Total cost of ownership (TCO)

AWS CLOUD CONCEPTS

Hatim Khouzaimi
Data scientist

datacamp

AWS cloud value framework

Cost Savings (TCO)

What is it?

Infrastructure cost savings/ avoidance from moving to the cloud.

Staff Productivity

What is it?

Efficiency improvement by function on a task-by-task basis.

Operational Resilience

What is it?

Benefit of improved availability, security, and compliance.

Business Agility

What is it?

Deploying new features/ applications faster and reducing errors

Total cost of ownership (TCO)

- The cost of owning and operating servers and data centers (for cloud vs on-premises cost comparison)
- Moving to the cloud **introduces a new cost structure**, including:
  - Compute
  - Storage
  - Networking
- And **eliminates on-premises related costs**, such as:
  - Space
  - Power
  - Cooling
  - Physical security

Economies of scale

> In microeconomics, **economies of scale** are the cost advantages that enterprises obtain due to their scale of operation - *Wikipedia*

- Reduced data center costs due to **massive investments** from AWS
- Important **CapEx (Capital Expenditures) reduction** compared to on-premises configurations

Optimizing costs

- Leverage the **pay as you go** model
  - Allocate the necessary resources only
  - Deallocate resources when they become unnecessary
- Leverage the different **pricing plans**
  - Adapted to the use case
  - E.g. renting crucial virtual machines for long periods vs. on-demand
- Use AWS **managed services**
  - E.g. using Amazon Aurora for relational databases or Amazon Redshift to host data warehouses is 10x less costly than on-premises alternatives.

Measuring cost optimization

- Tools:
  - AWS Cost Explorer
  - AWS Cost and Usage Report
  - AWS Budgets
- Resource costs comparison:
  - Cloud vs. on-premise
  - Optimization on the cloud (ex: most adapted tools, leveraging pricing plans, etc)
- Average IT infrastructure spend per user

Average cost savings on AWS

Overall spend per user

27%

Reduction in **overall spend per user**

Decreases as customers mature and scale on AWS

42%

Reduction in **overall spend per mature user**

12%

Lower on AWS
vs. multi-cloud customers

The case of General Electric Oil & Gas

52% TCO reduction

after moving 500 applications to AWS (2016)

The case of CMS

3x more servers

with the same cost vs. on-premises (2020)

The case of Standard Chartered

60% reduction in computations costs

leveraging AWS EC2 Spot (2020)

Let's practice!

AWS CLOUD CONCEPTS

Staff productivity

AWS CLOUD CONCEPTS

Hatim Khouzaimi
Data Scientist

datacamp

On-premises data centers staff efforts

- Planning, acquisition and maintenance of the **physical data center**:
  - Power cabling
  - Telecommunication cabling
  - Ventilation and cooling
  - Electronic security systems
- Continuous **server-related efforts**:
  - Provisioning
  - Monitoring
  - Patching/updating
  - Securing

Staff productivity on AWS

- Infrastructure **heavy-lifting performed by AWS**
- Development teams focus on:
  - The product
  - Its features
  - The value brought to customers
- Launch and manage **more resources**
- Manage **more important volumes of data**
  - Leveraging Big Data services (DynamoDB, Kinesis...)

Improve staff productivity

- First productivity jump by migrating to the cloud
- Further improvements by adapting applications to the cloud:
  - Rearchitecting and refactoring
  - Leveraging managed services
- Further improvements by implementing modern development and operations methodologies and tools such as:
  - Agile
  - DevOps
  - Containers

Measuring staff productivity

- VMs managed per administrator
- Amount of data managed per administrator
- Time of server configuration

Average staff productivity improvement on AWS

Cloud improves IT efficiency

68%
increase in TB managed per admin

58%
increase in VMs managed per admin

With larger gains for re-architected applications

154%
increase in TB managed per admin

148%
increase in VMs managed per admin

The case of Sage Group

500 hours of server configuration

saved yearly after migrating to AWS

The case of Unilever

75% time to market reduction

focusing on innovation rather than infrastructure

The case of the Kellogg Company

AWS servers deployed in 1 hour

vs. 8 weeks on-premises

Let's practice!

AWS CLOUD CONCEPTS

Operational resilience

AWS CLOUD CONCEPTS

Hatim Khouzaimi
Data Scientist

datacamp

Operational resilience

- Operational resilience domains (Gartner):
  - Security (cyber and physical)
  - Safety
  - Privacy
  - Continuity of operations
  - Reliability
- Leveraging AWS:
  - Built-in security technology and data encryption (e.g. AWS KMS)
  - Data center redundancy through availability zones
  - Stronger service-level agreement (SLA)

Improve operational resilience

- Migrating as much components as possible to the cloud to benefit from
  - Physical and virtual security
  - Redundancy
  - etc
- Security alerts using AWS CloudWatch
- Account activity tracking using AWS CloudTrail and regular auditing
- Deployment automation using AWS CloudFormation
- Leverage tools such as AWS CodePipeline for continuous delivery

Measuring operational resilience

- Application downtime
- Number of overall incidents
- Number of specific incidents
- Content access:
  - Stability of delays
  - Bounce rates
- Failover delays
  - The failover is the ability to **switch to a backup system**.

Average operational resilience improvement on AWS

57%
Decrease in **downtime**

32%
Decline in **critical (P1/P0) incidents**

39%
Decrease in **mean time to restore (MTTR) from critical (P1/P0) incidents**

The case of MedStar Health

MedStar Health

5 minutes of downtime

monthly, instead of 2 hours before migrating to the cloud

120 ms for page download

instead of 1.5 seconds on-premises

The case of Intuit Mint

1 minute for database failover

instead of 30 minutes on-premises

200% website traffic increase

after migrating to AWS

The case of Viskase

VISKASE®

~100% SLA

after migrating to AWS

1 hour to restore SAP solution

instead of 2 days on-premises

Let's practice!

AWS CLOUD CONCEPTS

Business agility

AWS CLOUD CONCEPTS

Hatim Khouzaimi
Data Scientist

datacamp

Business agility

- Enhancing product development by:
  - Quickly adapting to the market: fast new feature/application deployment
  - Reducing errors
- By leveraging AWS, no need to provision new physical resources to try new ideas:
  - Quick and cost-efficient allocation/deallocation of resources
  - Low cost of failure
  - Better use of innovation budget, more testing and learning

Improving business agility

- Test new ideas directly on AWS
  - Flexibility
  - Reduced exploration costs
- Immediately shut down resources for inconclusive ideas
  - Reduce the cost of failure
- Encourage teams to explore on the cloud more and escalate problems
- Implement agile methodologies (Agile, DevOps, etc)

Measuring business agility

- Time to market for new features/applications
- Code deployment frequency
- Time to deploy new code
- Overall time for:
  - Development cycles
  - Data manipulation cycles

Business agility improvement on AWS

37%

Decrease in
time to market

343%

Increase **in code deployment frequency**

The case of 3M (Health Information Systems)

Minutes of server provisioning

instead of 10 weeks on-premises

Code deployment every week

instead of once every 6 weeks before migrating to AWS

The case of the National Bank of Canada

1 minute data manipulation processes on AWS

took days on-premise

Hours of post-trade analytics

instead of weeks on-premises

NATIONAL BANK OF CANADA

The case of MediaTek

MEDIATEK

50% faster development cycle

after migrating to AWS

Let's practice!

AWS CLOUD CONCEPTS