Errors or corrections? Email us at aws-course-feedback@amazon.com.
Other questions? Email us at aws-training-info@amazon.com.

Architecting on AWS

Migrating Applications to the AWS Cloud

Migrating Applications to the AWS Cloud | What we'll cover

1

Defining cloud strategies

2

Planning migrations

3

Deploying applications

4

Optimizing applications

Migrating Applications to the AWS Cloud | Defining Cloud Strategies

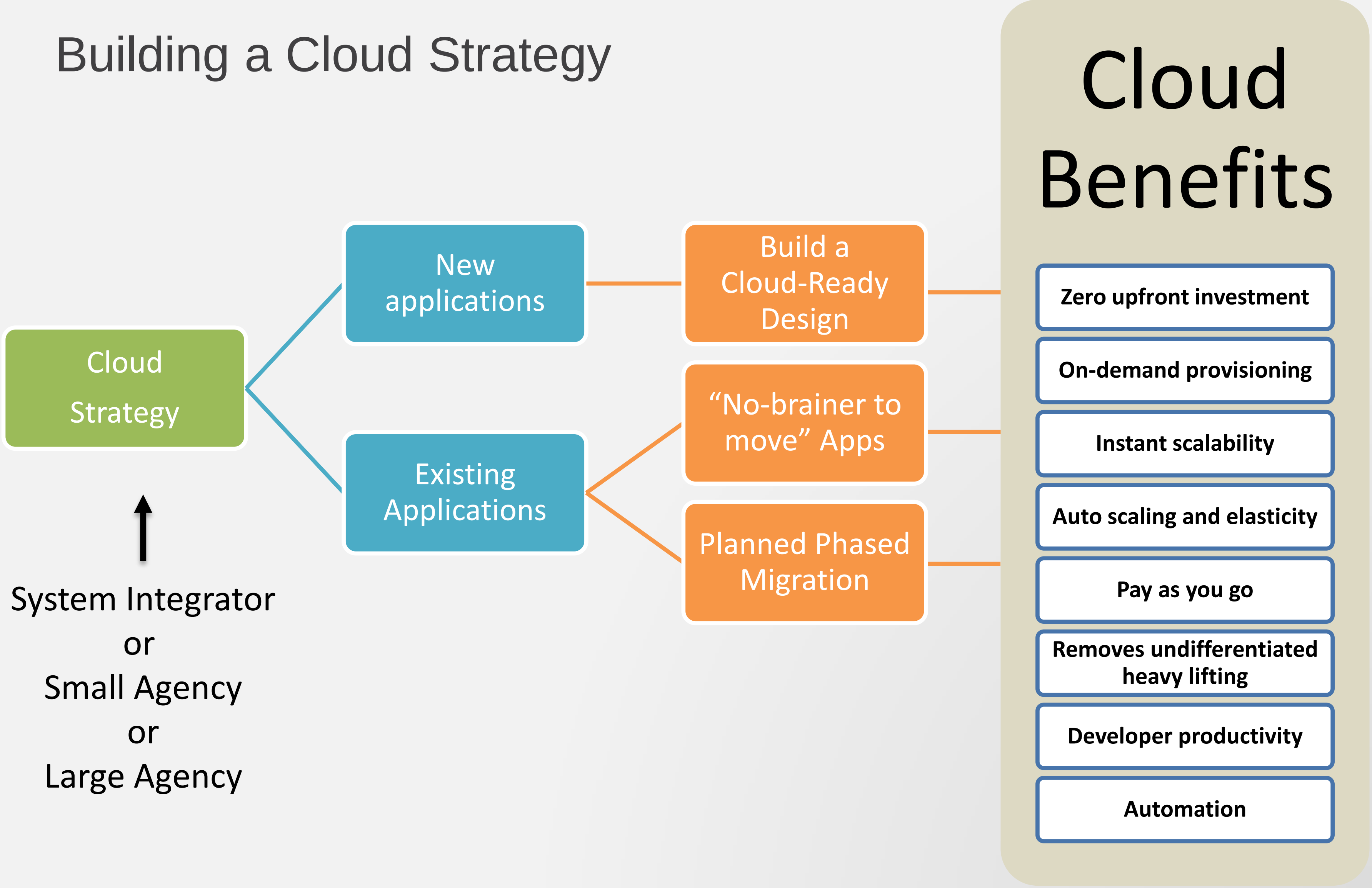
1

Defining cloud strategies

What we’ll cover

1. Basic strategies for new applications
2. Strategies for existing applications
3. Types of applications that are easy to migrate
4. Phases of migration

Building a Cloud Strategy



Cloud Strategy

New applications

Build a Cloud-Ready Design

Existing Applications

"No-brainer to move" Apps

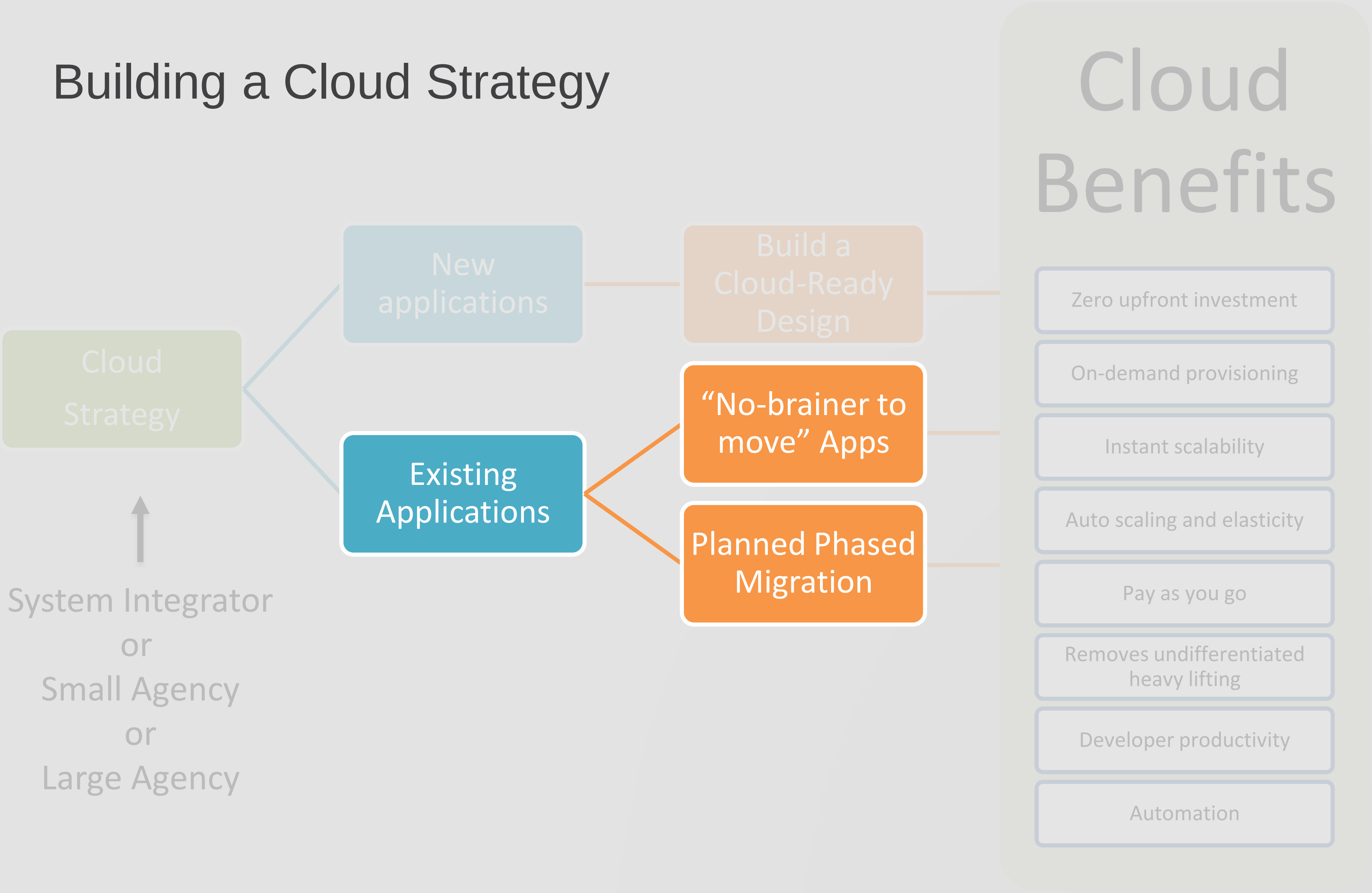
Planned Phased Migration

System Integrator
or
Small Agency
or
Large Agency

Cloud Benefits

- Zero upfront investment
- On-demand provisioning
- Instant scalability
- Auto scaling and elasticity
- Pay as you go
- Removes undifferentiated heavy lifting
- Developer productivity
- Automation

Building a Cloud Strategy



Cloud Strategy

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Existing Applications

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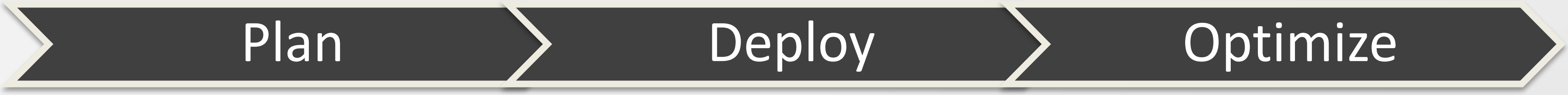
“No-brainer to move” Apps

- Dev/Test applications
- Self-contained Web Applications
- Social Media Product Marketing Campaigns
- Customer Training Sites
- Video Portals (Transcoding and Hosting)
- Pre-sales Demo Portal
- Software Downloads
- Trial Applications

Phased Approach to Migration



Migrating Applications to the AWS Cloud | Planning Migrations

2

Planning migrations

What we’ll cover

1 Two phases of migration planning

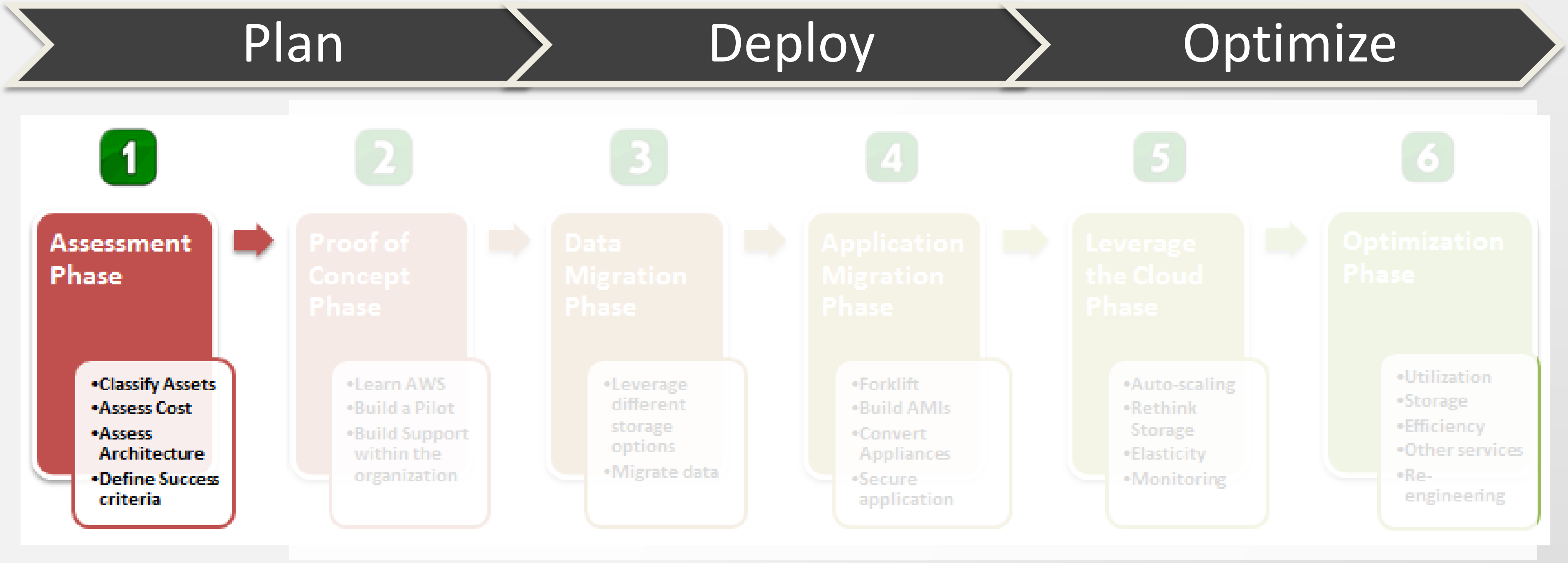
2 Key questions to ask prior to migration

3 Criteria for stack-ranking applications

4 Two tools for cost management

5 Licensing models and the cloud

Goal: Identify which application to move first



Plan

Deploy

Optimize

1

Assessment Phase

- Classify Assets
- Assess Cost
- Assess Architecture
- Define Success criteria

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Proof of Concept Phase

- Learn AWS
- Build a Pilot
- Build Support within the organization

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- Leverage different storage options
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Leverage the Cloud Phase

- Auto-scaling
- Rethink Storage
- Elasticity
- Monitoring

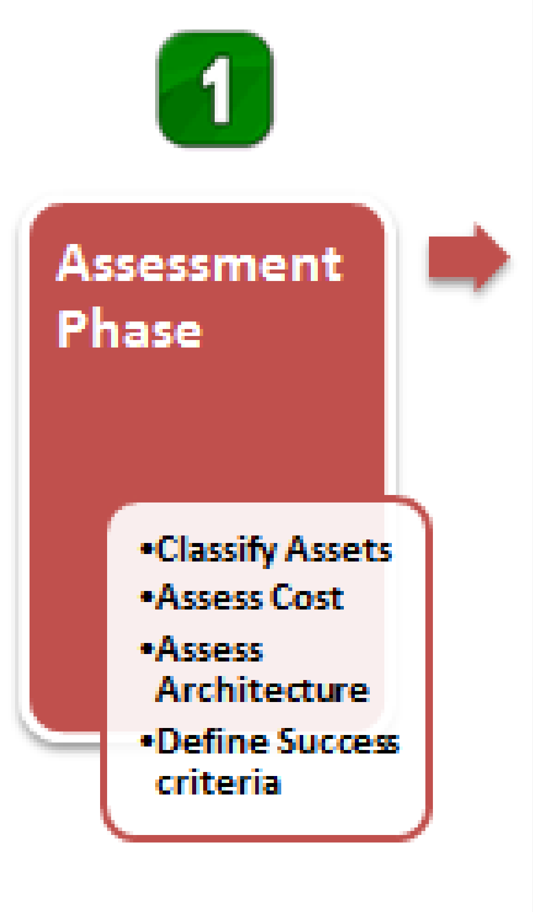
6

Optimization Phase

- Utilization
- Storage
- Efficiency
- Other services
- Re-engineering

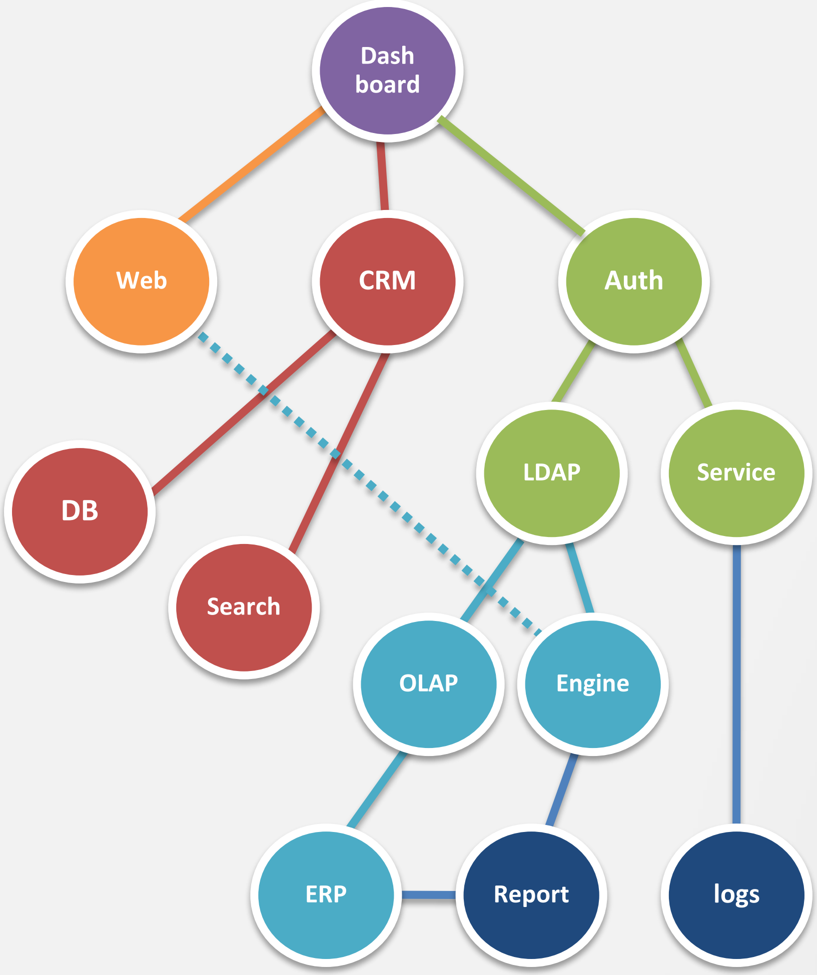
Most companies skip this phase!

Migrating Applications to the AWS Cloud | Planning Migrations



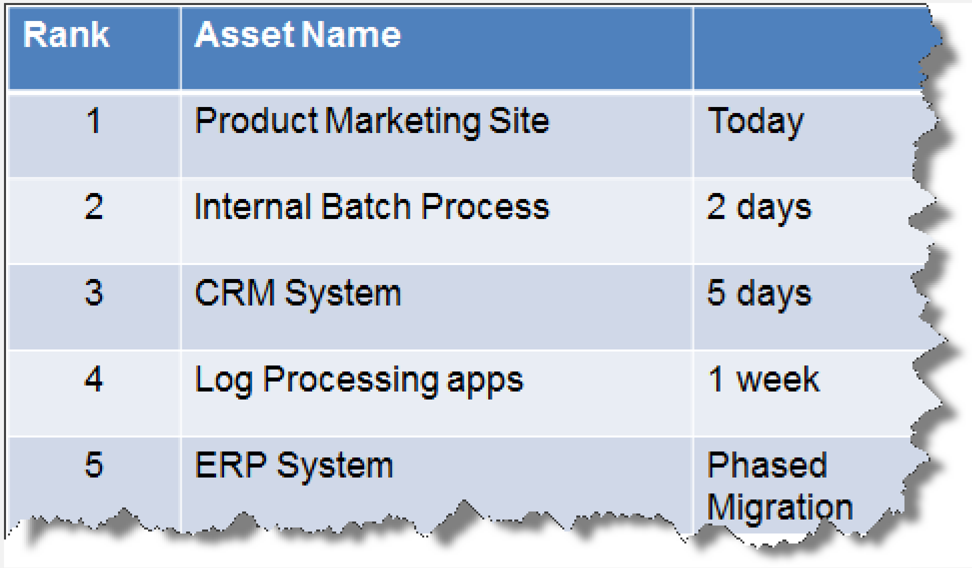
- Questions you need to ask:
- Which business applications should move to the cloud first?
- Does the cloud provide all of the infrastructure building blocks you require?
- Can you reuse your existing resource management and configuration tools?
- What are my legal, governance and compliance requirements?
- What are your criteria to measure success? How will you measure it ?

Classifying your IT Assets



- List all your IT assets
- Identify upward and downward dependencies
- Start classifying your IT assets into different categories:
  - Applications with Classified, Sensitive, or Public data sets
  - Applications with low, medium and high compliance requirements
  - Applications that are internal-only, partner-only or customer-facing
  - Applications with low, medium and high coupling
  - Applications with strict, relaxed licensing

Stack rank your IT assets and select the low-hanging fruits first



Rank	Asset Name	
1	Product Marketing Site	Today
2	Internal Batch Process	2 days
3	CRM System	5 days
4	Log Processing apps	1 week
5	ERP System	Phased Migration

- Search for under-utilized IT assets

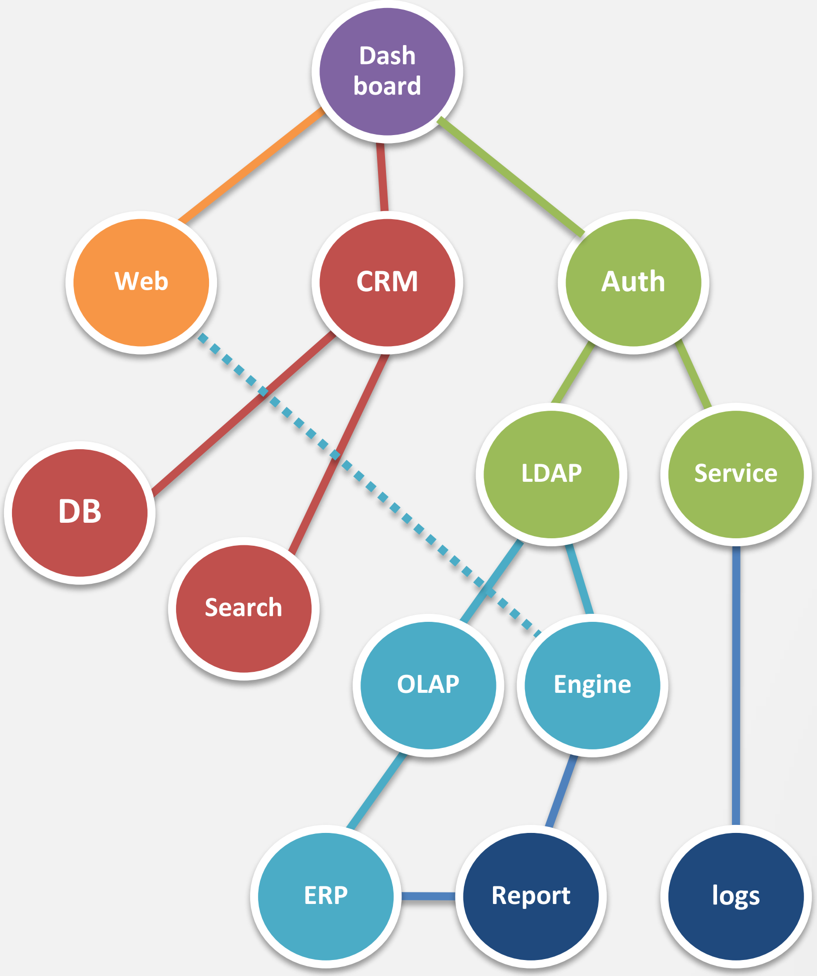
Applications that have immediate business need to scale

Applications that are running out of capacity

Easiest to move today

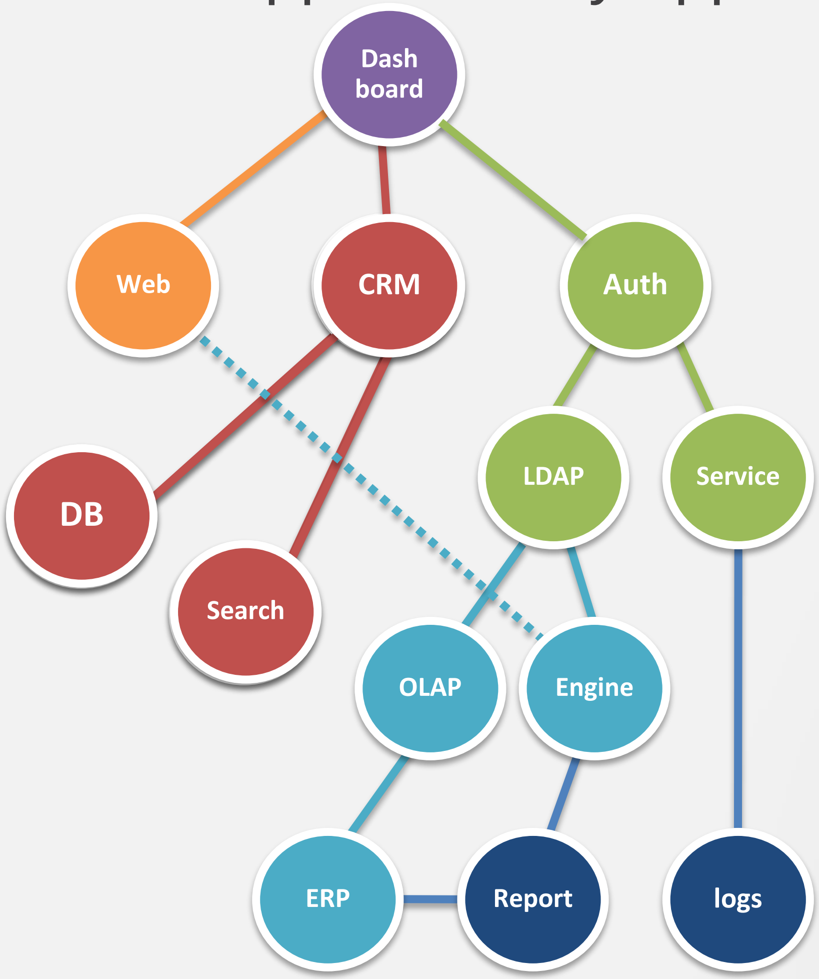
That builds support within your organization and creates awareness and excitement

Pick the Low-hanging fruit



- Examples:
- Web Applications
- Batch Processing systems
- Content Management Systems
- Digital Asset Management Systems
- Log Processing systems
- Collaborative Tools
- Big Data Analytics Platforms

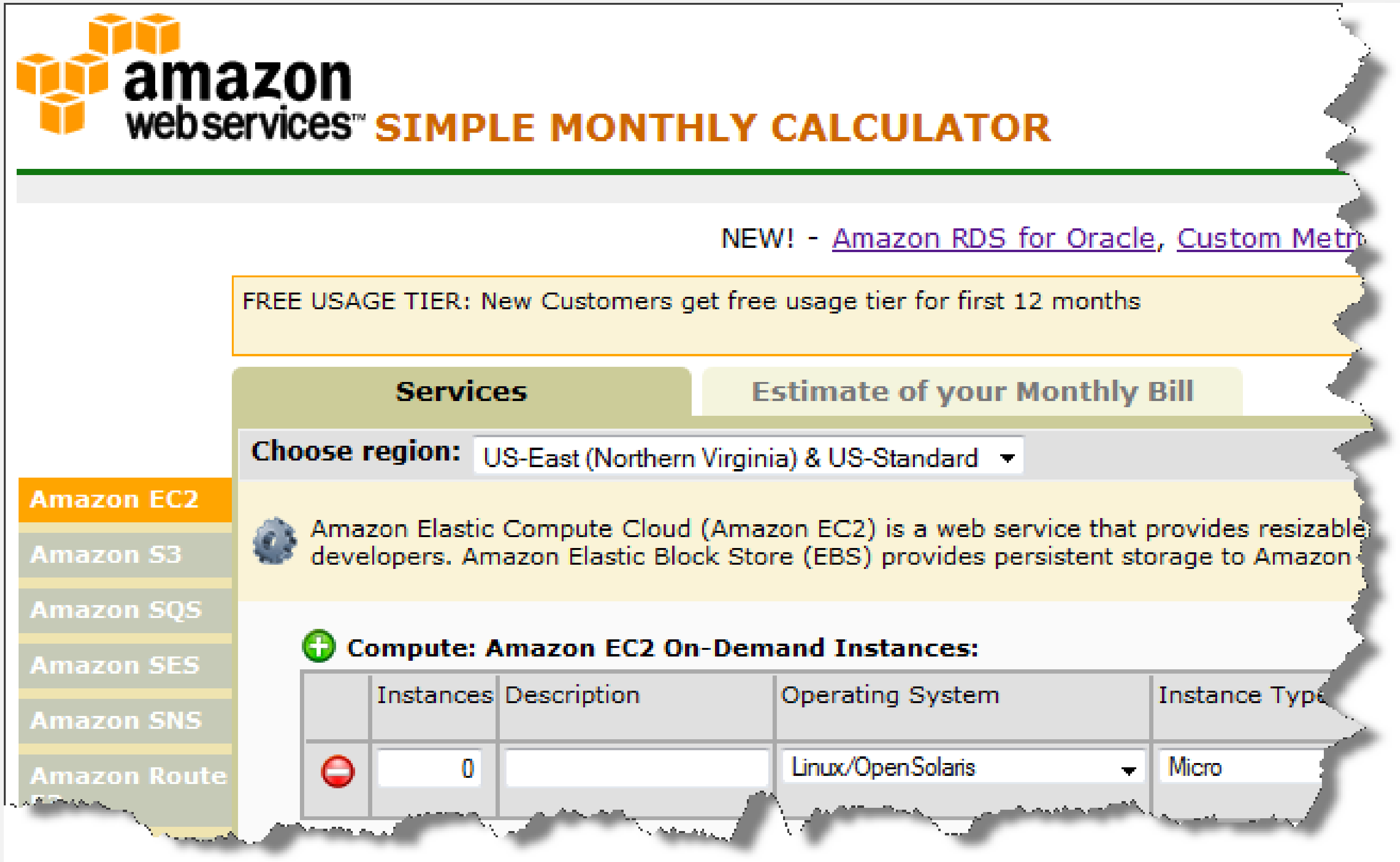
Move application by application



Migrating Applications to the AWS Cloud | Planning Migrations

Pricing Model	One-time Upfront			Monthly		
	AWS	Co-lo	On-Site	AWS	Co-lo	On-Site
Server Hardware	0	$$$	$$	$$	0	0
Network Hardware	0	$$	$$	0	0	0
Hardware Maintenance	0	$$	$$	0	0	0
Software OS	0	$$	$$	$	0	0
Power and Cooling and Data Center Efficiency	0	0	$$	0	0	$
Data Center/co-lo Space	0	$$	$$	0	0	0
Personnel	0	$$	$$	$	$$	$$$
Storage and Redundancy	0	$$	$$	$	0	0
Bandwidth	$	$$	$	$$	$	$
Resource Management Software	0	0	0	$$	$	0
Total						

Cost to run in AWS?



amazon webservices™ SIMPLE MONTHLY CALCULATOR

NEW! - Amazon RDS for Oracle, Custom Metr

FREE USAGE TIER: New Customers get free usage tier for first 12 months

Choose region: US-East (Northern Virginia) & US-Standard

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable
developers. Amazon Elastic Block Store (EBS) provides persistent storage to Amazon

Compute: Amazon EC2 On-Demand Instances:

	Instances	Description	Operating System	Instance Type
⊖	0		Linux/OpenSolaris	Micro

Migrating Applications to the AWS Cloud | Planning Migrations

Flexible Licensing Options Available Today

- Bring Your Own License (BYOL)

  (Oracle, IBM, Microsoft Server Apps, MatLab….)

- Use a utility style pricing model with a support package

  (Redhat, Microsoft, IBM, Adobe, Wowza, Several DevPay-based products….)

- Use ISV Cloud Service

  (Quantivo, Pervasive, Cast Iron, Cloud Mathematica….)

Migrating Applications to the AWS Cloud | Planning Migrations

Microsoft®

Microsoft Exchange Server, Microsoft SharePoint Server, Microsoft SQL Standard Server, Microsoft SQL Enterprise Server, Microsoft Lync Server, Microsoft System Center servers, and Microsoft Dynamics CRM through License Mobility Software Assurance

ORACLE®

Oracle fully supports Oracle E-Business Suite, Oracle's PeopleSoft Enterprise, Oracle's Siebel CRM, Oracle Fusion Middleware, Oracle Database, and Oracle Linux on the portion of AWS EC2 which uses Oracle VM.

IBM®

IBM DB2, Informix, Lotus® Forms Turbo, WebSphere® Application Server, WebSphere® sMash, WebSphere Portal Server, Lotus® Web Content Management Standard Edition , InfoSphere Information Server, Lotus Domino®, Lotus Web Content Management Standard Edition®, Tivoli Monitoring®

SAP®

SAP® solutions, including SAP® Rapid Deployment solutions and SAP® BusinessObjects™ solutions

bmcsoftware redhat ca CITRIX® symantec. TIBCO The Power of Now® Adobe®

Define your Success Criteria

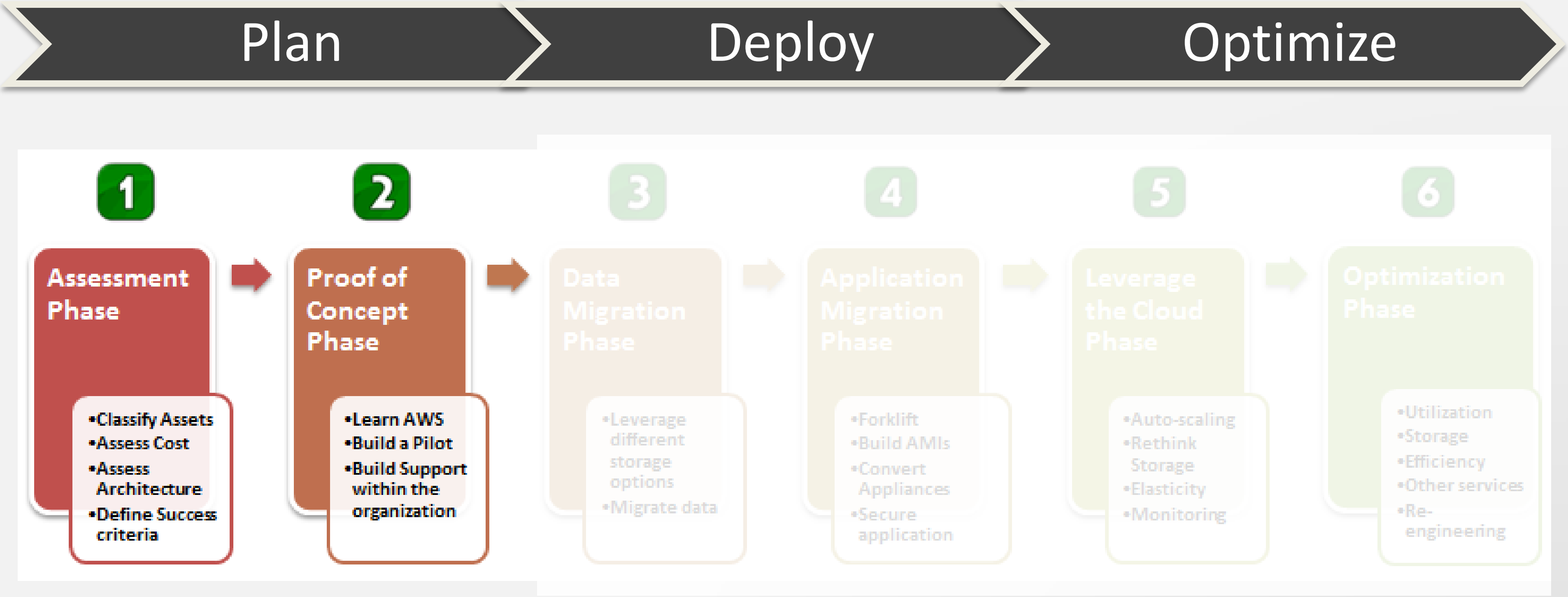
Cloud is not just about saving money

- Developer Productivity
- Business Agility
- Reduced Time to Market
- Data center efficiency
- Redundancy
- Chargeback and Billing
- Eliminates “Heavy lifting”
- Foundation of 21st century architectures
- Reduced waste/recycle
- Hardware upgrades
- Less number of 24/7 Personnel

Define your Success Criteria and measure it

Success Criteria Examples	Old	New
Cost (CapEx)	$1M	$300K
Cost (OpEx)	$20K/Year	$10K/Year
Hardware procurement efficiency	10 machines in 7 months	100 machines in 5 minutes
Time to market	9 months	1 month
Reliability	unknown	Redundant
Security	5 products launched in 1 year	15 products launched
Flexibility and Productivity	Fixed Stack	Any Stack
New opportunities	10 projects backlog	0 backlog, 5 new projects identified

Migrating Applications to the AWS Cloud | Planning Migrations



Plan

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Optimize

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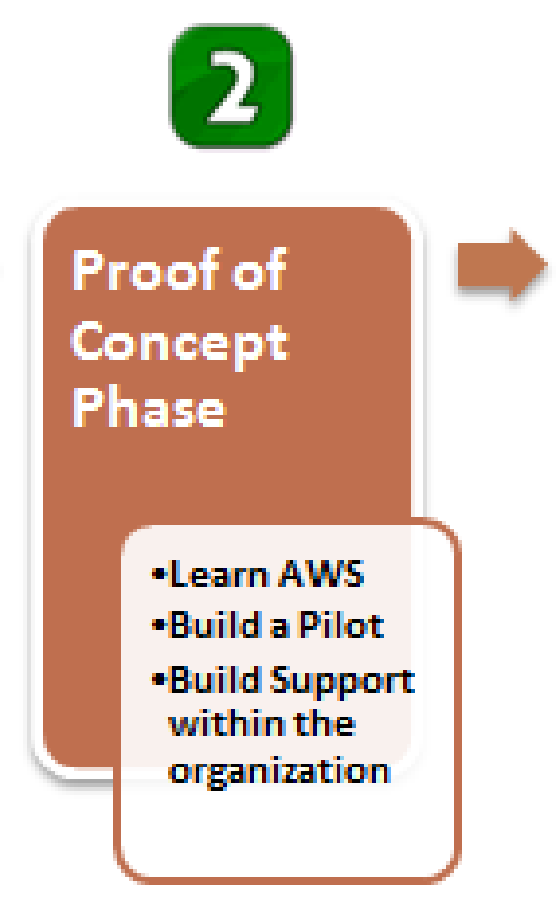
Migrating Applications to the AWS Cloud | Planning Migrations



Questions you need to ask:

- Will I learn different aspects of the AWS cloud by building this proof of concept ?
- How much effort is required to port a small dataset and small app ?
- Will this proof of concept build support and create awareness within the organization ?
- What is the best way to capture all my lessons learned? A whitepaper?
- Which applications can I move immediately after this proof of concept?

Invest in Proof of Concept Early

Proof of concept will answer tons of questions quickly

- Get your feet wet with Amazon Web Services
  - Learning AWS
  - Build reference architecture
  - Be aware of the security features
- Build a Prototype/Pilot
  - Build support in your organization
  - Validate the technology
  - Test legacy software in the cloud
  - Perform benchmarks and set expectations

Migrating Applications to the AWS Cloud | Deploying Applications

3

Deploying applications

What we'll cover

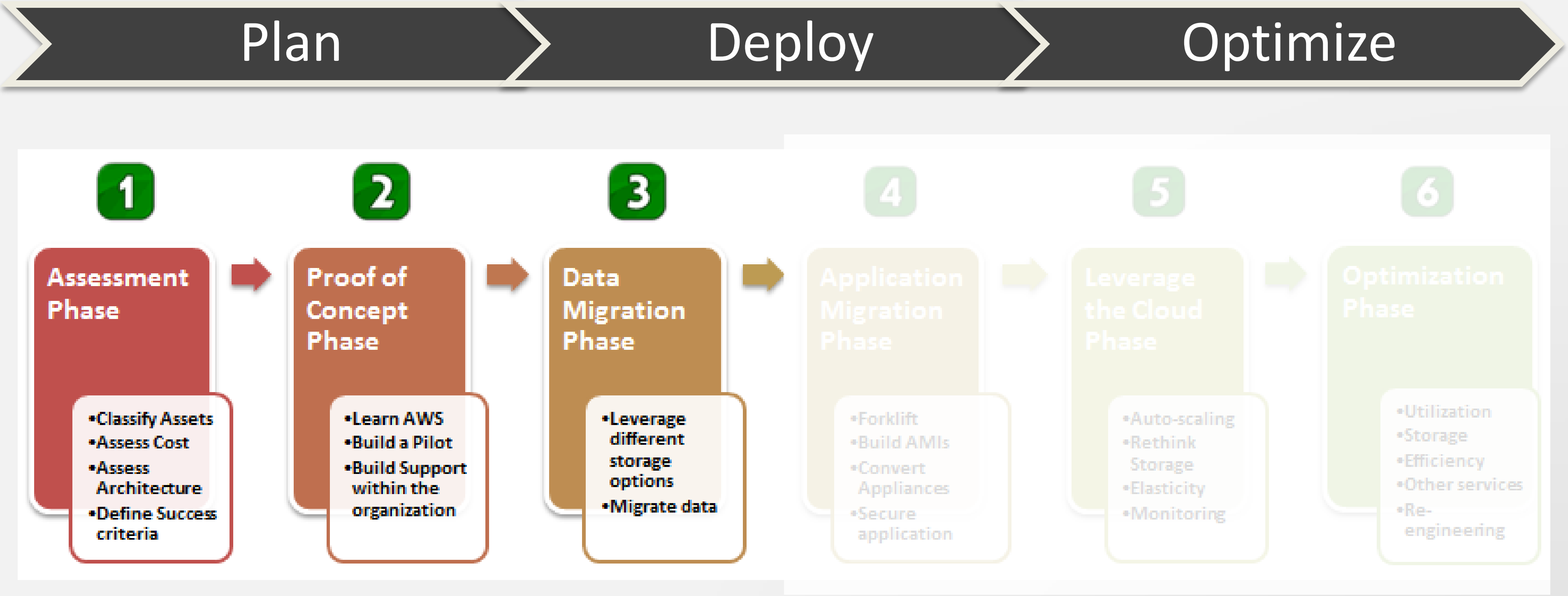
1 Two phases of deployment

2 How to get your data into AWS

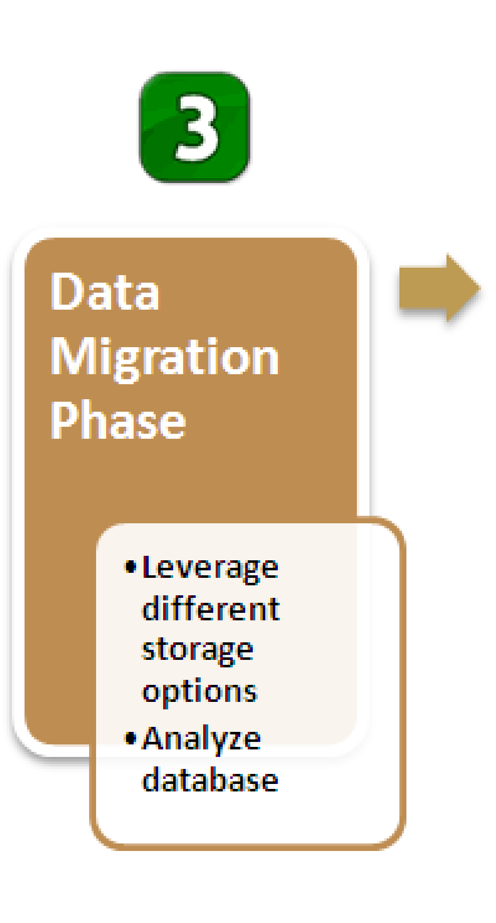
3 Handling your data

4 Mirroring on-premises hardware and software

Migrating Applications to the AWS Cloud | Deploying Applications



Migrating Applications to the AWS Cloud | Deploying Applications



3

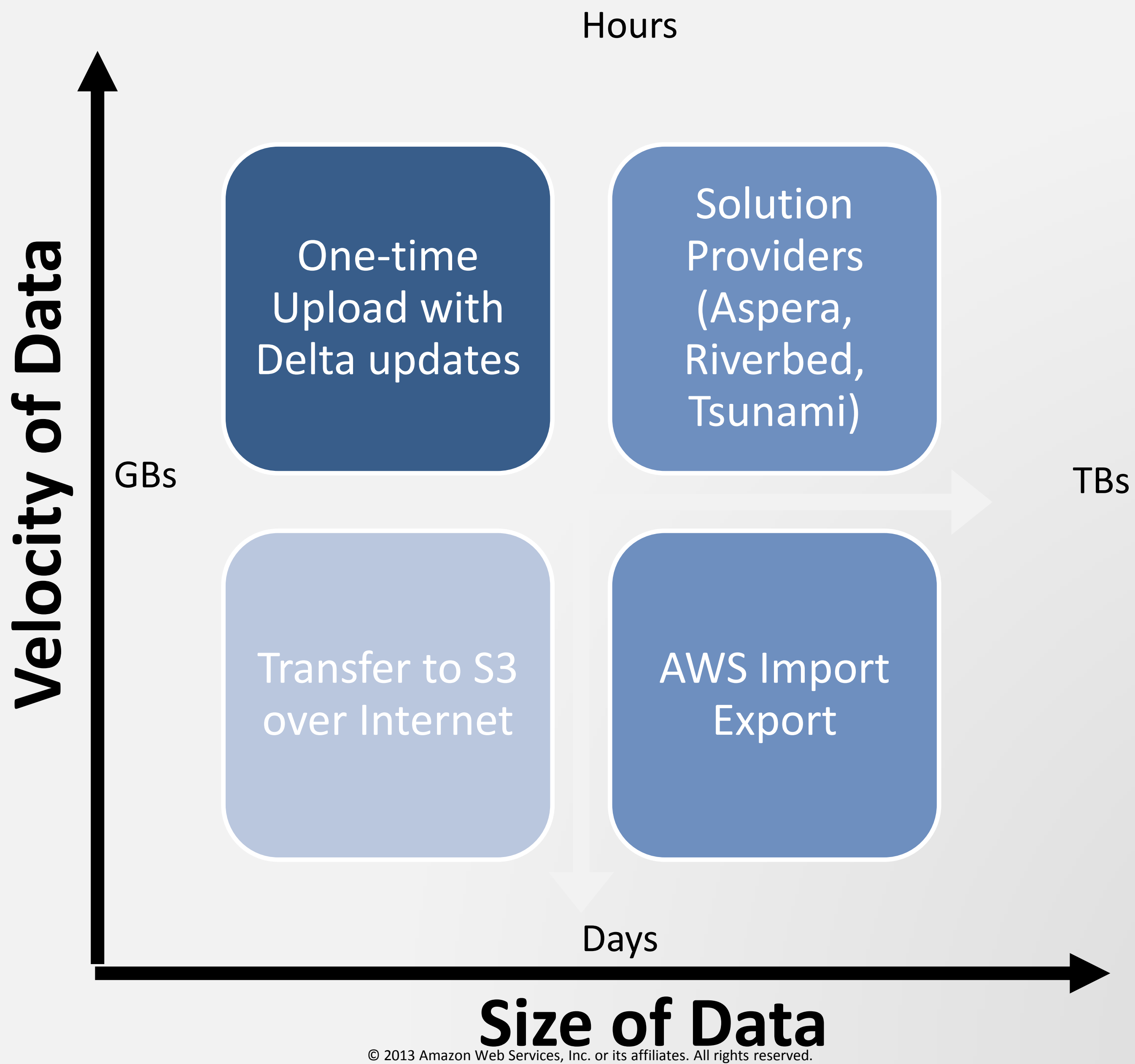
Data Migration Phase

- Leverage different storage options
- Analyze database

Includes:

- Learning about different database storage options available today
- Uploading/Moving your data in Batches
- Analyzing your database/datasets
- Build necessary tools and scripts to migrate data
- Security of your data (Encryption)

Migrating Applications to the AWS Cloud | Deploying Applications



Hours

One-time Upload with Delta updates

Solution Providers (Aspera, Riverbed, Tsunami)

GBs

TBs

Transfer to S3 over Internet

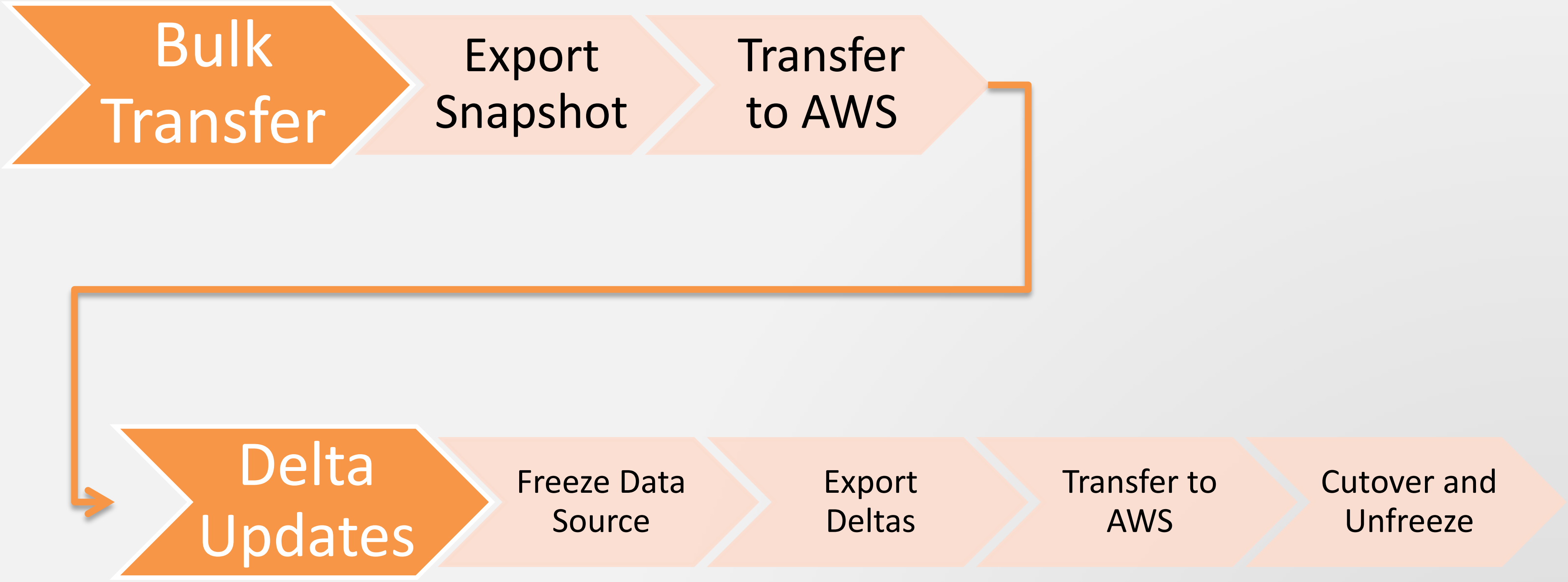
AWS Import Export

Days

Velocity of Data

Size of Data

Cutting Over Your Master Data Store



Bulk Transfer

Export Snapshot

Transfer to AWS

Delta Updates

Freeze Data Source

Export Deltas

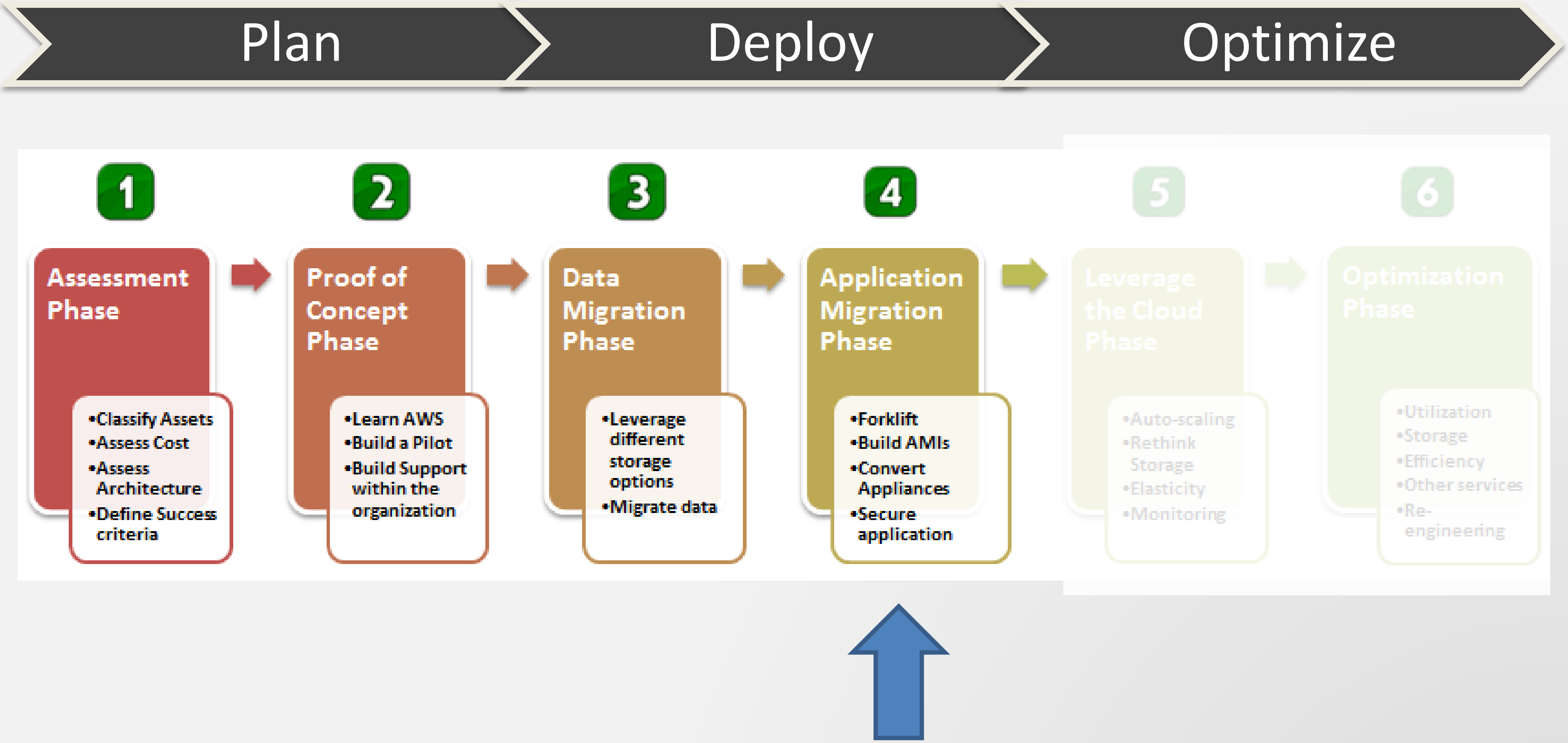
Transfer to AWS

Cutover and Unfreeze

Migrating Applications to the AWS Cloud | Deploying Applications

	Amazon S3 + CloudFront	Amazon EC2 Ephemeral Store	Amazon EBS	Amazon SimpleDB	Amazon RDS
Ideal for	Storing large write-once, read-many types of objects, Static Content Distribution	Storing local caches of state that can be easily re-built when needed	Off-instance persistent storage for any kind of data including File systems	Query-able light-weight attribute data	Storing and querying structured relational and referential data
Ideal examples	Media files, audio, video, images, Backups, archives, versioning	Config data, scratch files, TempDB	Clusters, boot data, Log or data of commercial RDBMS like Oracle, DB2	Querying, Indexing Mapping, tagging, click-stream logs, metadata, Configuration, catalogs	Web apps, Complex transactional systems, inventory management and order fulfillment systems
Not recommended for	Querying, Searching	Storing database logs or backups, customer data	Static data, Web-facing content, key-value data	Complex joins or transactions, BLOBs Relational, Typed data	Clusters
Not recommended examples	Database, File Systems	Shared drives, Sensitive data	Content Distribution	OLTP, DW cube rollups	Clustered DB, Simple lookups

Migrating Applications to the AWS Cloud | Deploying Applications



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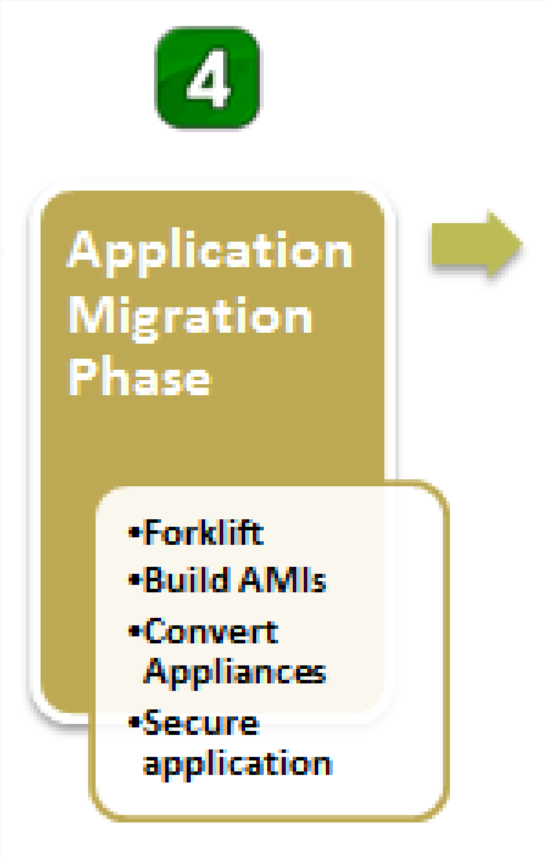


4

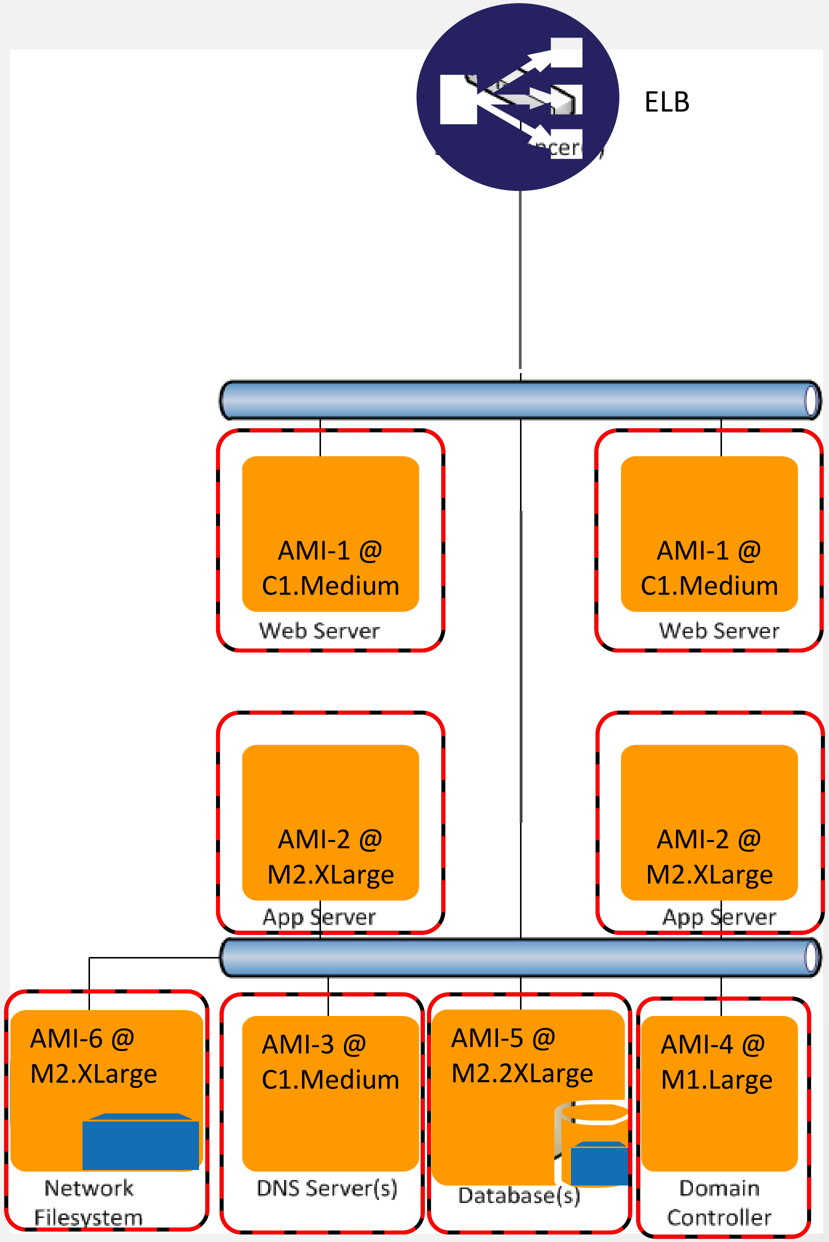
Application Migration Phase

- Forklift
- Build AMIs
- Convert Appliances
- Secure application

Includes - Forklift:

- Match your HW resources to the cloud
- Build AMIs
- Convert to virtual appliances
- Deploy supporting components (SAN, NAS, Domain controllers…)
- Secure your application
- Reuse existing management and monitoring tools or use cloud tools

Migrating Applications to the AWS Cloud | Deploying Applications



Forklift steps:

Match resources and build AMIs

- Thinks about application needs not server specs
- Build out custom AMI for application roles

Convert appliances:

- Map appliances to AWS services or virtual appliance AMIs

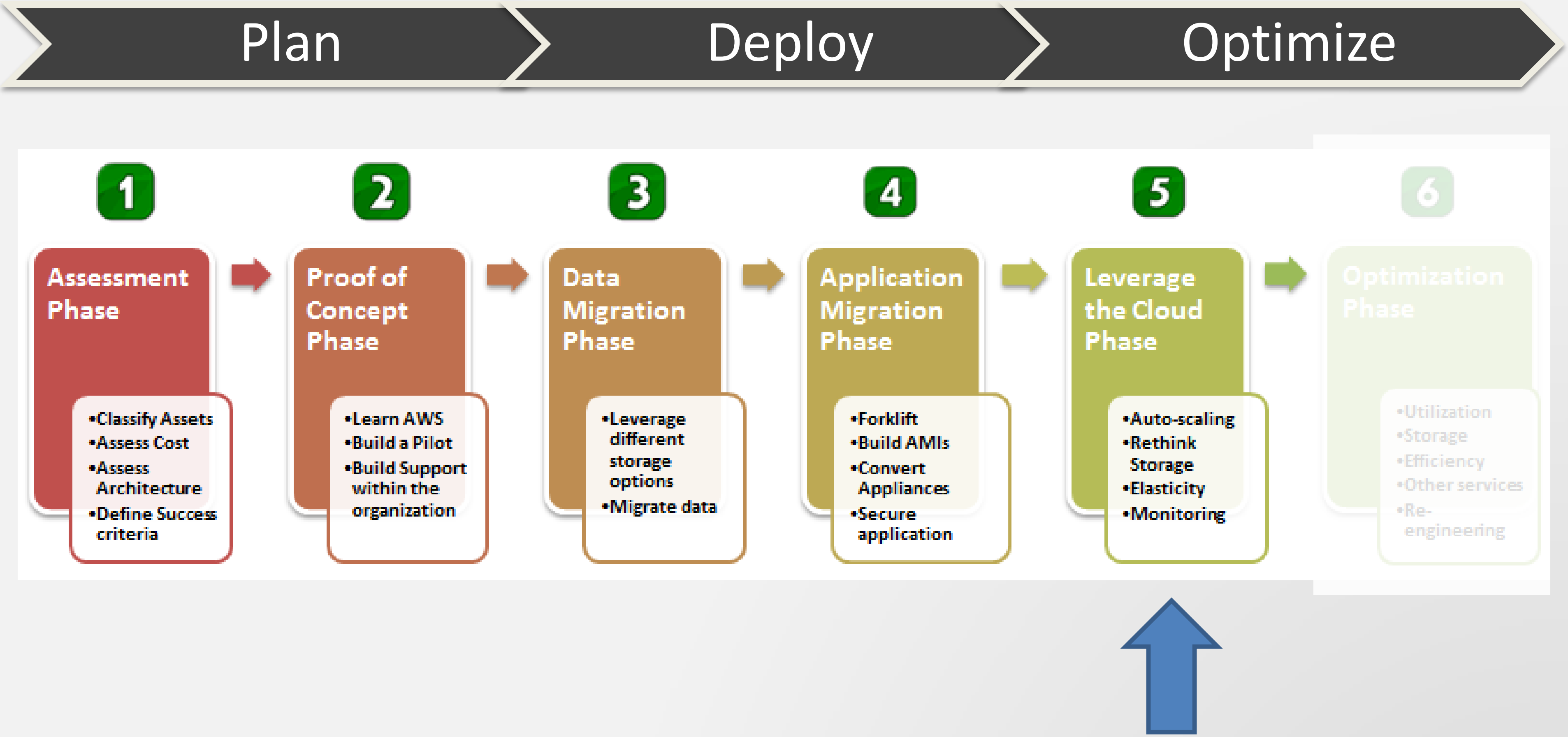
Deploy supporting components:

- SAN replacements
- DNS
- Domain controllers

Secure the application components:

- Use layered security groups to replicate firewalls

Migrating Applications to the AWS Cloud | Deploying Applications



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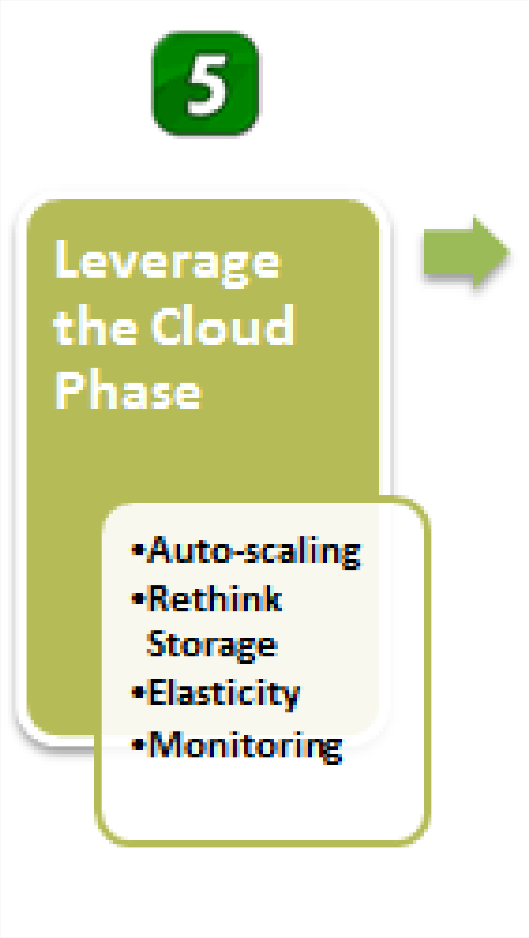
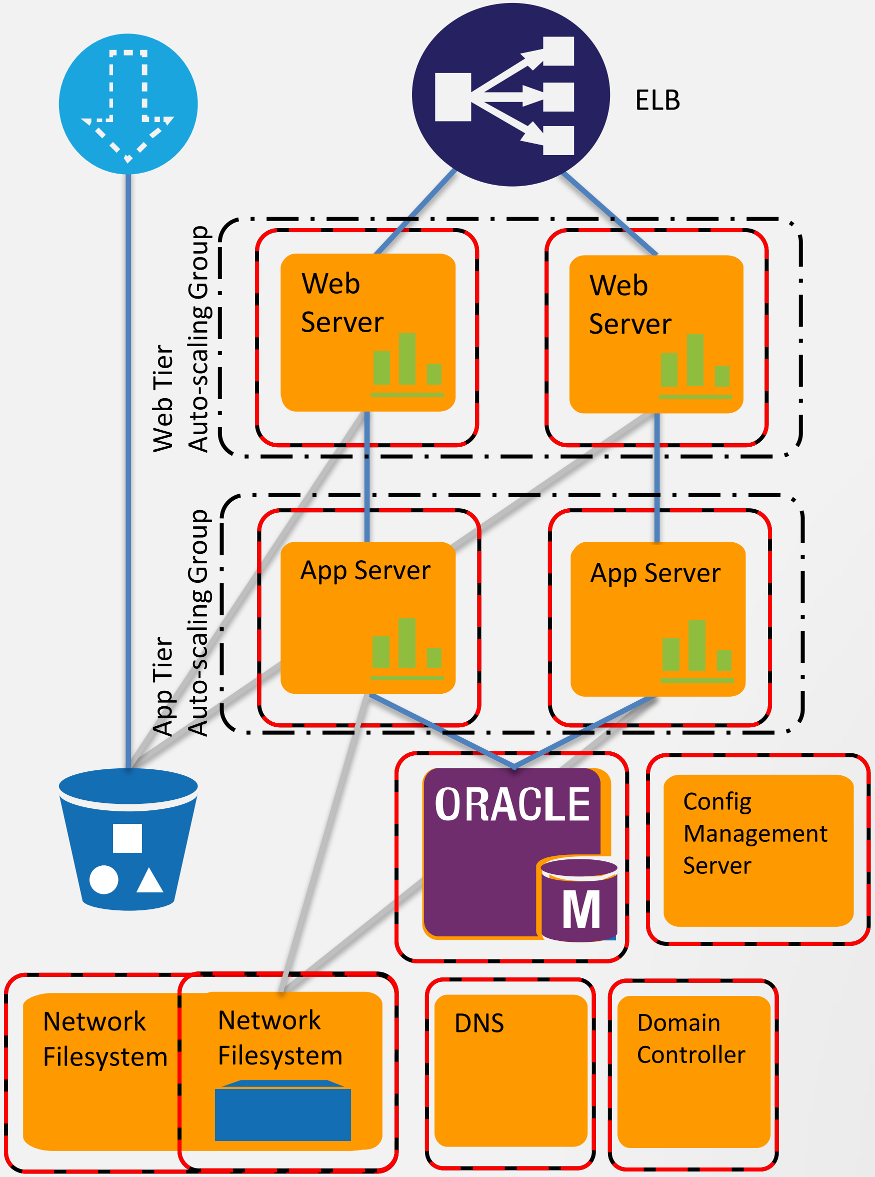


- Embrace and Implement Elasticity
- Bootstrap AMIs
- Automate processes
- Leverage Auto Scaling
- Leverage new storage options by AWS
- Harden Security (IAM)

Migrating Applications to the AWS Cloud | Deploying Applications



Steps to Leverage AWS:

Rethink storage:

- Leverage S3 for scalable storage
- Edge cache with CloudFront
- Consider RDS for HA RDBMS

Implement Elasticity

- Bootstrap AMIs for auto-discovery
- Pass in bootstrapping parameters
- Leverage configuration management tools for automated build out

Scale out and in on-demand:

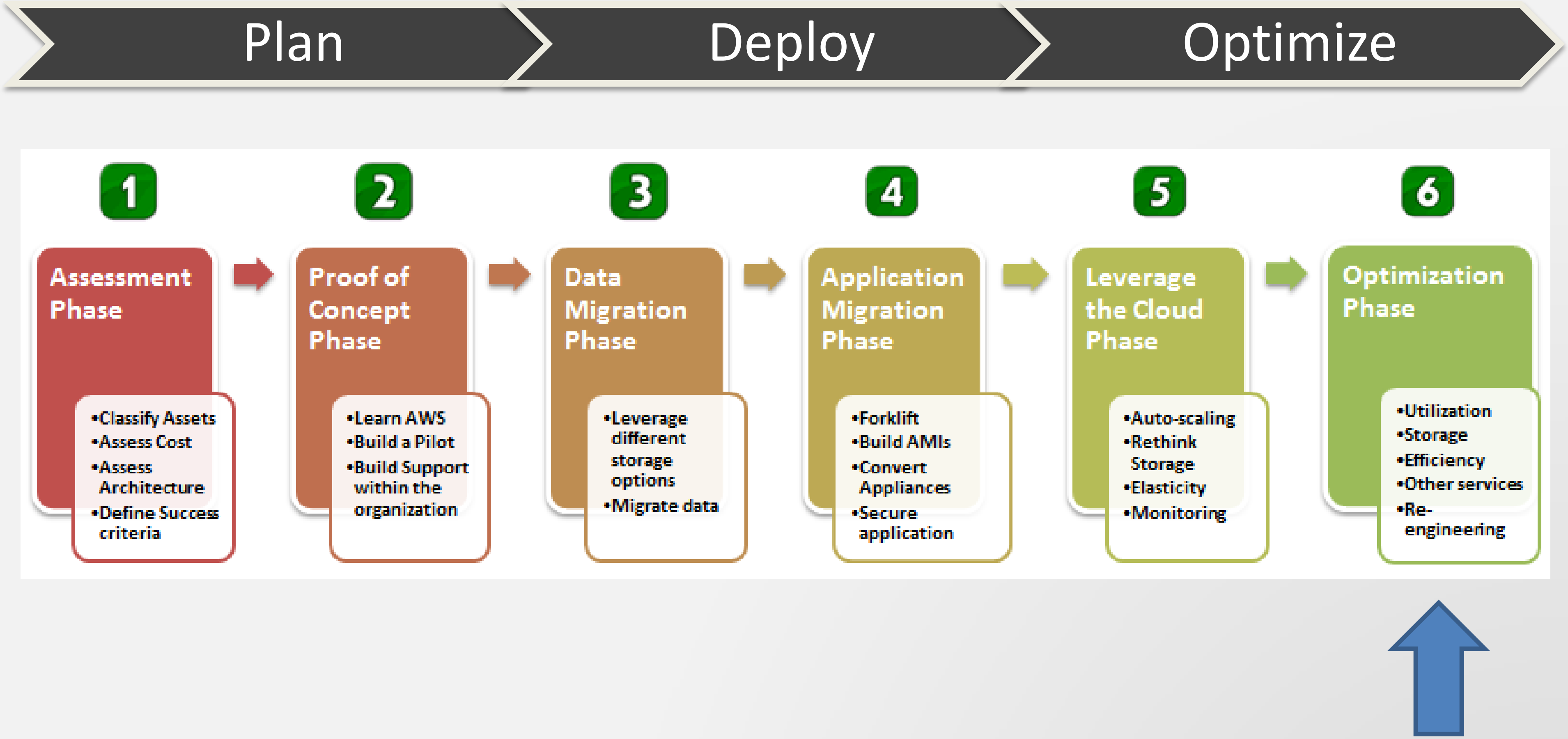
- Use CloudWatch and Auto-scaling to auto-provision the fleet

Accelerate the cloud adoption within your organization

Be the Cloud Champion within your company or team

- Be a Cloud Advocate
- Starting a weekly sync meeting
- Share Lessons Learned (Brownbags)
- Document Best Practices
- Reuse tools, scripts, How-Tos
- Start Cloud Computing practice or Cloud Computing Center Of Excellence
- Educate and Evangelize

Migrating Applications to the AWS Cloud | Deploying Applications



Migrating Applications to the AWS Cloud | Optimizing Applications

4

Optimizing applications

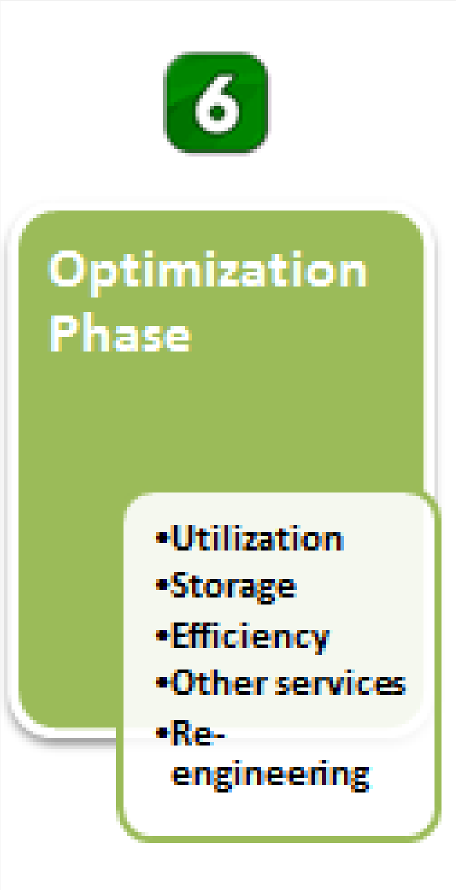
What we'll cover

1 Two phases of optimization

2 Leveraging the cloud

3 Planning your application's next update

Migrating Applications to the AWS Cloud | Optimizing Applications



6

Optimization Phase

- Utilization
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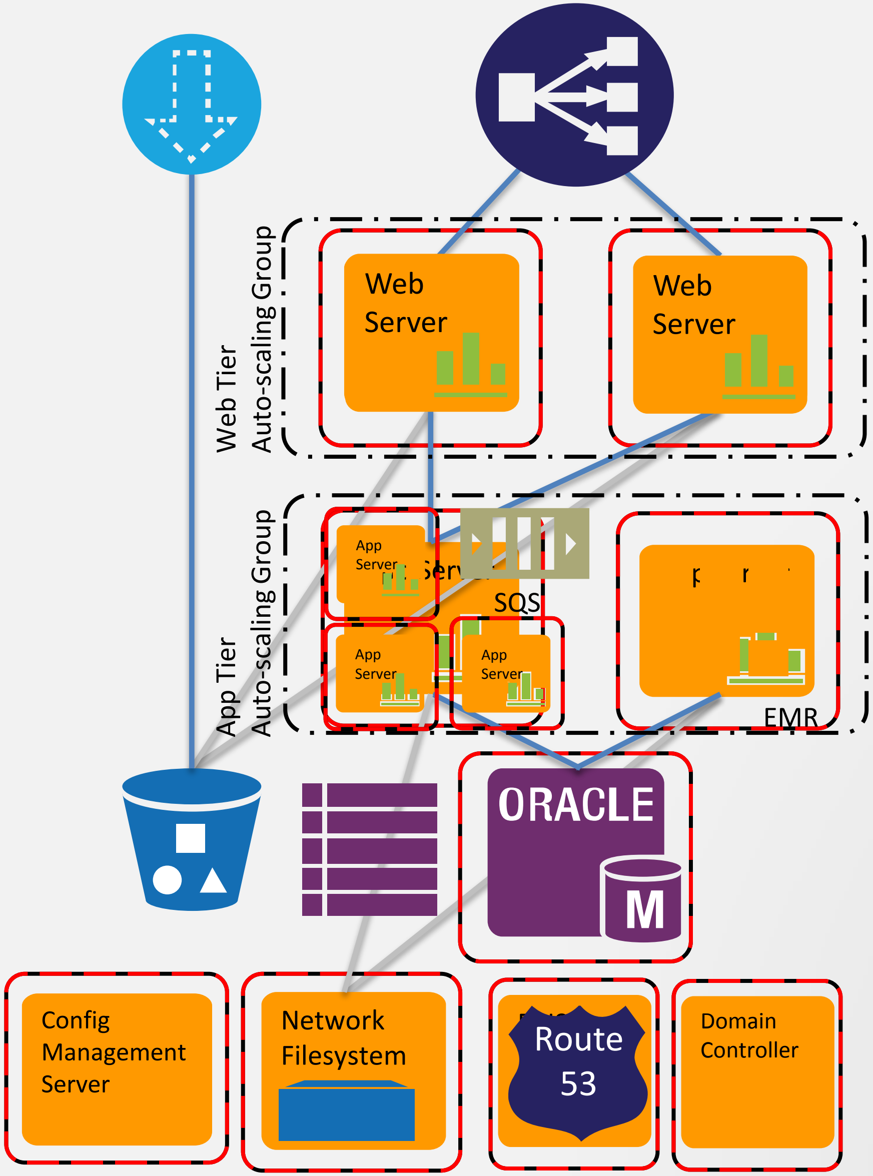
Improve Efficiency:

- Re-rethink Storage
- Parallel processing
- Optimize for cost (Use Spot)
- Optimize for availability
- Leverage scalable on-demand services like SNS, SQS

Migrating Applications to the AWS Cloud | Optimizing Applications



Steps to Optimize for AWS:

Re-Rethink storage:

- Break up datasets across storage solutions based on best fit and scalability

Parallelize processing:

- Spread load across multiple resources
- Decouple components for parallel processing

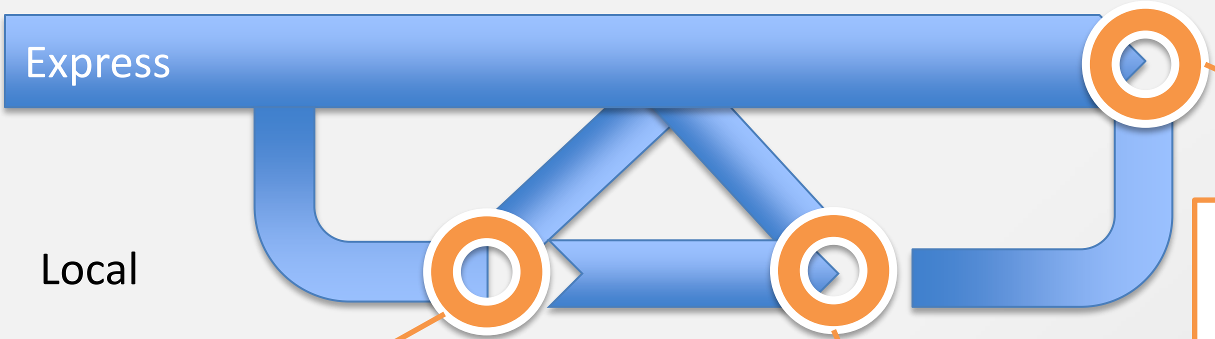
Use Spot where possible to reduce costs

Embrace scalable on-demand services

- Scale out systems with minimal effort
- Route53
- SES, SQS, SNS

…

Finding your first stop…



Forklift

- Virtualize app
- Retain operational approach

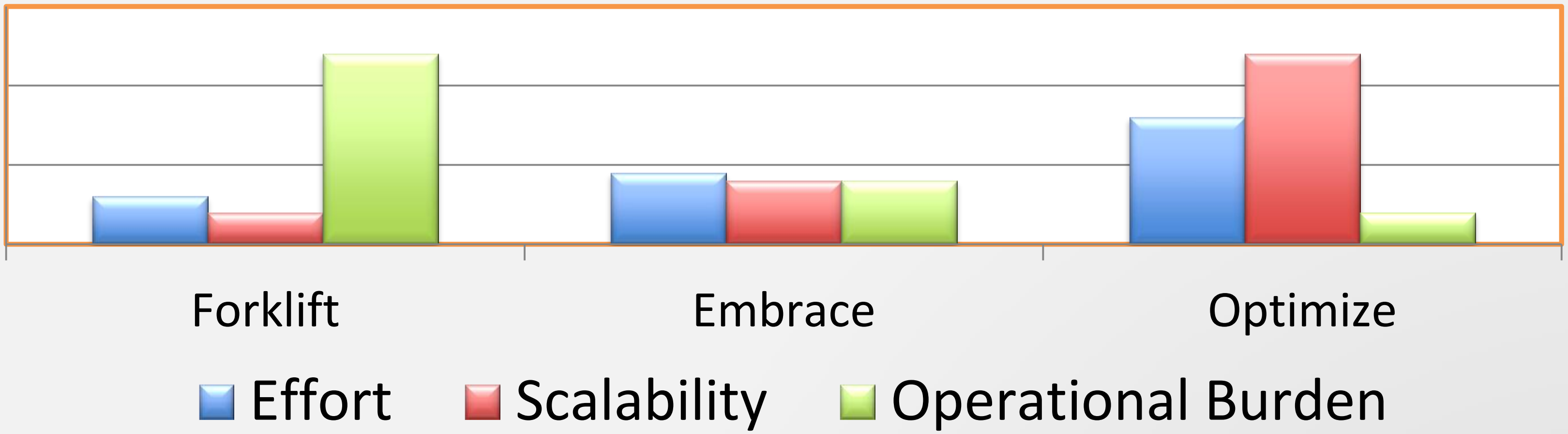
Embrace AWS

- Optimize resources
- Scale on-demand

Optimize for AWS

- Re-design for AWS
- Fully embrace cloud architecture

The Migration Continuum

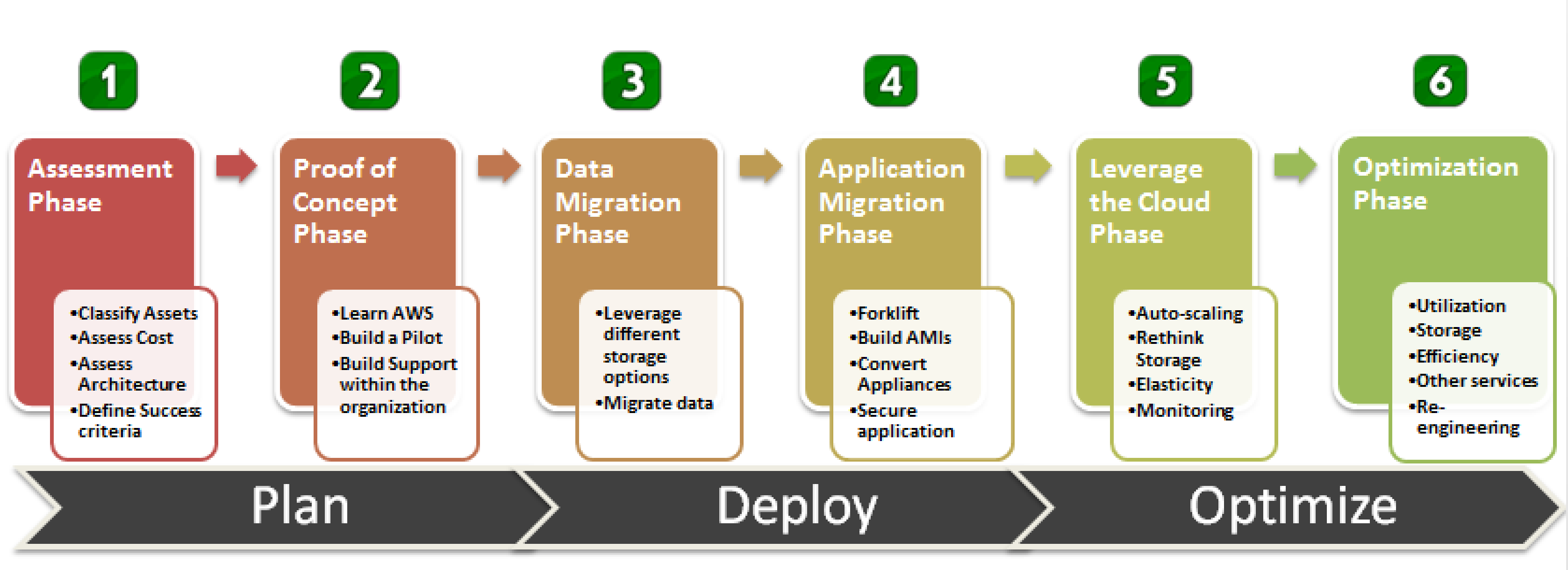


Forklift	Embrace AWS	Optimize for AWS
• May be only option for some apps • Run AWS like a virtual co-lo (low effort) • Does not optimize for on-demand (over-provisioned)	• Minor modifications to improve cloud usage • Automating servers can lower operational burden • Leveraging more scalable storage	• Re-design with AWS in mind (high effort) • Embrace scalable services (reduce admin) • Closer to fully utilized resources at all times

Key Takeaways

- **Classify and stack rank your apps** and move the easy ones first, gain confidence and define your success criteria
- Dive into a **Proof of Concept** quickly as it will answer several questions quickly
- Leverage **multiple storage options** – one size does not fit all
- Migrate with confidence: Forklift – Leverage – Optimize
- Be the **Cloud Champion** within your agency, department or team

Cloud Migration: A Phased Approach



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Plan → Deploy → Optimize

http://aws.amazon.com/whitepapers