# In a rapidly changing world, what's here to stay?

Adopting technologies and best practices that matter

**Ravi Mupkala**
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MACC 2020 Virtual Conference

# What to expect from this session?

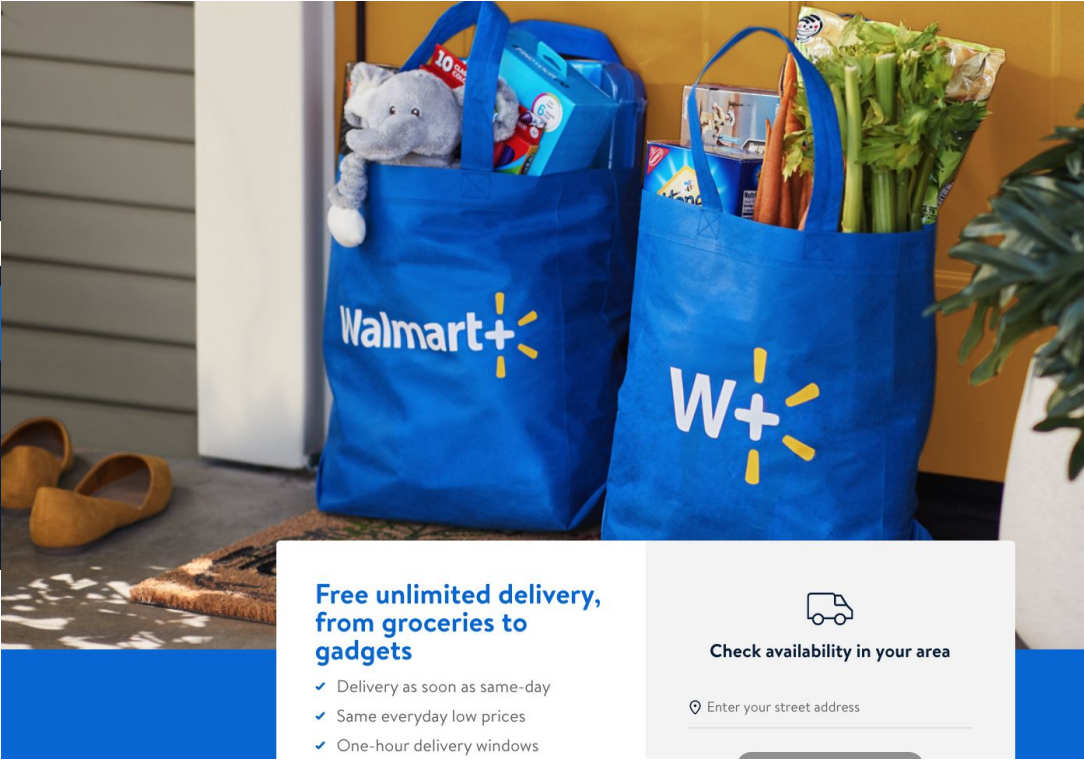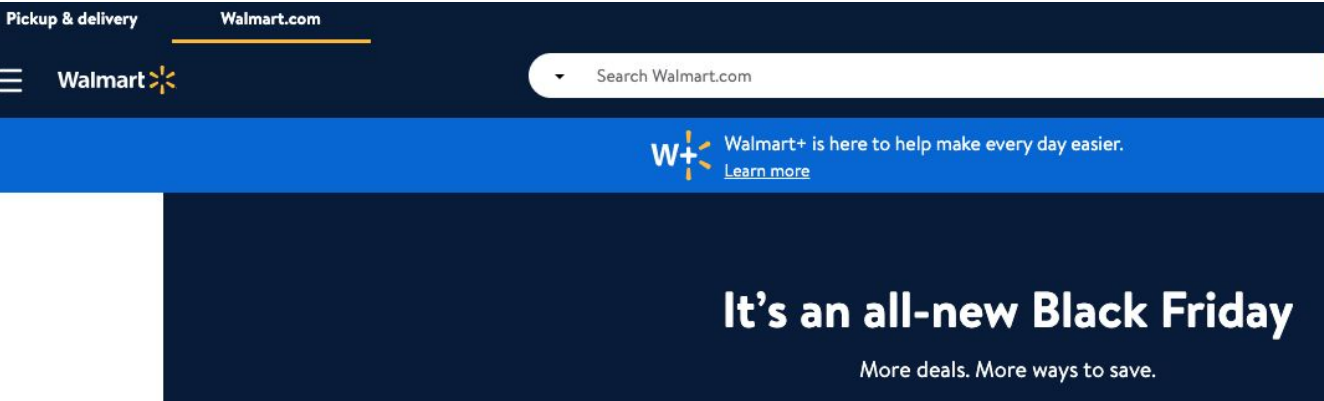Insights based on our tech journey and resilience

More from experience, sharing best practices

This talk is not about disruptive technologies

Hopefully not surprising topics

# Is it time for Digital Transformation?

## The obvious...

# Somewhat obvious...



Home / Grocery Delivery And Pickup

## Free pickup or delivery.

Prime members: Skip the lines, skip the hassle and get your Whole Foods Market favorites carefully packed and ready to go or delivered for free — all on your schedule. It's that easy.

# Not so obvious...

# A glimpse of our own...

# Three key areas of our Tech Transformation…

Cloud

Data

Machine Learning

Bonus topic

# Cloud Transformation

# Things to consider

### When to Start?
As early as possible

End of 2014

### How much cloud vs. on-prem?
As much as you can

2016: declared all-in on Cloud

### Public or Private Cloud?
Public has its benefits

Public Cloud

### Multi-Cloud or Single?
It depends

Predominantly AWS

Color: Indicates Capital One's approach

# Challenges

## Leadership Buy-in

Not just part of IT Strategy

## Talent / Skills

Education, Up skill, Learning

Over 3400 AWS Certifications

## Existing Architectures

Lift and Shift, Re-Architect, Decommission

## Governance / Compliance

Well-managed, controls



Cloud Custodian

Opensource Cloud Security, Governance, and Management

DOCS | INSTALL | GITHUB | GITTER

### The Path to a Well Managed Cloud

Cloud Custodian enables users to be well managed in the cloud. The simple YAML DSL allows you to easily define rules to enable a well-managed cloud infrastructure, that's both secure and cost optimized. It consolidates many of the ad-hoc scripts organizations have into a lightweight and flexible tool, with unified metrics and reporting.

Custodian supports managing AWS, Azure, and GCP public cloud environments.

### 🔒 Real-time Compliance

Besides just providing reports of issues, Custodian can actively enforce the security policies you define.

### 🕐 Cost Management

Setup off-hours to save you money, by turning-off resources when they're not being used. Garbage collect unused resources by looking into utilization metrics.

### >_ Run Anywhere

Custodian can be run locally, on an instance, or Serverless in AWS Lambda.

### </> Open Source

Cloud Custodian is open source and free for everyone to use.

### 📄 Simple DSL

Use Custodian to build complex workflows or simple queries, millions of policies can be constructed using our easy to read DSL.

Capital One®

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# Best Practices

## Automation, CI/CD

Automate everything

## DevOps

More than technology

Our YBYO Culture

## Resiliency, SRE

Stability in adversity

## Cost Optimization

Simple to complex solutions

## Open Source

What's open will remain open

## Containers

Pets vs. Cattle
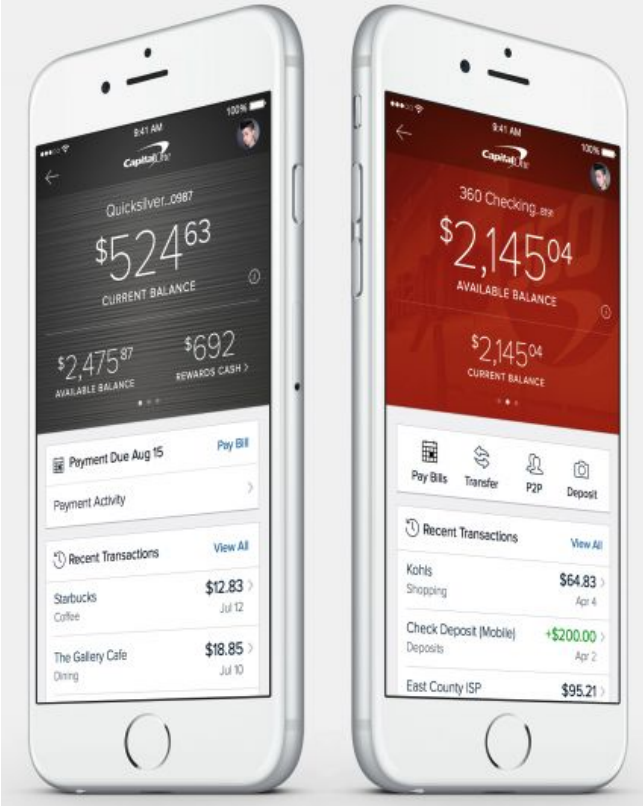
Portability

## Observability

Instrument everything

## Security

Shared responsibility
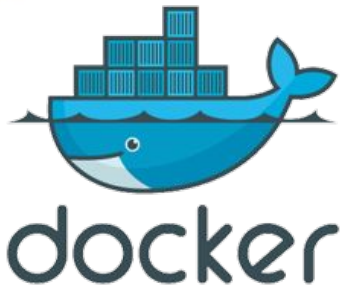
# Some recent examples



Digital



Customer Support



VPN / Work from home

# Technology Landscape

# Data Transformation

# Things to consider

### Where to Start?
Review your existing systems

We discovered systems built when compute, storage was limited

### Is the ecosystem Cloud ready?
Leverage the benefits of cloud

Rebuilding our data ecosystem

### How long is it going to take?
It depends, plan your journey

Still in our multi-year transformation

### Will something break?
Likely. Ensure business continuity

Utilized interim states

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# Challenges

## Breaking the silos

Enterprise effort

## Data Management

Data quality, governance, inventory

Producers, Consumers

## Existing Architectures, Legacy Technologies

Data migration, Decommission

Integrating newer architectures

## Compliance, Security

Regulation, Access Controls

# Best Practices

**Data Quality**

Ensure validation at source

**Fit for purpose**

Over one size fits all

**Separate compute vs. storage**

Where possible

**Data Inventory, metadata**

Know where your data lives

**Open Source**

What's open will remain open

**Focus on high priority data**

Migrate based on usage and abstract your transformations

**Leverage streaming data**

Identify use cases

**Security**

Tokenization, DLP, Medium / Fine Grained access control

# Technology Landscape

# Machine Learning (ML)

# Things to consider

### Where to Start?
Start with your data, ask questions

Data has been at the core of our business

### What does Cloud offer?
ML for the masses

We use both Cloud and in-house products

### Hype vs Value?
When data leads to usable answers

Successfully leveraging ML in business

### Centralized or Federated?
It depends

We have a COE and also federated groups

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# Challenges

## Getting from hype to value

Start with low hanging fruit

## Talent / Skills

Attract and retain talent

Education, Up skill, Learning
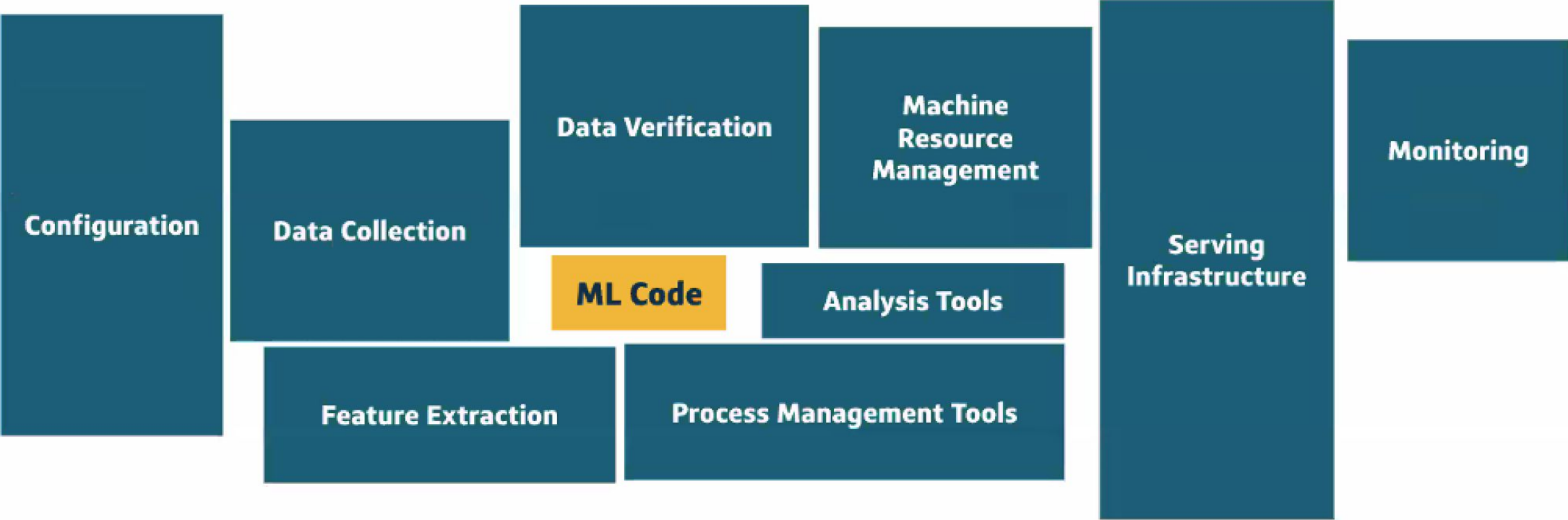
## Identifying Use Cases

Collaborate with business

## Exploration vs. Production

Data scientist's machine

Build or leverage off the shelf

# ML Code vs. real-world production ML systems

# Best Practices

## Create ML Pipelines

Automate the deployment of models

## Re-use

Models, pipelines, infrastructure

## Know the roles

Data Scientist, Data Engineer, ML Engineer

## Know your data

Data is as important as your code

## Open Source

What's open will remain open

## Explainability

Responsible AI and Bias

## Model Risk Governance
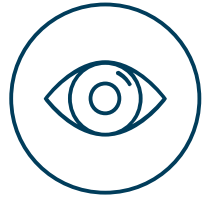
Validating, Monitoring models for accuracy
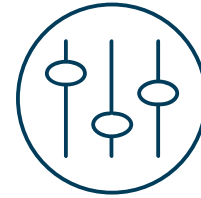
# Technology Landscape

# Architecture / Architects

# Things to consider

## Strategy

Be open to new avenues

Focus on operational excellence

## Agile

Nimble and adapt to change
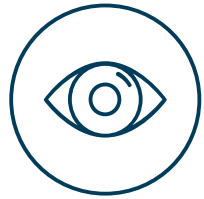
Evolutionary Architecture

## Resilience

Enable your customers

Prepared for the comeback
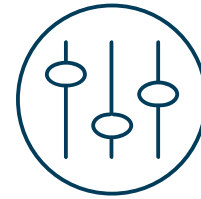
# Resilience Reimagined

# Things to consider

### Strategy

Be open to new avenues

Focus on operational excellence

### Agile

Nimble and adapt to change

Evolutionary Architecture

### Resilience

Enable your customers

Prepared for the comeback

### Kindness

Show empathy

Where it's not expected!

"..people will forget what you said, people will forget what you did, but people will never forget how you made them feel" - Maya Angelou

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# THANK YOU!

Continue the conversation…

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**Speaker Bio:**

Ravi Mupkala is an Architecture and Engineering Leader at Capital One (McLean, VA) providing technology strategy, leadership, vision, architecture and implementation guidance to high performing engineering teams, architects and product teams. Prior to Capital One, Ravi has significant experience leading transformation initiatives for Fortune 500 companies and for public sector.

Ravi's current focus is on Cloud, Data and ML. He has led a team as the lead inventor to file for multiple patents leveraging ML and technology to solve business problems. He also has some great memories of partnering with friends at MACC and IASA MN.