



# On the wings of SREs; JPMorgan Chase's journey into the cloud

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SRECon23 Americas



# Hi, I'm Fred

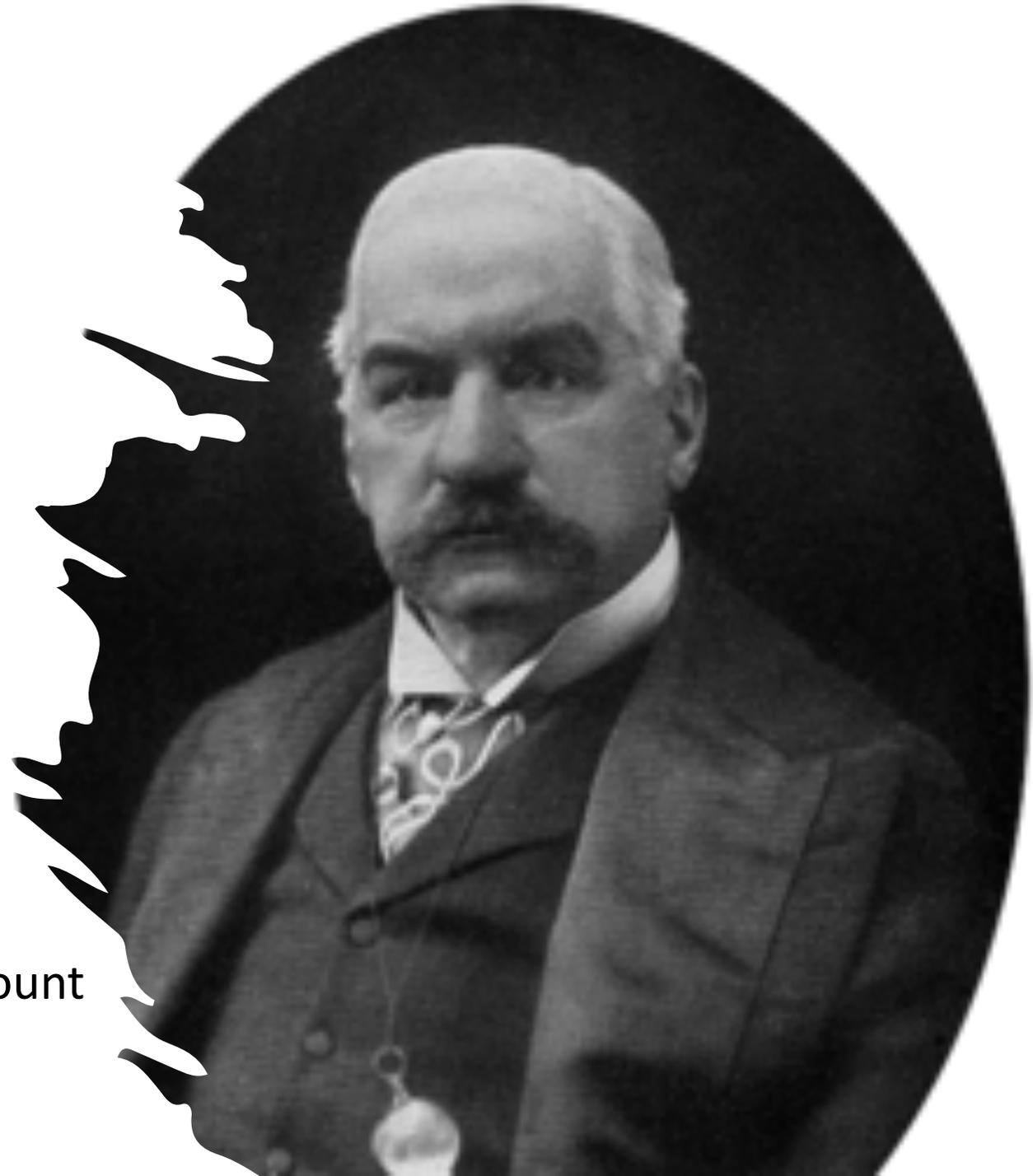
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- Executive Director, SRE Observability
- Writing software, operating production for 20+ years
- Nagios, Zabbix, top, vmstat, dtrace, \$vendors[0..n-1]
- Histograms, TSDBs, SLOs, Latency
- Opinions and statements in this talk are my own



# Global Technology at JPMorgan Chase

- 57,000 technologists, 60 countries
- \$14B annual tech spend
- In house systems built over decades of work
- Security is table stakes
- Reliability (availability + correctness) is paramount





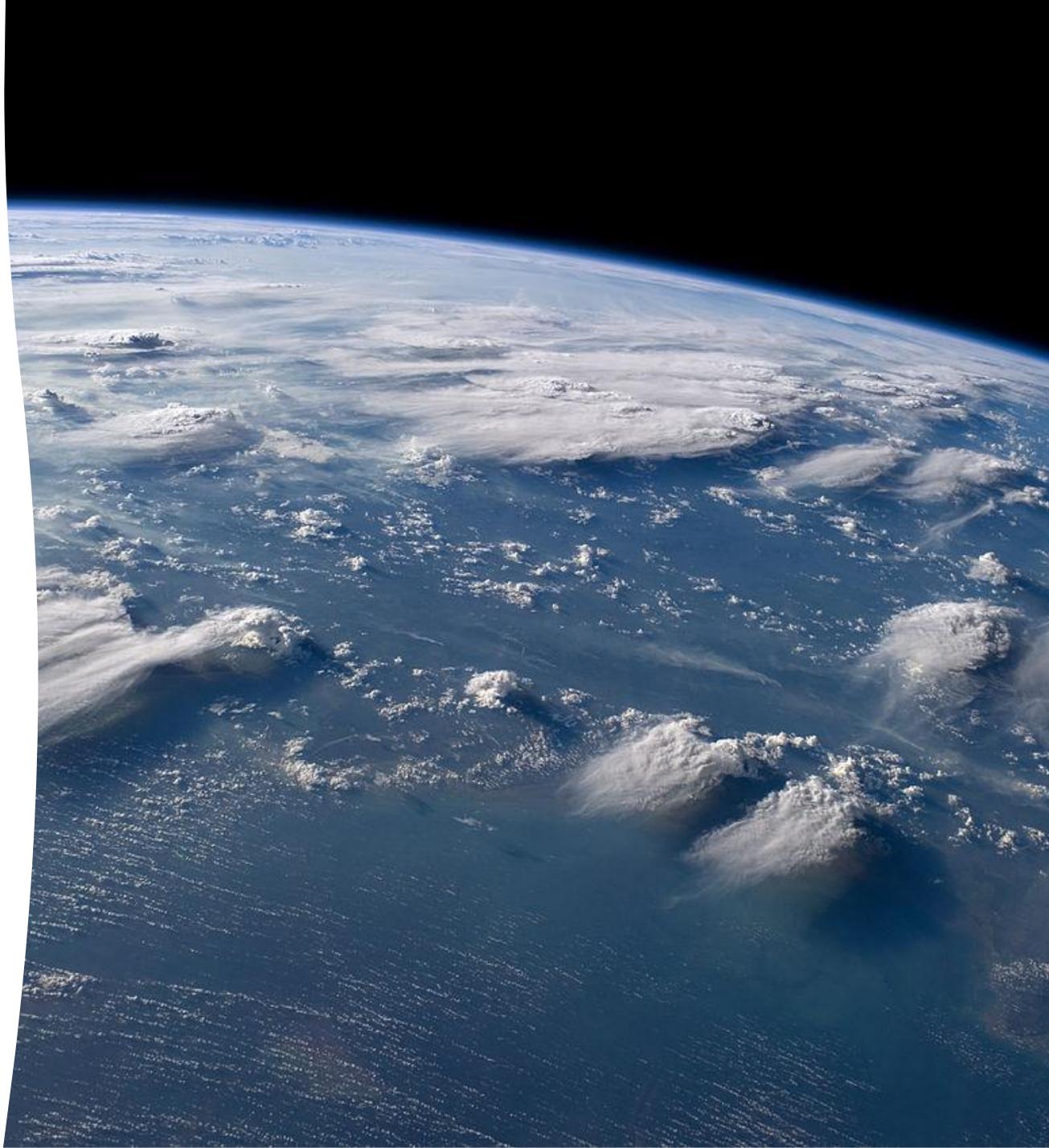
# JPMorgan Chase Digital Transformation

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- 2022 annual tech spend increase by over 25% to \$14B
- “Digital products are now table stakes for consumers”
- Initiative from leadership to transition architecture and operations to the public cloud
- Regulations demand attestation to robust security

# JPMorgan Chase Digital Transformation

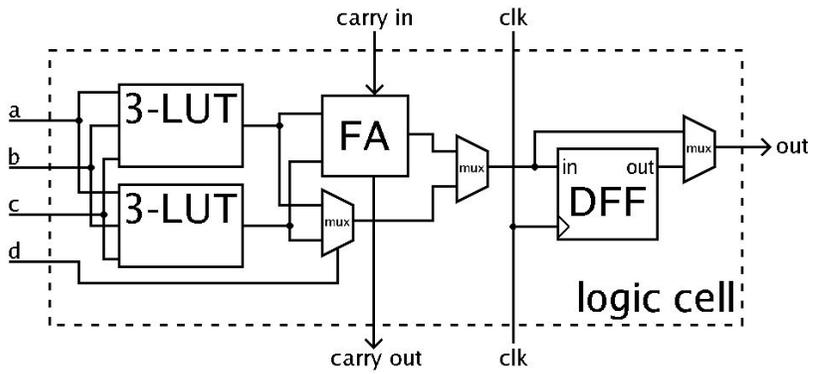
- Financial services company for 224 years
- Hired thousands of software eng, data science, cyber, cloud computing each year
- Combine tech industry expertise with financial services domain knowledge
- Tech empowers movement of \$10T/day
- SRE function created as a catalyst



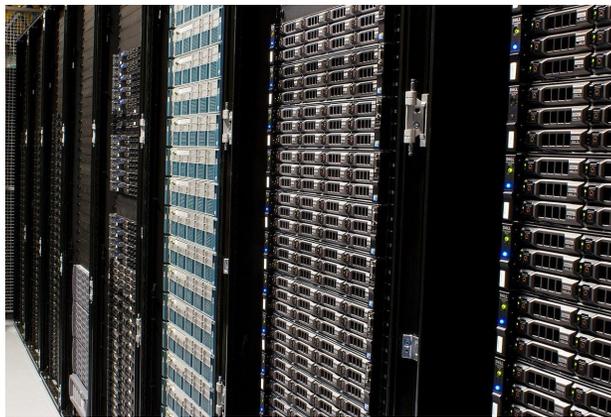


## Operating at Scale

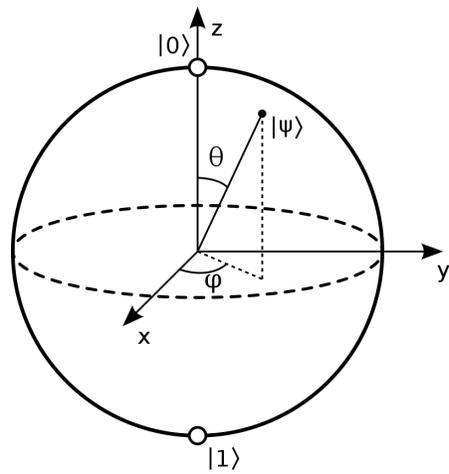
- Multiple lines of business, multiple orgs within
  - Corporate & Investment Bank
    - Markets, Equities, Sales & Research
  - Commercial Bank
  - Asset & Wealth Management
  - Consumer & Community Banking
- Multiple SRE teams; per org, per LOB



FPGA



Rackmount Servers



Quantum Computing

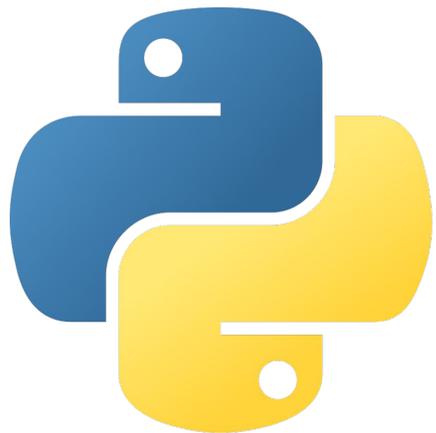


Public Cloud



Mainframe

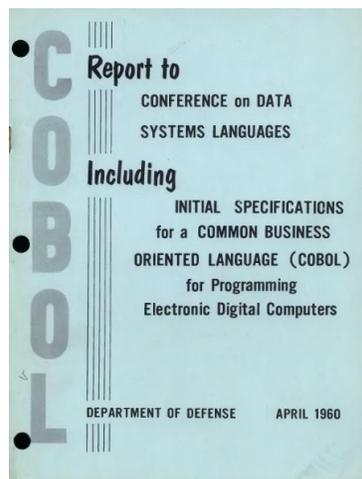
# Compute Landscape



LaC



.net



GO



Non-Exhaustive Programming Landscape



## Technology Estate

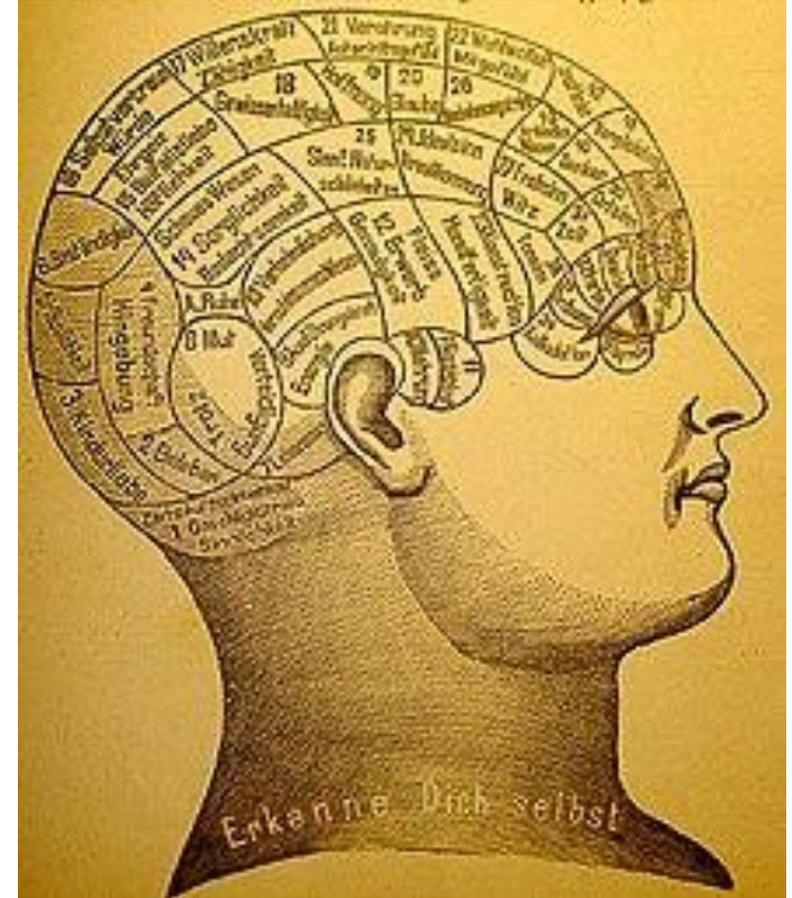
- 60k+ Applications
- 500 PB Data Storage
- 270k virtual workspaces

# Applying the SRE mindset



Pre 2023

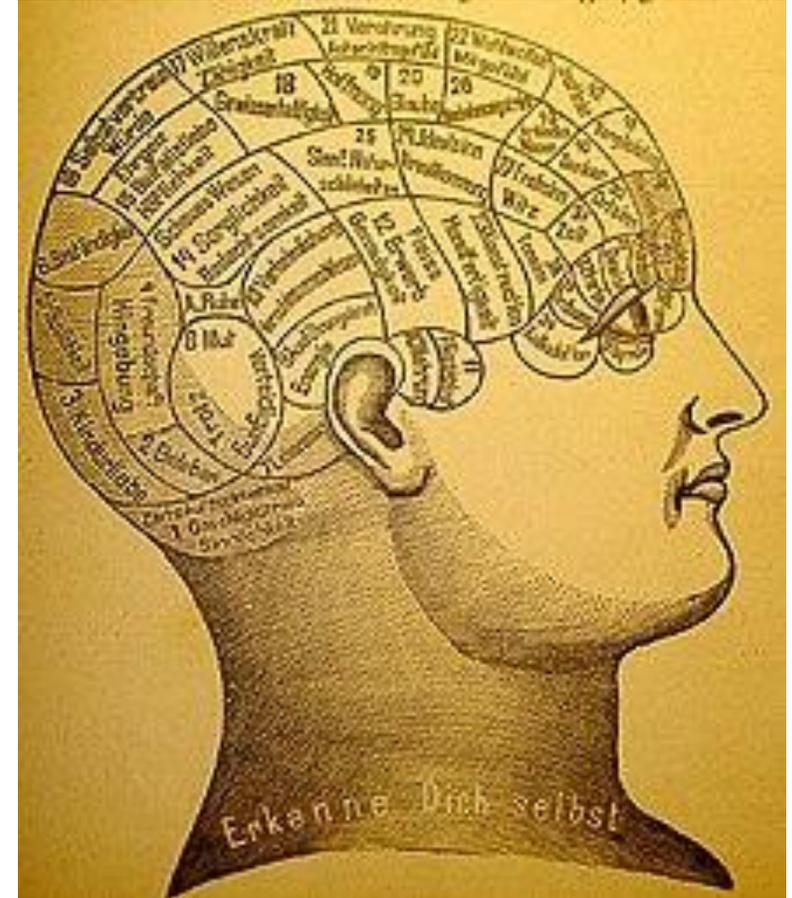
A journey from 100 public cloud apps to 500



# Applying the SRE mindset

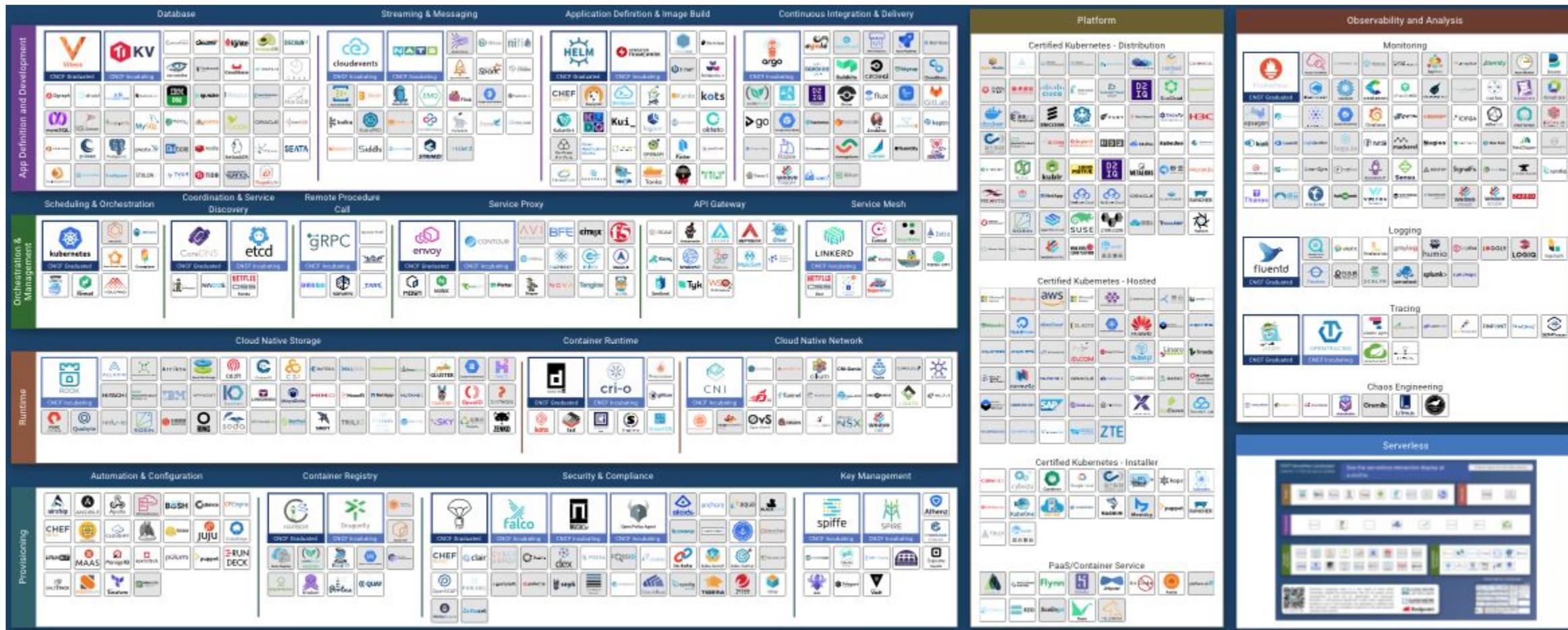
SRE at JPMorgan Chase is

*Software methodology applied to web operations to solve problems at scale*



# Challenge #1

## Mapping legacy on premise systems to a cloud native landscape



\* Compiled by the Cloud Native Computing Foundation (CNCF)

# Challenge #1

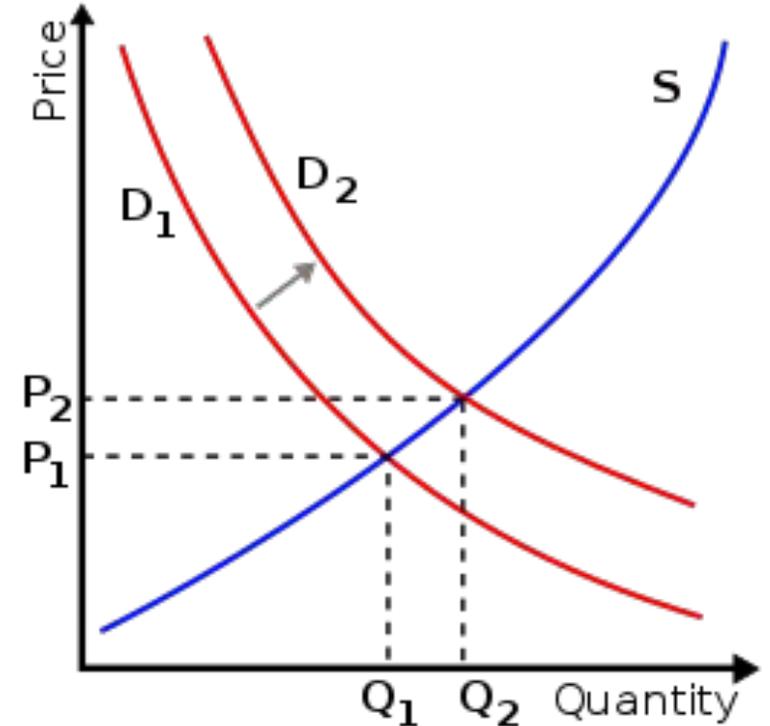
## Issue 1: Resource Management



On premise approach – static resource capacity management



Cloud native approach – resource usage optimization in an auto-scaling environment



# Challenge #1

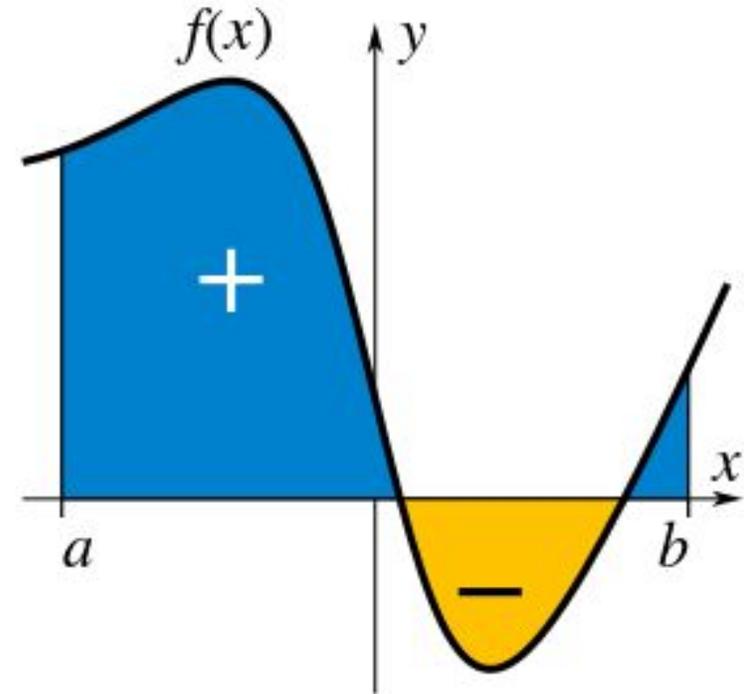
## Issue 2: Reliability Measurement



Incident focused approach – how many incidents did we get this time period

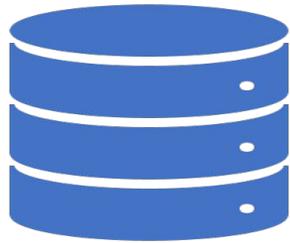


SLO approach – set service level objectives, measure error budget burn



# Challenge #1

## Issue 3: Infrastructure Management



Persistent deployment management –  
configure X servers for an app



IaC - provision ephemeral resources  
with DSLs (like the ones you may use)

# Challenge #2

Digital transformation engagement

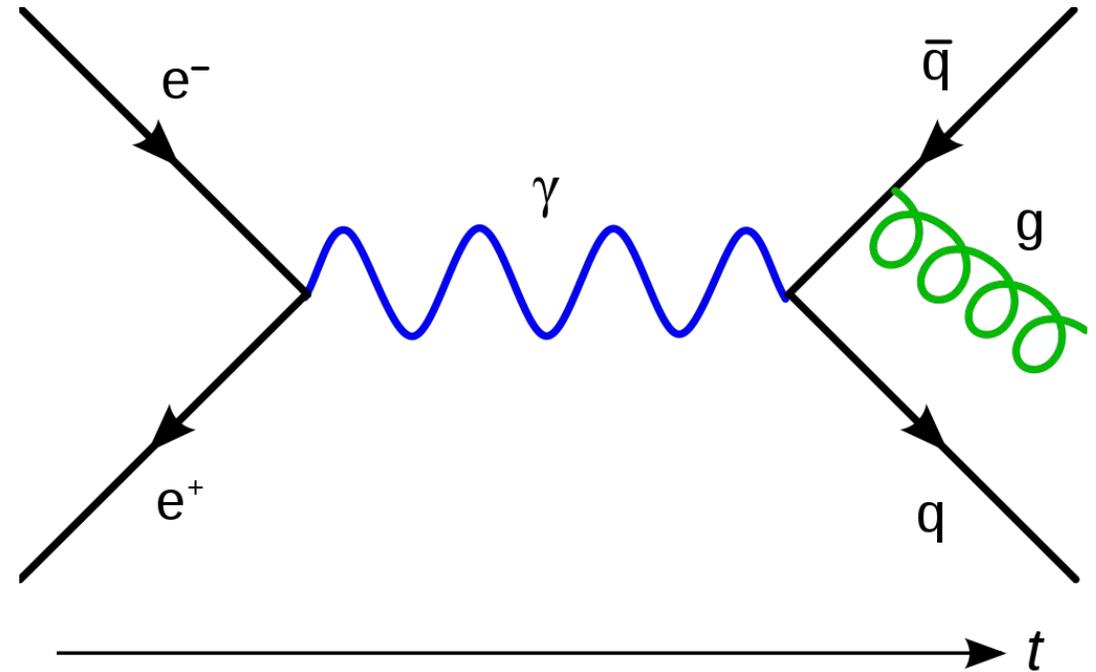
- 60k+ applications
- 57k engineers
- 60 countries
- 22 Technology Centers; NAMR, LATAM, EMEA, APAC, India



# Challenge #2

Issue 1: Scale down to scale up

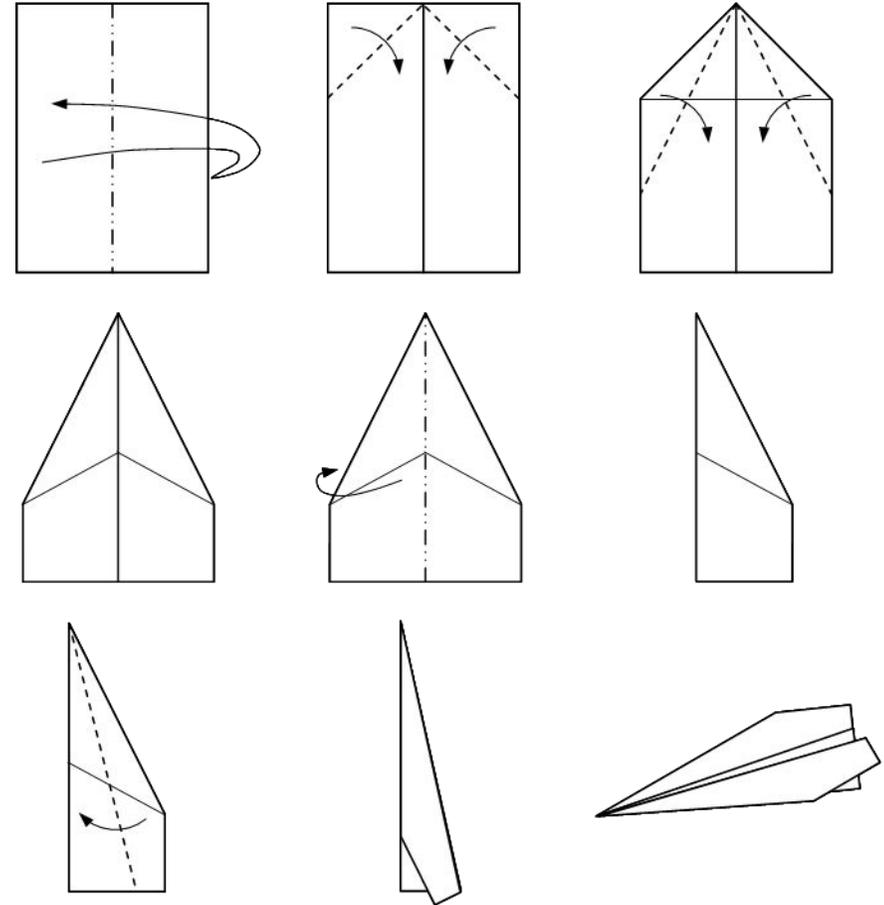
- Relationships matter
- Building trust matters
- Solve 1 before you solve N



# Challenge #2

Issue 2: Use your SRE wings

- Your expertise is scaling operations
- App teams are domain experts
- Lead by following
- Lead with empathy



# Challenge #2

## Issue 3: JPMorgan Chase Scale

- Lots of specialized expertise
- SREs glue all expertise together
- Team relationships matter
- Lots of business processes
- Scale through automation



Dunbar's Number

*the max number of relationships a person can maintain*

# Safety First

Trust and reliability is industry currency



Fixed Trading  
Windows



Cost of  
Downtime



White Swan  
Events



Black Swan  
Events

Thank you

