Lecture 11: Clouds
Applied Cloud Computing

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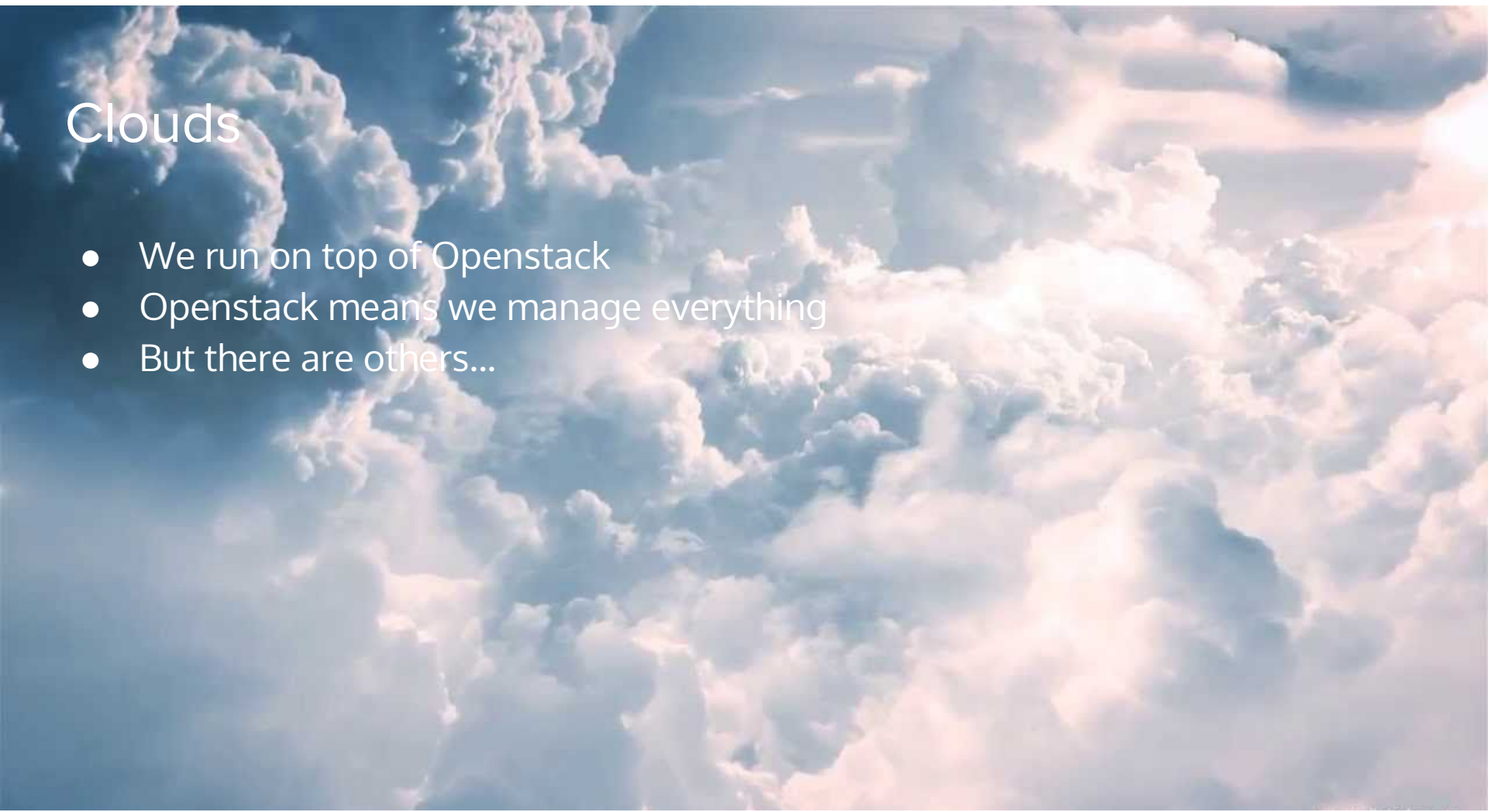
How was research?



Clouds

- We run on top of Openstack
- Openstack means we manage everything
- But there are others...

The Giants

The Giants


amazon
web services
Google Cloud Platform
Microsoft
Azure

The Giants

Google Cloud Platform

Amazon Web Services (AWS)

- The largest by far of the public clouds
  - You use it every day and don’t even know it
  - Netflix, Reddit, Spotify, and millions others
- When it goes down, the half of the internet goes down

AWS Offerings

Compute
EC2
EC2 Container Service
Lightsail
Elastic Beanstalk
Lambda
Batch

Storage
S3
EFS
Glacier
Storage Gateway

Database
RDS
DynamoDB
ElastiCache
Redshift

Networking & Content Delivery
VPC
CloudFront
Direct Connect
Route 53

Migration
Application Discovery Service
DMS
Server Migration
Snowball

Developer Tools
CodeCommit
CodeBuild
CodeDeploy
CodePipeline
X-Ray

Management Tools
CloudWatch
CloudFormation
CloudTrail
Config
OpsWorks
Service Catalog
Trusted Advisor
Managed Services

Security, Identity & Compliance
IAM
Inspector
Certificate Manager
Directory Service
WAF & Shield
Compliance Reports

Analytics
Athena
EMR
CloudSearch
Elasticsearch Service
Kinesis
Data Pipeline
QuickSight

Artificial Intelligence
Lex
Polly
Rekognition
Machine Learning

Internet Of Things
AWS IoT

Contact Center
Amazon Connect

Game Development
Amazon GameLift

Mobile Services
Mobile Hub
Cognito
Device Farm
Mobile Analytics
Pinpoint

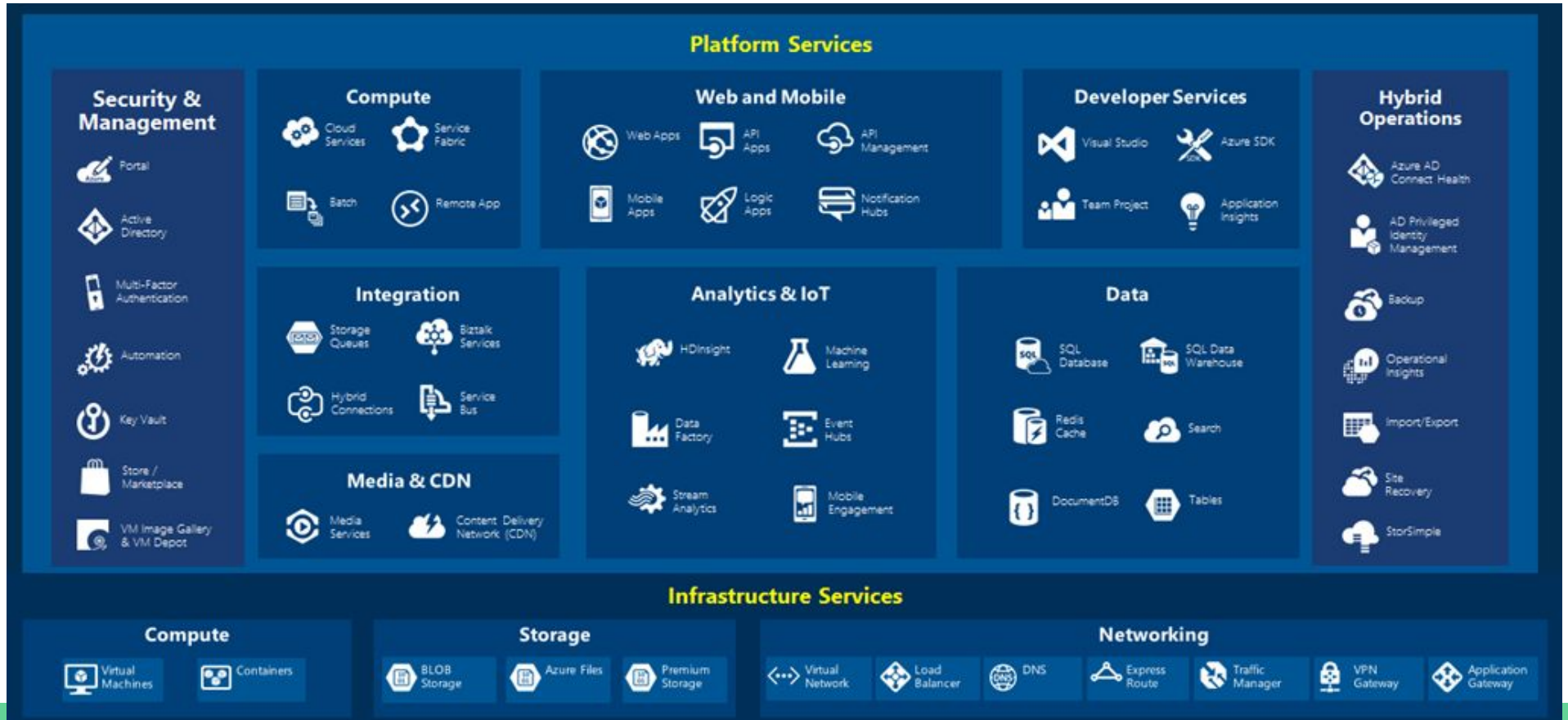
Application Services
Step Functions
SWF
API Gateway
Elastic Transcoder

Messaging
Simple Queue Service
Simple Notification Service
SES

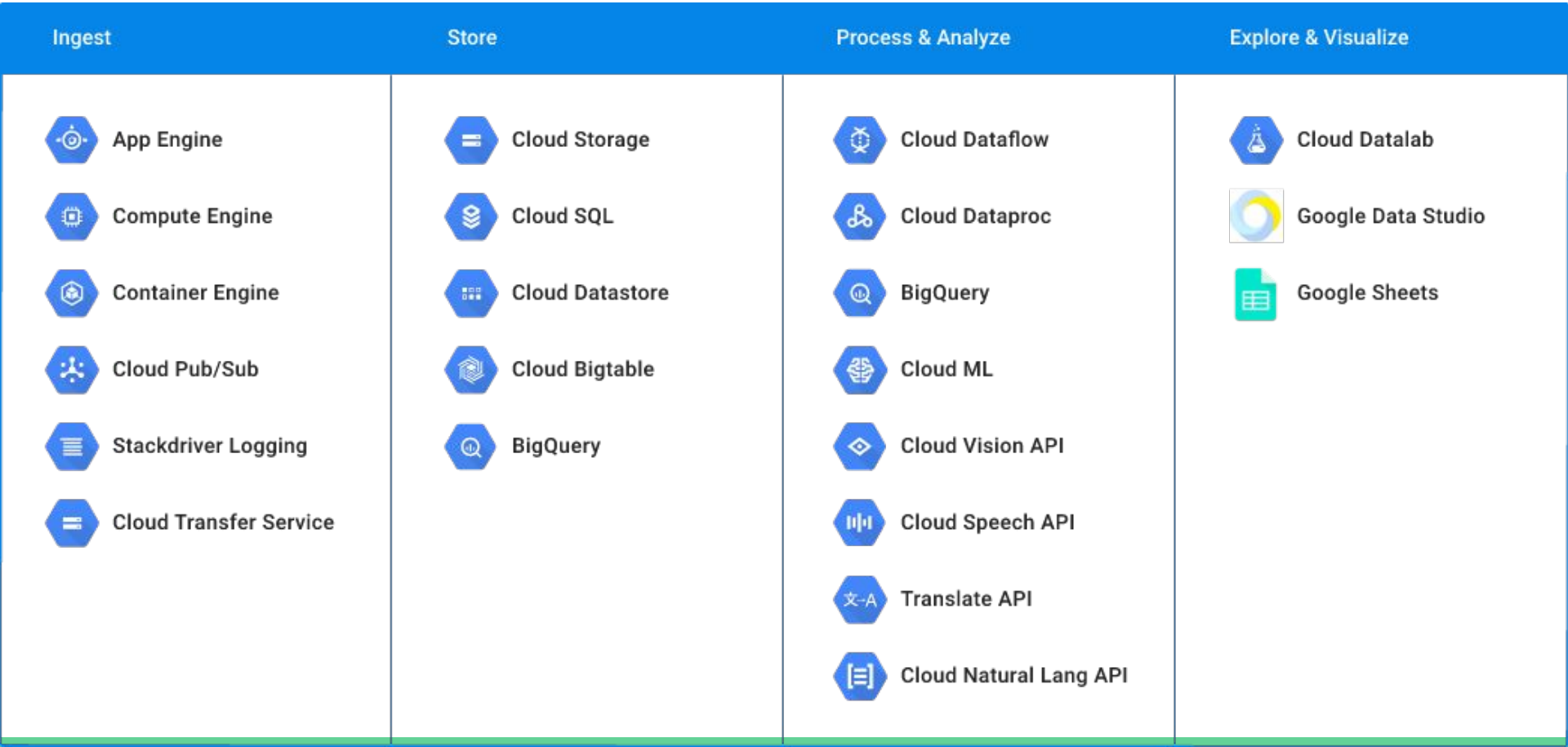
Business Productivity
WorkDocs
WorkMail
Amazon Chime

Desktop & App Streaming
WorkSpaces
AppStream 2.0

Azure Services



Google Cloud Platform



Feature Parity

- All clouds try to compete on features so they all end up having extremely similar feature sets

Virtual Machines

AWS Elastic Compute Cloud (EC2)

- The basic one which all of these clouds provide are Virtual Machines
- AWS has everything from the tiny to gigantic monsters
  - T2.Nano: 1 VCPU 512 MB Ram
  - X1.32xlarge: 128 VCPU 2000 GB Ram (One of these is more powerful than our cluster)
- Everything is billed by the hour
- They have GPUS!
  - Can do deep learning
- Most are fixed price per hour but there is a price auction for unused machines
  - Lets you do stuff super cheap as long as your program can handle getting a shutdown notice within 30 seconds

Azure Virtual Machines

- Similar to AWS
- GPUs
- Not as many CPUs (Max is 32 currently)
- Not as much ram (Max 800 GB currently)
- But you probably will not hit these limits

Google Compute Engine

- Provides VMs
- Largest server is 64 VCPU, 416 GB Ram
- Provides custom sized machines
- Cost is per minute!!

Storage

- AWS Simple Storage Service (AWS S3)
  - Massive storage, a ton of the internet stores all their content here.
    - Imgur
- Google Cloud Storage
- Azure Storage

Hosted Data Processing

- Hosted Hadoop, Spark, HBase, Presto, Hive clusters
- Does all the management for you
- Is extremely reliable (more than our current cluster sadly)

- Amazon Elastic Map Reduce
- Microsoft HDinsight
- Google Dataproc

Databases

- Let the clouds manage your database hosting
  - Does create tables and stuff for you, just the stuff below it
- AWS
  - DyanamoDB
  - Relational Database Server (RDS)
- GCP
  - BigTable
  - BigQuery
  - CloudSQL
  - Spanner
- Azure
  - MSSQL
  - DocumentDB

Unique Features

- GCP
  - CloudSpanner
    - A planet distributed database
    - CP System
    - But not really...
    - They changed the rules
  - Tensor Processing Unit
    - Do deeplearning in hardware
- AWS
  - Absurdly large feature set
  - FPGAs

Technical Reports

- Next week your rough draft is due
- Should be 4-6 pages
- You should use our template
- Your rough draft is not an outline, it’s a paper. We will grade it.