AWS Summits 2014

Optimizing Total Cost of Ownership for AWS

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New York, NY -- July 10th, 2014

amazon web services

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Agenda

What would it cost to run in-house versus on AWS?

Total Cost of Ownership

How can I reduce my AWS Spend?

Cost Optimization

Lower Costs with AWS

1

Replacing CapEx + OpEx with OpEx

"Average of 400 servers replaced per customer"

IDC
Analyze the Future

2

Continuous AWS Price Reductions

42 Price Reductions since 2006

3

Pricing Model Choice

On-Demand

Reserved

Spot

4

Increased Savings as You Grow on AWS

Tiered Pricing

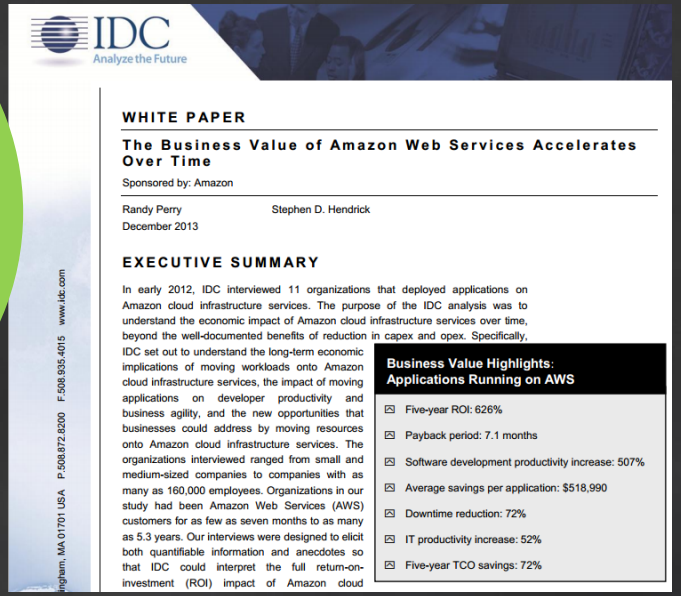
Volume Discounts

Source: IDC Whitepaper, sponsored by Amazon, "The Business Value of Amazon Web Services Accelerates Over Time." December 2013

Analysts have shown AWS reduces costs

IT PRODUCTIVITY INCREASE:
52%

AVERAGE SAVINGS PER APPLICATION:
$518,990



IDC
Analyze the Future

WHITE PAPER

The Business Value of Amazon Web Services Accelerates Over Time

Sponsored by: Amazon

Randy Perry Stephen D. Hendrick
December 2013

EXECUTIVE SUMMARY

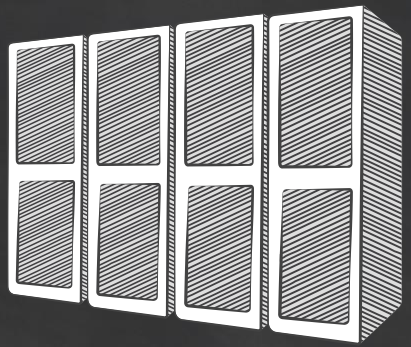
In early 2012, IDC interviewed 11 organizations that deployed applications on Amazon cloud infrastructure services. The purpose of the IDC analysis was to understand the economic impact of Amazon cloud infrastructure services over time, beyond the well-documented benefits of reduction in capex and opex. Specifically, IDC set out to understand the long-term economic implications of moving workloads onto Amazon cloud infrastructure services, the impact of moving applications on developer productivity and business agility, and the new opportunities that businesses could address by moving resources onto Amazon cloud infrastructure services. The organizations interviewed ranged from small and medium-sized companies to companies with as many as 160,000 employees. Organizations in our study had been Amazon Web Services (AWS) customers for as few as seven months to as many as 5.3 years. Our interviews were designed to elicit both quantifiable information and anecdotes so that IDC could interpret the full return-on-investment (ROI) impact of Amazon cloud

Business Value Highlights: Applications Running on AWS

- Five-year ROI: 626%
- Payback period: 7.1 months
- Software development productivity increase: 507%
- Average savings per application: $518,990
- Downtime reduction: 72%
- IT productivity increase: 52%
- Five-year TCO savings: 72%

In early 2012, AWS commissioned IDC to interview 11 organizations that deployed applications on AWS. Since this study was conducted in early 2012, AWS has introduced price reductions nearly 20 times across Amazon EC2 and Amazon S3. IDC estimated what the impact of AWS's fee restructuring would be on the organizations that participated in the 2012 study and determined that the overall fees would drop by 21% lowering the five year TCO from $909,000 to $846,000. Source: IDC Business Value of AWS Accelerates over time

Comparing TCO is not easy



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What is Total Cost of Ownership exactly and why does it matter?

Definition: **the total acquisition and operating costs** for running an infrastructure environment end-to-end

1) Comparing the costs of running an **entire infrastructure environment or specific workload** on premises or in a co-location facility versus on AWS

2) **Budgeting** and **building the business case** for moving to AWS

TCO estimates for on-premises deployments often ignore overhead costs – not a true comparison

illustrative

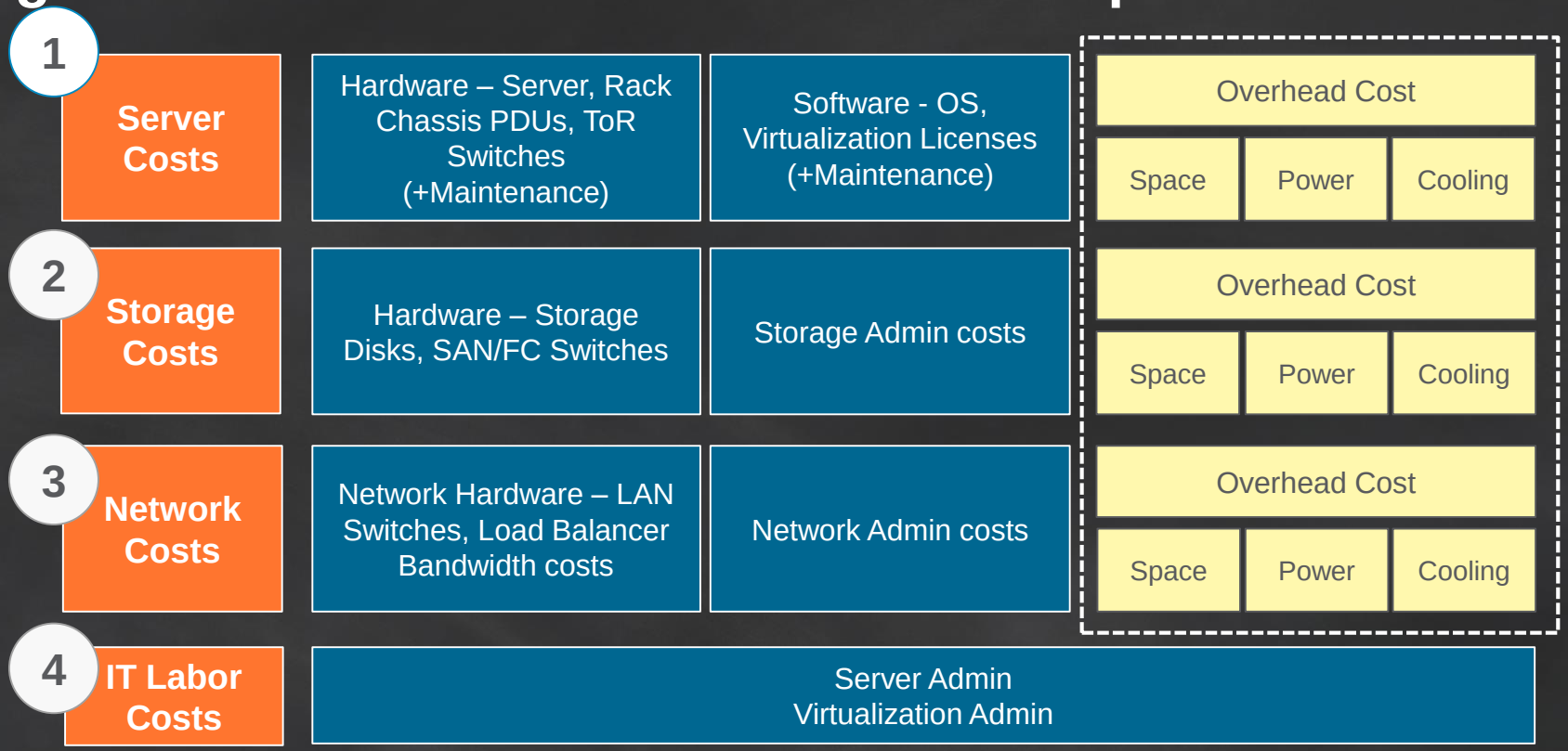
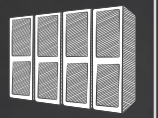
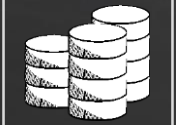
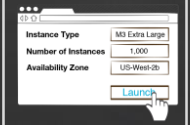


Diagram doesn't include every cost item. E.g. software costs can include database, management, middle tier software costs. Facilities cost can include costs associated with upgrades, maintenance, building security, taxes etc. IT labor costs can include security admin and application admin costs.

AWS offers services that include overhead costs in the price

	Server Network Hardware	Software OS + VMs	DC/Co-lo Floor Space	Powering Cooling	Personnel Admins	HW Maint.	Storage Redundancy	Resource Mgmt. /SW Automation	Software Defined Networking
									
amazon web services	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardware Vendor Offering	✓	✗	✗	✗	✗	✗	✗	✗	✗

TCO Example: Three Tier Web App On-premise vs. AWS

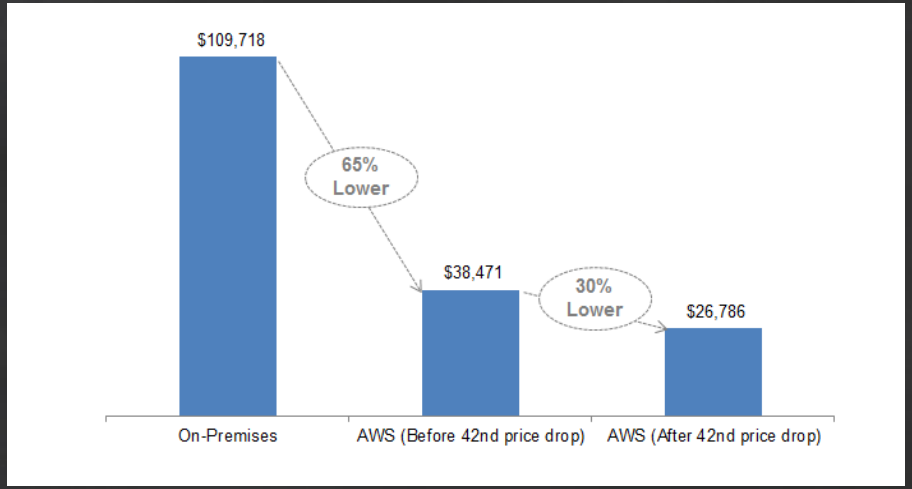
Web App Scenario Overview:

- Application serves approximately 10,000 page views / day
- Underlying Physical Infrastructure:
  - 3 web servers
  - 3 application servers
  - 2 cache servers
  - 1 load balancer
  - 1 high availability DB server
  - 100GB of storage
  - 300 GB of data transfer every month

Summary:

- After April price drop, running this Web App on AWS would save 75%
- Net impact of April price drop: Additional savings of 30%

TCO Comparison Summary – 3 Years



TCO Example: Three Tier Web App On-premise vs. AWS

Servers & Rack Infrastructure	
10 Linux Servers (1U @ $889/ server)	$8,890
Server Maintenance (@15%/yr.)	$4,000
Rack Chassis with PDU (@$3500/rack)	$3,500
PDU, dual 280V per rack (2 for HA)	$1,080
TOR 24x10GbE 48 port (@$4,800 w/ support)	$9,600
Spare Capacity Provision	$1,933
Total Rack Cost (3 Yrs.)	**$29,003**

Operating Cost (Data Center Space, Power, Cooling)	
3 Yr. Cost to operate a rack (@$1,500/rack/mo)	$54,000
3 Yr. Power/Cooling Charges	$11,858
Total Operating Cost (3 Yrs.)	**$65,858**

Networking & Storage	
Load Balancer, Firewall, and Switches	$12,851
Shared Storage	$2,005
Total Networking Cost (3 Yrs.)	**$14,816**

Total 3 Year Cost	**$109,717**

AWS Pricing for Equivalent Environment	
	April 2014
Compute	$471.41
EBS Volumes	$5,000
EBS Snapshots	$9.50
EBS IOPS	$13.18
Elastic Load Balancer	$18.30
Data Processed by ELB	$0
Amazon RDS	$131.76
DB Instances	$4.00
IOPS	$0.20
Cloud Front	
Data Transfer Out	$47.22
Requests	$7.50
AWS Data Transfer Out	$36.00
Total Cost for 3 Years	**$26,786**

Total savings of 75% over on-prem environment

In Your TCO Analysis

DON'T FORGET

- **Power/Cooling** (compute, storage, shared network)
- **Data Center Administration** (procurement, design, build, operate, network, security personnel)
- **Rent/Real Estate** (building deprecation, taxes)
- **Software** (OS, Virtualization Licensing & Maintenance)
- **RAW** vs. **USABLE** storage capacity
- **Storage Redundancy** (RAID penalty, OS penalty)
- **Storage Backup costs** (Tape, backup software)
- **Bandwidth, Network Gear & Redundancy** (Routers, VPN, WAN)

THINK BENEFITS

- **Reduced Procurement Time**
- **Right-sized Resource Provisioning**
- **Less down time, increased productivity**

DEMO – AWS Online TCO Calculator

www.awstcocalculator.com

Customer Case – InfoSpace

Wayson Vannatta,
VP of Technology

InfoSpace

Our Network

Our position in the search marketplace centers around bringing **liquidity** and **quality traffic** to our search engine partners and **differentiated content** and **monetization solutions** to end-users and partners.

SEARCH BRANDS

Our owned and operated search engines offer consumers comprehensive and relevant search results and content from the industry's most prominent search and content partners for a superior web experience.

nation Advanced Search

dogpile

excite

ZOO

WebCrawler

16+ YEARS EXPERIENCE

DISTRIBUTION NETWORK

Infospace operates a diversified network of partners that includes traditional publishers, internet service providers and software developers.

blekko

PUBLISHERS CLEARING HOUSE

iminent

TELUS

MyPoints Rewarding smart shoppers.

real

100+ PARTNERS WORLDWIDE

Where were we in 2012

Data Center Foot Print

- West and East Coast Data Centers (Washington state and Virginia)
- 65 Racks
- Contracts expiring in June and August 2013

Partner Traffic

- Growing International Traffic

Operations Staff

- 28 personnel

Our Goals

Provide
International
Exposure

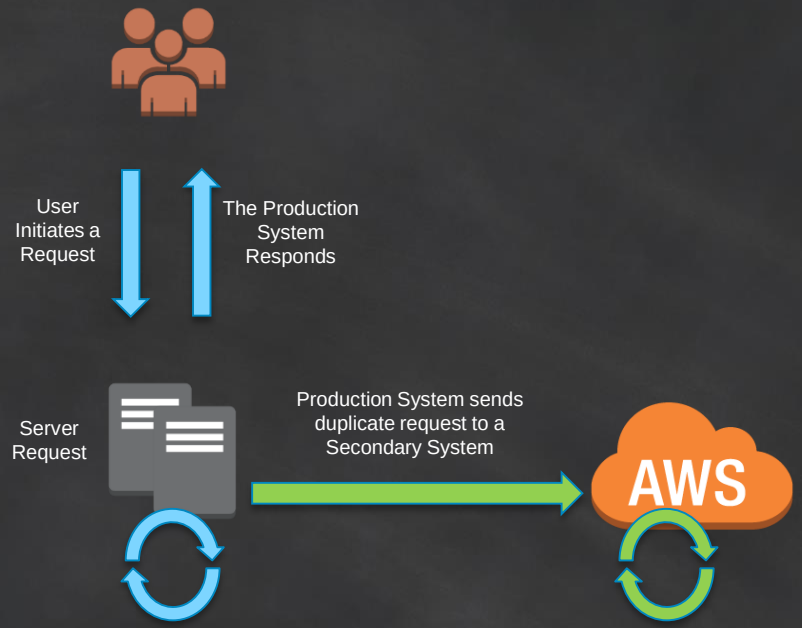
Improve
Response Time
& Availability

Reduce
Capex & Opex
Cost

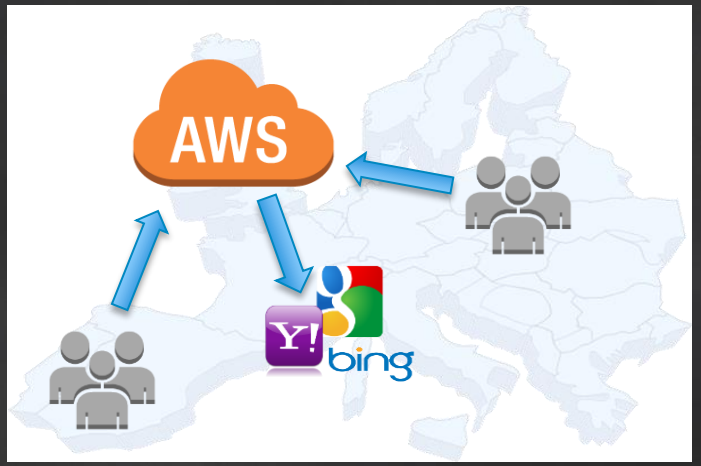
Evaluating AWS

Technical Proof of Concept

Request and Forget



International Response Times



Where are we achieving or expecting cost reductions?

CapEx Costs

2013 Servers
Storage (Performance)

2014 Routers
Load Balancers
Data Warehouse

2015 Storage
Firewalls

Opex Costs

- Data Center
- Support
- Bandwidth
- Reduced Licenses
- Resources

TCO: Data Center vs. AWS

Data Center Assets			2013		2014		2015		AWS
Server	Asset Counts Servers, Maintenance	Depreciation Value	Capex Server Refresh Cost	Opex Server Cost	Capex Server Refresh Cost	Opex Server Cost	Capex Server Refresh Cost	Opex Server Cost	AWS EC2 Cost
Storage	Asset Counts Disk Storage, Controllers, Tape Backup	Depreciation Value	Capex Storage Refresh Cost	Opex Storage Cost	Capex Storage Refresh Cost	Opex Storage Cost	Capex Storage Refresh Cost	Opex Storage Cost	AWS S3, Glacier Cost
Network	Asset Counts Routers, Load Balancers, Firewall, IDS, DNS	Depreciation Value	Capex Network Refresh Cost	Opex Network Cost	Capex Network Refresh Cost	Opex Network Cost	Capex Network Refresh Cost	Opex Network Cost	AWS ELB, VPC Cost
Software	Asset Counts Virtualization, OS, DB, Monitoring, certificates	Depreciation Value	Capex Software Refresh Cost	Opex Software Cost	Capex Software Refresh Cost	Opex Software Cost	Capex Software Refresh Cost	Opex Software Cost	AWS Cost
Bandwidth	MPLS, Internet, CDN		Opex Bandwidth Cost		Opex Bandwidth Cost		Opex Bandwidth Cost		AWS Cost

Other Unexpected Benefits

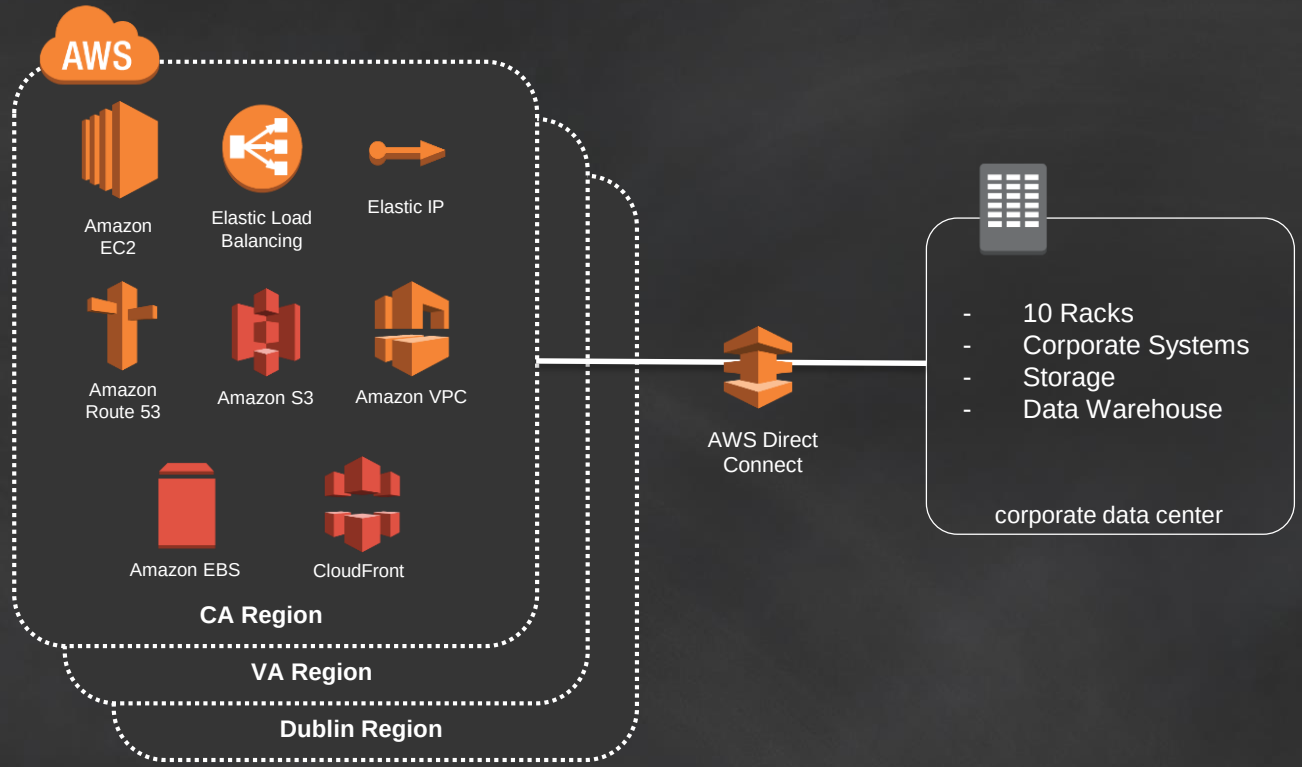
Elimination of Redundant Systems Add Up…

- Global Load Balancers
- Local Load Balancers
- Edge Routers
- Switches
- Core Routers
- MPLS Network
- Firewalls

Resources

- Closing the Service Operations Center (24x7)

Multi-Region Hybrid Cloud



Optimizing with AWS

Optimizing with AWS

Choosing the right instance types

Continuous evaluations to change instance size up or down

CloudWatch

Utilizing Reserved Instances

Reduced monthly costs by 28%

Monitoring and turning off unused instances

“Junkyard Dog”

Optimizing with AWS (continued)

Offloading architecture

Moved to Cloudfront

CloudFront

Leveraging Application Services

Including ELB, SNS, SES

Amazon SES

Amazon SNS

Leveraging AWS Tools

Trusted Advisor

The Results

The Results

Cost Savings

OpEx:

- 2014: **31% reduction**

CapEx:

- 2013: **70% reduction** (servers)
- 2014: **87% reduction** (load balancers, data warehouse, routers)

Efficiency & Performance

Reduced Response Times:

- International = 20% improvement
- Domestic = ~10% improvement

Operations Staff:

- From 28 FTE to 16 FTE

Our Future

Amazon Redshift
September 2014

Amazon Glacier
January 2015

Eliminate Data Center
April 2015

Summary

TCO

- Develop the cost estimate to include all end-to-end costs
- Make reasonable assumptions and leverage benchmarks
- Know the on-premises “hidden costs”

Cost Optimization

- Re-evaluate your architecture often
- Leverage tools like Trusted Advisor and CloudWatch
- Stay up to date with Reserved Instance modifications
- Follow documented AWS Best Practices