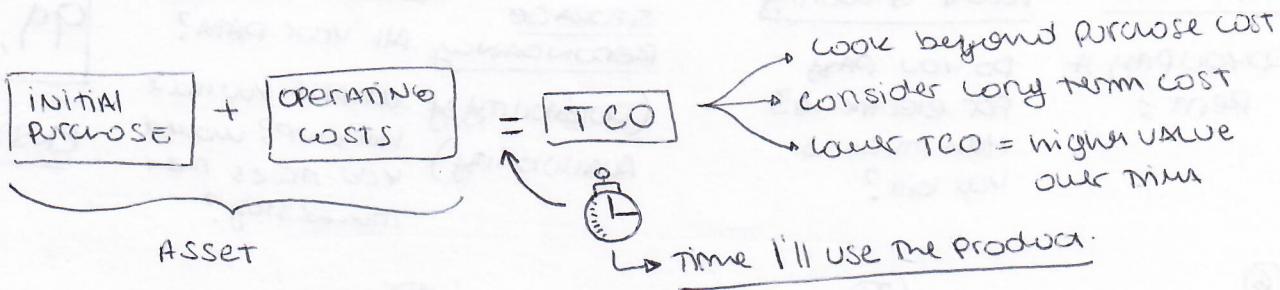


# TCO & Cloud Economics

Module 01

What is TCO? - TOTAL COST OF OWNERSHIP.

TCO IS THE INITIAL PURCHASE PRICE OF AN ASSET PLUS IT'S OPERATING COST.



Timeboxing → RESTRICTING THE PERIOD OF TIME THAT FACTORS TCO CALC.

## AWS TCO Analysis Methodology

- PRIMARY COMPARES THE COSTS OF AWS BETWEEN **AWS CLOUD** VS **ON-PREMISE COLLOCATION**

## Why AWS Lowers the TCO?

- REPLACE UP-FRONT CAPITAL EXPENSE
- ECONOMIES OF SCALE TO CONTINUALLY LOWER COSTS → A PROPORTIONED SAVING IN COSTS GAINED BY AN INCREASE LEVEL OF PRODUCTION
- PRICING MODEL CHOICE (PAY AS YOU GO)
- LOWER COSTS AS YOU gROW + PRODUCT AND SERVICE OF YOUR CHOICE THAT MEETS EVERY BUSINESS NEEDS

## AWS TCO Components

- |   |                                    |                            |
|---|------------------------------------|----------------------------|
| ① SERVERS, NETWORK HARDWARE                   | ② O.S. AND VIRTUALIZATION SOFTWARE | ③ COLOCATION AND WORKSPACE |
| ④ POWER & COOLING                             | ⑤ DATA CENTER PERSONNEL            | ⑥ STORAGE REDUNDANCY       |
| ⑦ RESOURCE MANAGEMENT AND SOFTWARE AUTOMATION | ⑧ SOFTWARE DEFINE NETWORKING       |                            |

- ① compare current resources (speed, capacity, process) with AWS resources
- ② compare virtual vs physical instances; windows and linux; virtualization included

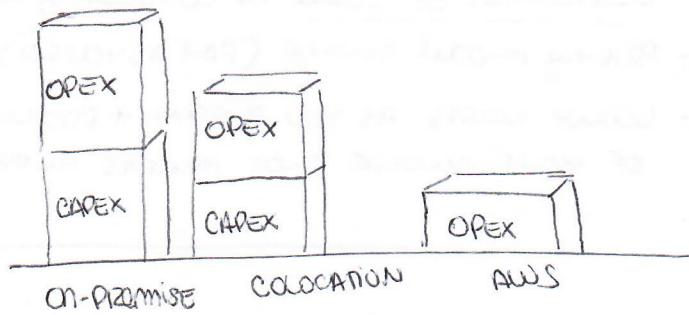
<u>Floor Space</u>	<u>Power &amp; Cooling</u>	<u>Storage Redundancy</u>	99,999... %
DO YOU PAY IT RENT?	DO YOU PAY FOR ELECTRICITY? How much is your bill?	What if you lose all your DATA? (Durability, Availability)	ENSURES!
<u>Personnel</u>	<u>Resources Management &amp; Soft. Auto.</u>	<u>Soft Define Network</u>	1 person can use multiple complex environments
ARE YOU BEING SUED? (lol.)  NO worries AWS won't sue you.	Cloud Formation	AWS VPC	

Simplify Data Collection → DATA collection template → Helps you have a complete picture of present AND future environments

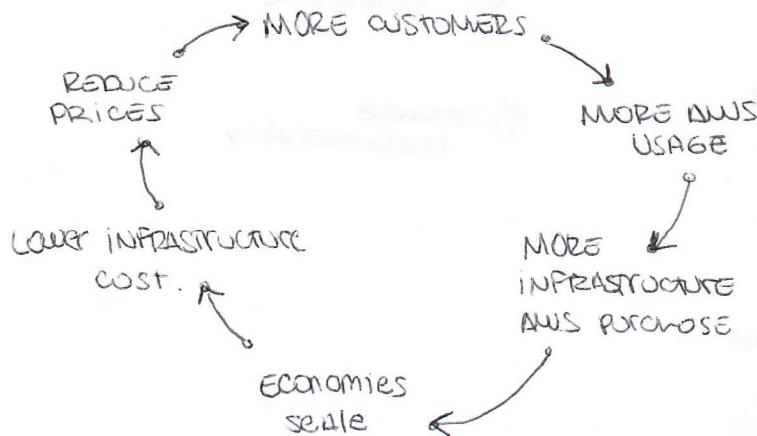
## AWS PRICING

OPEX = OPERATING EXPENSES

CAPEX = CAPITAL EXPENSES



## AWS Pricing Philosophy



## PRICING MODEL

(PRINCIPAL characteristics)

- Data Transfer.
- Storage
- Compute



DATA TRANSFER.

IN = fee

OUT = tiered pricing.

Global Solutions.

Price depends on market, taxes, and utility costs.

STORAGE

Depends on customer needs

Discounts based on usageCOMPUTE  
(EC2)

- ON-DEMAND (1)
- RESERVED (2)
- SPOT (3)
- Dedicated (4)

(1) On-Demand (per hr)

Pays what you need

(2) Up to 75% vs on-demand

All upfront

Partial upfront

No upfront

## (3) SPOT

- o bid for unused AWS EC2 instances
- o spot is set by the market. ← (Price)
- o Supply and Demand ↑
- o spot request with spec details (type, AZ, N°, max price)

(not for critical workload)

(4). Run on a single-tenant hardware not shared for hard use for other task.

- Hourly per-instance usage fee

- dedicated per-region fee.

PART 2CUSTOMIZE YOUR MESSAGE

think like IT, think li \$\$

OVERALL

Module 02

3 TARGET CUSTOMER

## Technology Owner (CTO)



SAY:

- Strategic business tech goals.
- High level budget.
- Better faster cheaper IT. serv.
- Focus on tech and cost.
- Address Risk.

- Accommodate TRAFIC as the Bussins grow.
- Volume Pricing.

## Economics Owner (CFO)

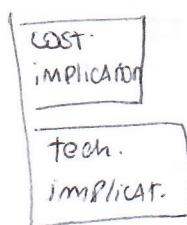
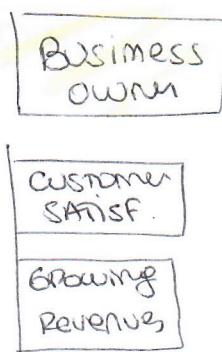


- Financial Visibility
- Service cost details.
- Informed decision making
- Cost of IT services.
- Financial and industry data
- Risk in terms of cost, time and sec.

## Business Owner



- Prod And efficiency
- Reliable, Agile And Scalable
- Meeting customer needs
- Willing to take risks.



## TCO conversation - Arguments -

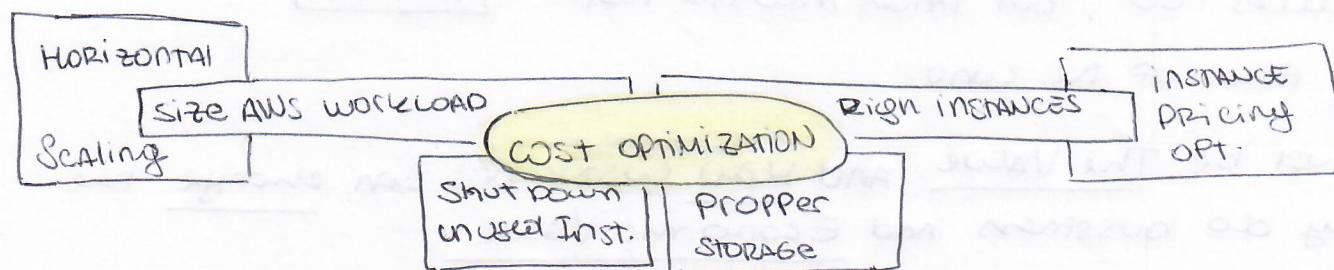
- + Which solution is really less expensive?
- + Running an APP on several SV?
- Want SV to be better cheaper and faster?
- + CFO might be worried on the growth of AWS bill → Emphasis on AWS grow cost efficiency "Scalable Economics"

### Pricing vs TCO

- ↳ Lower cost + long term analysis + benefits.
- ↳ Cheaper.

### COST OPTIMIZATION

- Customer using AWS that experience an increase in cost.
- ↳ Need to improve AWS cost.
- ↳ Need to adjust AWS budget.



### Explain Architecture Optimization

Four topics to consider:

#### CAPACITY PLANNING

- Find how much the customer provision or over provision.  
(could be in % or time)
- High CAPEX
- Limited DATA CENTER SPACE
- OVERPROVISIONED

TALK him TO AWS!

You know me  
dill!

## Utilization

- Make the customer describe their current average server utilization.
- Underutilization } You know the drill. (⊗)

## Operations

- Power And Cooling }
- High OPEX. }

## Optimization

- Is it cost-optimized arch. on your stupid useless DATA CENTER broh?
- Cost-optimized ARCH
- VARIABLE PRICING.
- Auto-Scaling.
- Reserved INSTANCES

AWS Reduces TCO , but prices must not  
be the focus of the company.

Module 03

Focus must be The Value And How customers can change the way they do business. And Economic Value

Now you can accomplish this customers cost before

- Scale up and down at a low cost.

## Agility and Economics

- CapEx Reduce
- OpEx Reduce
- Variable Costs and pricing tiers

## AWS Value Proposition

- Agility
- Platform breadth
- Global Reach
- Place of Innovation
- Cost and Flexibility

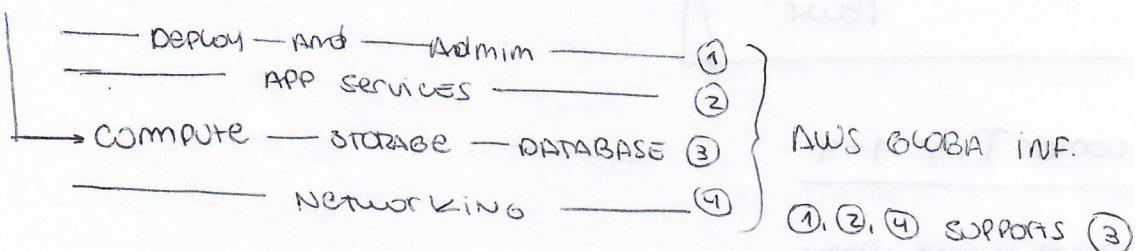
## Agility

- culture of innovation
- fail and improve quickly at a minimum cost.
- Experiment at a low cost.

## Platform Breadth

- NO longer manage their own infrastructure
- Build sophisticated, scalable apps
- Have resources to run ANY workload

## Services Core



## Global Reach

- Deploy global in minutes
- 26 Availability Zone, 51 edge loc. 6 continents, 10 regions

## Pace of Innovation

- Saves money and add value.
- Freq. updates

## Cost Saving

- Reduce upfront cost
- Utilizing economies of scale.
- Offering a range of pricing models.
- Allowing customer to save as they grow

## Data Centers & Economics

DATA CENTERS ARE Highly complex environments ecosystems.  
high-level design, components and operations

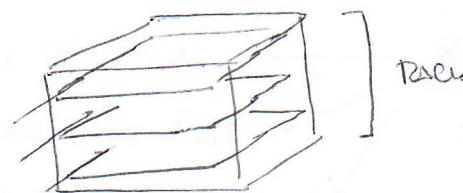
### simplify:

SOFT, power, cooling, IT staff..

A bunch of PC, networks  
and disk within a room

# The Principle of Design

## RACK Configuration



- ① - The rack-based approach utilizes modular components easily upgradable.

## Cooling Challenges



- ② - Trade off among Data center, space, power, and cooling.

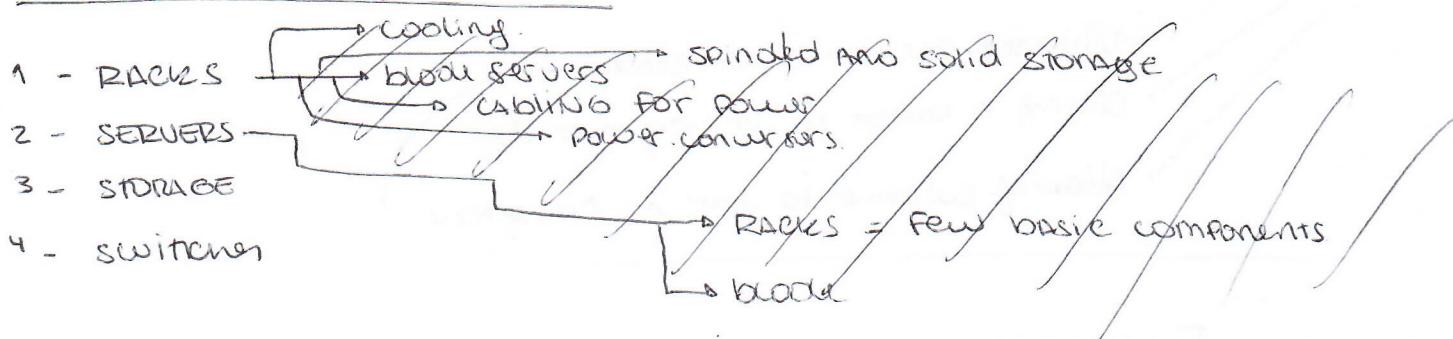
$$\begin{matrix} \text{congested} \\ \text{D.C.} \end{matrix} \Rightarrow = \begin{matrix} \text{cooling} \\ \text{power} \end{matrix}$$

## Standard Data center Tier 1-4

- Critical APAs require night uptime
- Tier 1 → lowest → server room with no redundant capacity comp.
- Tier 4 → highest → 99.9% reliability, full tolerance

TODAY most centers and customer are Tier 2, moving to 3 & 4 were costs rise substantially.

## Components of a Data center



### (1) RACKS

- cooling.
- blade servers
- cabling power.
- power converters

### (2) servers (2 types)

#### RACKS



#### Blade



## ② Servers

### RACKS

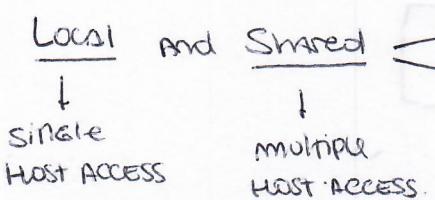
few basic components, including power supply, networking, memory and processing hardware.

### Blade

Need to be mounted in a blade enclosure that includes the power supply and networking.

The average RACK-server operates at 75% capacity. And occupies 30 square feet of space.

## ③ Storage (2 primary types)



3 types shared:

### 1 SAN (Storage Area Network)

Remote storage that looks like a SCSI block device

### NAS (Network Attached Storage)

The server attached to disk enabling remote hosts to mount files directly on the server.

### iSCSI

Operates like a local SCSI that you would find on your PC or laptop.

## NETWORK AND STORAGE switches

### Network switches

Backbone of data center communication and infrastructure

### Storage switches

Connect SV to storage.

## Model DATA CENTERS Costs

### Additional Costs

#### Servers

soft. and hard

#### Storage

SAN and  
PISCS.

#### Network

WAN CAPACITY

each one  
get a +\$  
for IT ops.

\$400 for square foot Tier-4

\$600 Tier-1

### Driven Peaces

- CAPACITY WASHED

## Mismatch and Payment Cycles

Life cycle of components mismatch and payments cycles result in a higher TCO.

### STATS

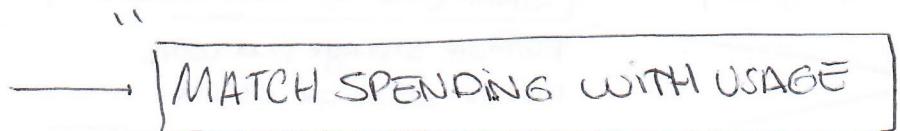
30% of datacenters will face constraints within one year.

- Run out of power, cooling, floor space, demand increasing

### Customers are paying for

- Unuse assets + cost associated with them

with AWS



## Deliver the Amazon AWS

### TCO Message

Everything is Bundled.

HARD	✓	✓	✓	✓	✓
	✓	X	X	X	X

Module 05

- CREATE NEED AND URGENCY
- SHOW HOW TO SAVE MONEY with AWS.
- ESTABLISH TRUST.
- GENERATE INTEREST.

### Customize your TCO Message

- To suit customer needs
- Address their concerns.
- Gather info.

ROI = Return on investment

# How AWS Reduces TCO

6

## Upfront CapEx.

## Economies of Scale

## Scalability

## Pricing Models

Low Variable Cost

-

① ~~Same capacity - 24x7 - 99.9%~~

② ~~Same capacity - 24x7 - 99.9%~~

③ ~~Same capacity - 24x7 - 99.9%~~

Demand Pricing, Reserved Instances, Spot Pricing, Dedicated Instances

## TCO Benefits Increases over Time

3X AFTER 36 months

6X AFTER 60 months

## Amazon Tradition

- Lowest Price for customers
- Price Reduction.
- Cost Decreases over time.
- No Extra Expenses

## Pricing Philosophy

- PAY AS YOU GO
- PAY FOR WHAT YOU USE
- PAY LESS WHEN YOU RESERVE CAP.

Module 06

Lower TCO AS AWS GROW.

AWS PASS SAVINGS TO THEIR CUSTOMERS.

↳ It has regularly AND REPEATEDLY lowered the prices of AWS services

## Tiered Pricing

- ↳ The more customer use the less they pay for Gigabyte



## Reserved Instance Pricing

- ↳ Discounts up to 75%.
- ↳ No upfront, partial upfront, All upfront.
- ↳ Can be purchased and provisioned within minutes.

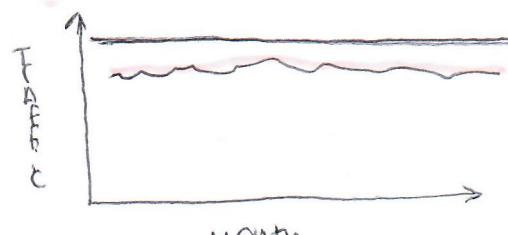
↓  
significantly lower price than on-premises.

## AWS TCO Modeling

- When determining TCO, AWS considers the nature of the APP and historical data

### USAGE PATTERNS

- Steady state (1)
- Spiky but predictable (2)
- ① Uncertain and unpredictable. (3)



← You pay for this traffic in case of spikes.

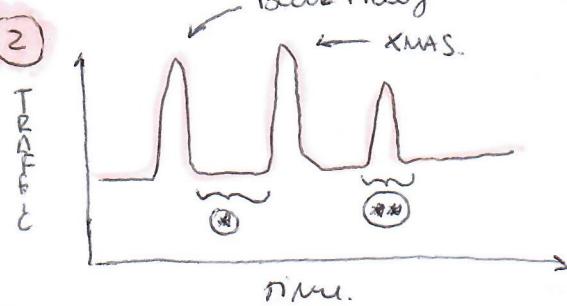
### Solution (AWS)

→ Reserved instances plan.

↑ most cost-effective sol

(①) 75% savings

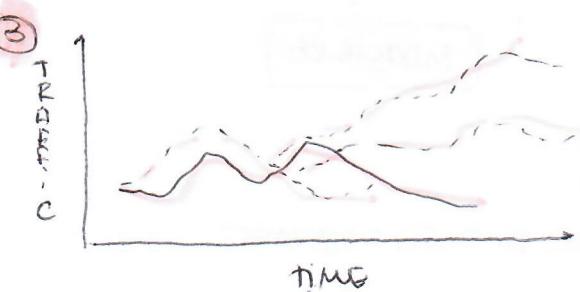
(②) lower cost than traditional cost



### Solution

Reserved (steady traffic)

+ On-demand Instances.



→ NO PATTERNS.

NO upfront commitment.

### Solutions

ON-DEMAND

PAY ONLY FOR what you USE

75% ON SAVINGS.

80%

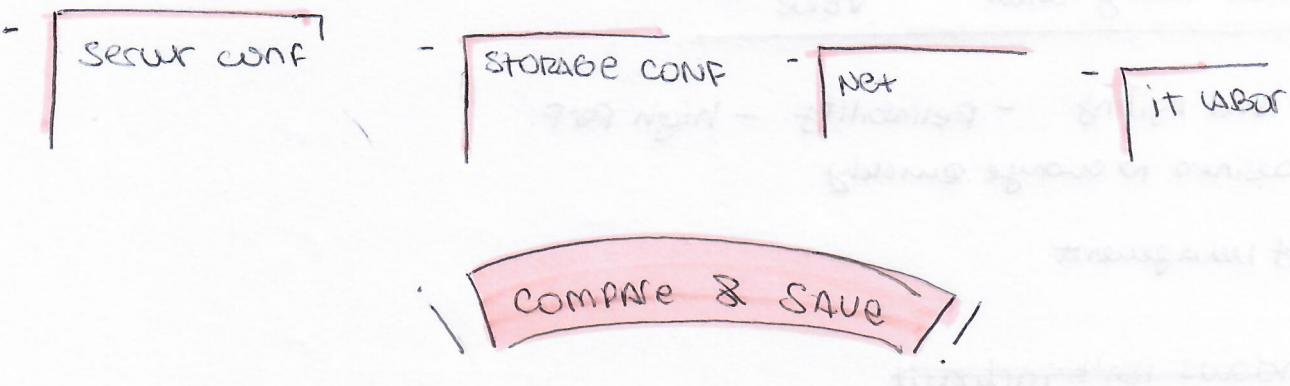
AWS TCO  
MODELING.

# AWS CALCULATOR

- What kind of environment?

- ② On-Premises ③ colocation.

- ideal Region?



## Presenting the Results

- Yearly and three years savings
- Match customer ref to AWS for lowest **TCO**.

## 3 Graphics for

Server      Storage      Network

Module 07

## Discussion Topics

- Three or Five Years Amortized cost
  - Reserved Instances
  - Volume Discounts
- Tiered Pricing  
 Cost benefits of automation (anticipate demand)  
 (No longer need personnel for routine processes)  
 (Ratio of vms to full-time employee)

COST SAVINGS

## COST SAVINGS

- Power and cooling
- Admin
- Rental or real state
- VM licensing or maintenance
- Redundancy

## • COST OF UNUSED CAPACITY

### • DISAPPOINTING CLIENTS

### • INCREMENTAL COST OF ADDING SERVERS

Tying that thing called "Value"

- Speed and agility
- Reliability.
- High Perf.
- Allow business to change quickly
- Simplify management.

~~Why Windows isn't included~~

## Obstacles

Module 08

No need → Agility

No money → cost less

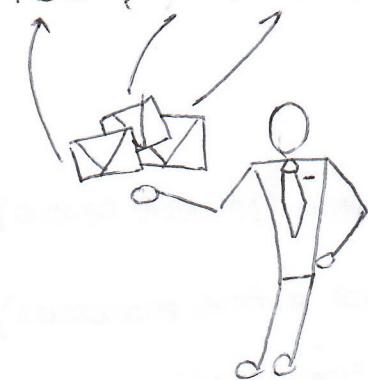
No hurry → Can't hurry quickly

No desire → X

No Trust → TCO Analysis is built collaborative with clients

## The Decision Makers

TCO, CFO, CEO



## 5 REASONS why can failed

- 1 - TOO LATE with the discussion
- 2 - NOT A TRUE TCO
- 3 - Low-end challenge. (me) → (Why not grow?)  
↳ Reserved Instances
- 4 - Fows on pricing → (derived <sup>very clear</sup> cost comp)
- 5 - Didn't understand RI pricing  
↳ Emphasis in Pricing Models

## 4 WINS

1 - cross functional

1 - intro early with numbers

2 -

2 - TCO overall value proposition

3 - TCO with customer.

# Addressing Common Issues

8

Long-Term Numbers

Power overhead cost

Assumptions

Labor cost

Three Years Reserved Instances

## Long-Term Numbers

Although short term could seem too little for ~~TAKING THE RISK~~

- AWS
  - GAINS will ACCELERATE over time
  - AT 36 months, ORGANIZATIONS realized \$3.50 in Benefits for every USD invested
  - AT 60 months \$8.40

## Costs

CUSTOMER → Power and overhead don't actually cost much.

AWS → Power consumption budget can be hidden in other budget layers within the company

## Assumptions

- TCO Assumptions are not accurate ← CUST.
- Based on industry research.

He might be  
Right!

## Labor

- IDC Revealed that IT productivity increased by 82% with AWS.
- Customer might not want fire employees, → Focus on customer satisfaction.

## Three Years RI

- Customer PAYS A LOW, one-time fee AND RECIPIENT DISCOUNT.
- Customers can predict.
- TYPICAL PAYBACK PERIOD IN AWS IS LESS THAN A YEAR.
- CAPACITY CAN BE SOLD ON THE RI MARKETPLACE

