Multiple toolsets drive complexity and overhead
- Balancing data security and privacy, governance, cost, and utility objectives

4 Proactively Governing Technology and Vendors

- Maintenance of multiple vendor specific policies, SLAs
- Increased configuration management complexity
- Applying on premise risk, security, compliance for vendor provided services
- Balancing data privacy, governance, cost, and utility objectives

Key Drivers for a Multi-Cloud Environment

We believe multi-cloud can drive increased cost efficiency and flexibility while tapping in to technology innovation democratized in the cloud

Multi-Cloud Adoption Drivers

- **Reduce cloud spend** through competitive negotiation

- **Gain autonomy** by minimizing vendor lock-in

- **Improve resiliency and reliability** by distributing workloads across multiple cloud service providers

- **Increase business agility** through greater access to the latest technologies across multiple providers

- **Optimize the best of breed** of cloud computing solutions across the various Cloud Service Providers

- Meet current and future requirements of **governance, security, privacy, risk management and compliance regulations**

Multi-Cloud Environment Benefits

Business Continuity
Improve geographic presence and disaster recovery in response to outages

Technology Innovation
Adopt the latest technologies from different leading service providers

Cost Reduction
Reduce operating cost with more competitive price

Service Flexibility
Offers true flexibility to implement solutions that best fit each business workload to optimize performance

Vulnerability Mitigation
Reduce vulnerability risk by limiting blast radius with multiple Cloud Service Providers

Data Gravity Reduction
Reduce latency caused by exploding data volume on single cloud service provider platform

An IDC study found that 86% of enterprises predict that they will need a Multi-Cloud approach to support their solutions within the next two years

Challenges of Multi-Cloud Environments

While multi-cloud strategy improves performance, minimizes risk of downtime, and avoids data loss, challenges can be significant

- **Resource constraints**
  - Requires excellent infrastructure and resource expertise as cross functionality across teams is required
- **Transitioning complexity**
  - Application feasibility review required before choosing cloud platform
  - Same application should not be on multiple clouds
- **Management Complexity**
  - Need a robust multi-cloud management portal
  - A standard set of interfaces and capabilities can be provided as APIs might not be compatible
- **Compliance with Governance**
  - Multiple cloud vendors have to meet the company's compliance requirements
  - Right resources should have access to the right applications
  - Quality Agreements driving GxP compliance requirements
- **Procurement, Billing and Accounting**
  - Company has to compare cloud providers and handle multiple invoices
  - Potential for lower discount rates due to multiple providers
- **Security**
  - Strong identity management is required between different cloud providers
  - Disparate solutions with different, inconsistent approaches to integrating security concepts

Deloitte's Framework for Multi-Cloud Execution

Our holistic framework means that we can support Baxter at every stage of your multi-cloud journey

1. Plan & Assessment

- Data Center
- Colo/MSP
- In Process / Net New
- Special Systems (e.g., factory robotics)

2. Target Solution Planning

- Multi-cloud
  Public Clouds
  Private Clouds
- IoT/Edge
- Colo/MSP
- DevOps Chain Planning

3. Operations Planning

- Performance
- Security
- BC / DR
- Governance
- Cost Management
- Abstraction
- Automation

7. Migrate

- Code Migration
- Data Migration
- Resource Migration
- Migration Verification
- Operations Planning
- Security Migration
- Governance Migration
- DevOps Integration

8. Operate

- SecOps
- GovOps
- PerfOps
- Monitoring and Metrics Plan
- Legacy/Cloud Operations
- DevOps

4. Common Services

- Common Security Services (data protection, identity, access, MFA, monitoring, scanning, encryption, compliance, SecOps)
- Common Governance Services (services, cost, compliance, resource, GovOps)
- Common Cognitive Services (machine and deep Learning)
- Common Management and Monitoring (AIOps, CloudOps)

5. Cloud Complexity Management (abstraction, automation, complexity mediation, complexity in domains)

6. Skills Gap Analysis and Augmentation Planning

Key Considerations

Modernization	Security and Privacy	Complexity Management	Use Cases	DevOps & Agile
Migration	Monitoring	Innovation	Deployments	Financial Management

Planning   Migrate   Operate

Revising the Operating Model in Anticipation of Multi-Cloud (1)

Moving to multi-cloud increases an organization's need to focus on maturing the operating model in response to cloud

Cloud Operating Model Maturity

Cloud 3.0: Enhance operating model, incorporate feedback, iterate and automate workflows and processes

Cloud 2.0: Design and formulate teams, define processes, frameworks and test plans to implement changes identified in the assessment process

Cloud 4.0: Achieve end state maturity with optimized model. Fully-integrated capabilities aligned with cloud organization; Frictionless governance and control policies in place; and automated operations

Business inputs are increasingly delivered through ongoing iterations of cloud services

Cloud 0: Assess current state of Operating model using the diagnostic tool across the 8 key categories, current state competency assessment

Cloud 1.0: Identify gaps, new roles / capabilities, key procedures, tools, KPIs and standards and policies across all 8 categories

Operating model continues to evolve and be refined

Today | 90 Days | 180 Days | 270 Days | 360 Days **Time**

As part of the cloud transformation program, an organization needs to evolve its existing IT Operating Model processes, workflows, roles, and governance to support the agile nature of cloud, and transform how services are delivered in efficient manner.

Roll out of cloud operating model can be iterative and continue to evolve over time. It can start with establishing a Minimum Viable Operating Model leveraging 3-5 scenarios per LOB as pilots, and evolve into a fully integrated set of cloud with business focus.

Thank You

Questions?