



Launching PayPal

If it is important, you will find a way

Sri Shivananda • @srishivananda • November 16 2015

Table of contents

Introduction

The Beginning

Technical Journey

Organizational Journey

Lessons Learned

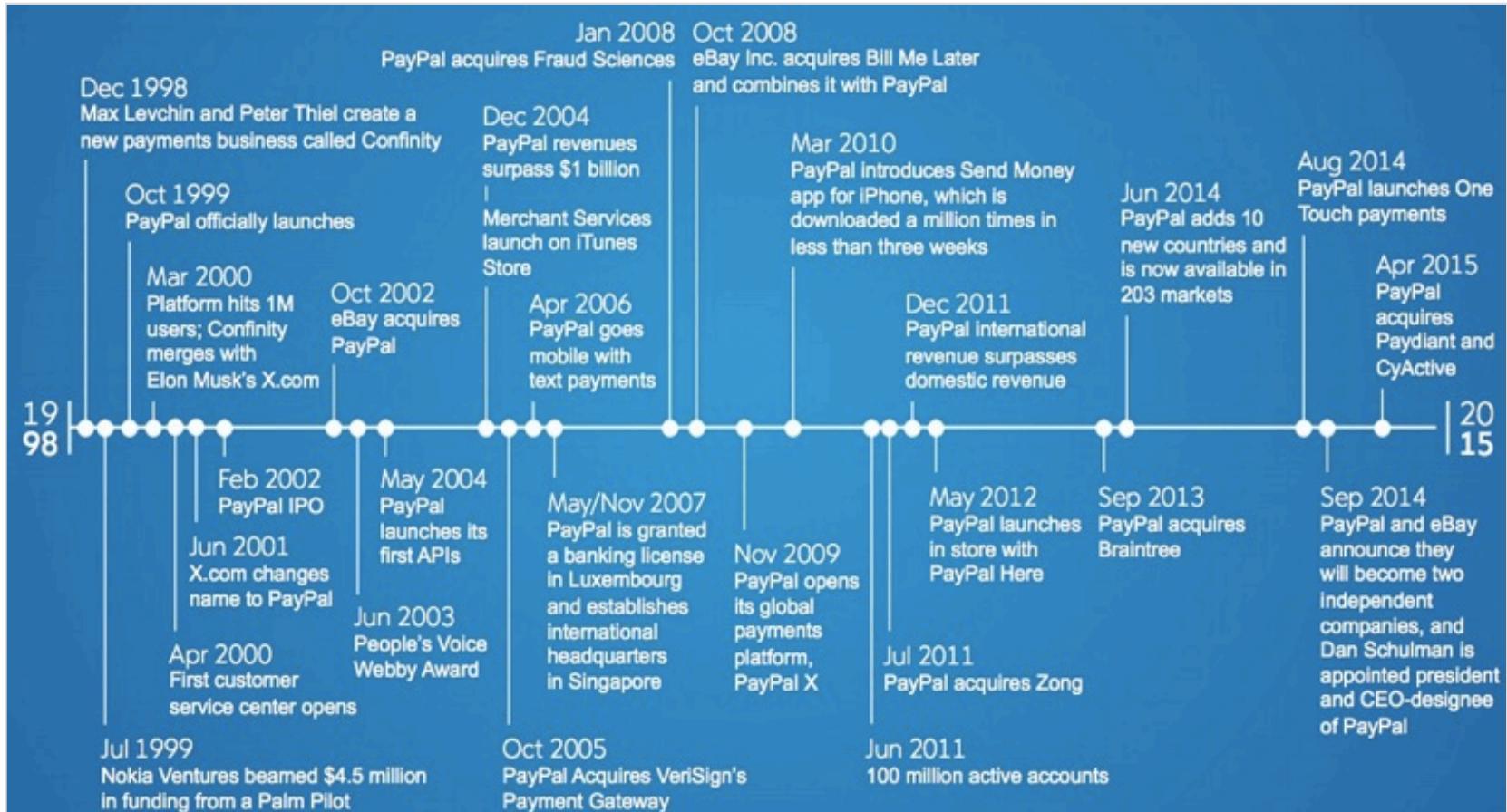
Q&A

Introduction to PayPal

A Technology Perspective

About PayPal

PayPal is a leading technology platform company that enables digital and mobile payments on behalf of consumers and merchants worldwide. We put our customers at the center of everything we do. We strive to increase our relevance for consumers, merchants, friends and family to access and move their money anywhere in the world, anytime, on any platform and through any device.



Braintree
A PayPal Company

venmo

Paydiant



Architecture @ PayPal

Robust Infrastructure, Reusable Platforms, Payments Operating System, Delightful Experiences

Customer Facing

Experience



Payments Operating System



Infrastructure

Technology Platform



Analytics Platform



Infrastructure & Operations Layer



Scale @ PayPal

Serving \$240B in payments through 4B payments in over 200 countries using over 100 currencies

1.1 B Payments
Q1 2015

15.6 M Payments
Q1 Peak Day

293 Payments
Q1 Peak Second

1501
Services

4.5 Trillion
Database Calls

395
SQL Instances

101
NoSQL Instances

53,000
Hosts

2,600
Network Devices

40 PB
Storage

3
Regions

8
Availability Zones

10 MW
Power

20,647 Changes
Q1 2015

16,048
Q1 Ops Changes

4,599
Q1 Code Changes

The Beginning

The decision to launch PayPal as a independent company

Captain's log stardate -308250.9279553526 (Base Jan 01 2323)

The announcement of the launch of PayPal as a separate company

TECH TIMES PERSONAL TECH BIZ TECH FUTURE TECH SCIENCE LIFE T-LOUNGE

eBay, PayPal to become two separate companies in 2015. What's happening?

By [Aaron Mamiit](#), Tech Times | October 1, 9:30 AM

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eBay revealed that it will be spinning out its PayPal unit into a separate company in the second half of 2015.

The planned separation between eBay and PayPal will usher in new leadership, with eBay Marketplaces president Devin Wenig becoming the new eBay CEO and American Express Enterprise Growth Group president Dan Schulman becoming the new PayPal CEO.

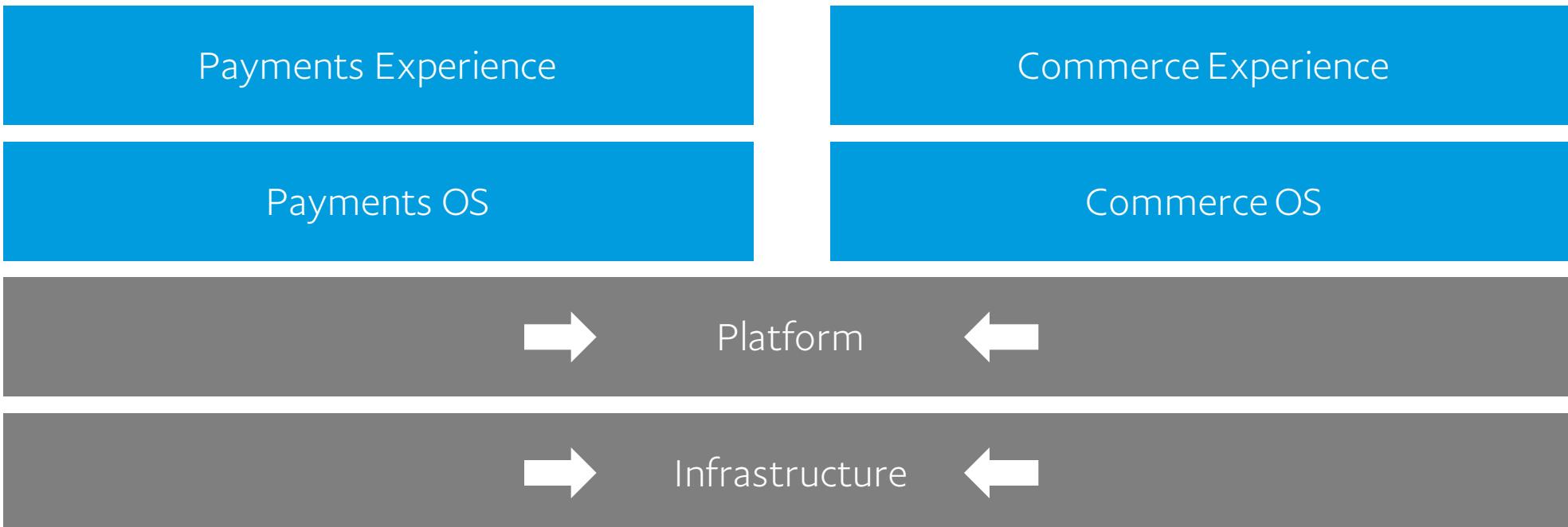
John Donahoe, current CEO of eBay, and Bob Swan, current CFO, will assist in the pending transition but will not be joining either company after the separation.

The Prequel

The 18 month journey to integrate eBay and PayPal Infrastructure

In June 2013 ...

- After a decade of being together we decided to integrate eBay and PayPal at the infrastructure level
- We had shared data centers and data warehouses for many years, but, the rest was independent
- By Oct 2014, we had finished integrating significant portions of infrastructure and platforms, but as tenants



The Technical Journey

Agile @ Scale & Zero downtime approaches to large infrastructure changes

STEP – Separation Team for Ebay & PayPal

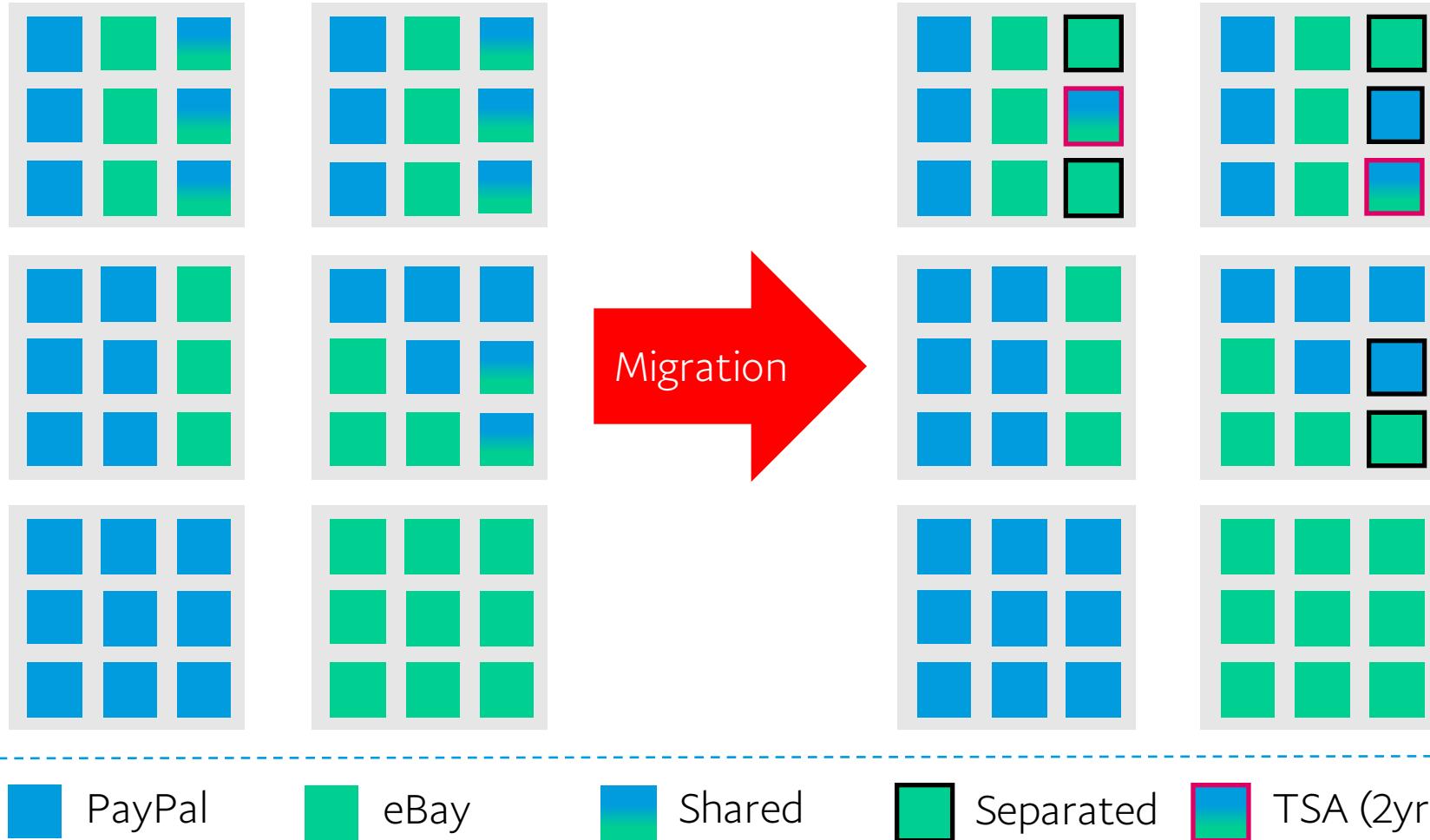
Enormous magnitude, risks, unknowns and variables

- Datacenter Separation
- New PayPal Site Network
- New PayPal Corporate Network
- New PayPal Analytics Infrastructure
- Internal Developer Platform
- New instances of Platform Services
- Command Center (NOC) Relocation

>500 Milestones | 119 Critical deliverables | 6 Months | 1000s of people

Datacenter Separation

Achieve what is possible, punt the rest to a transition agreement

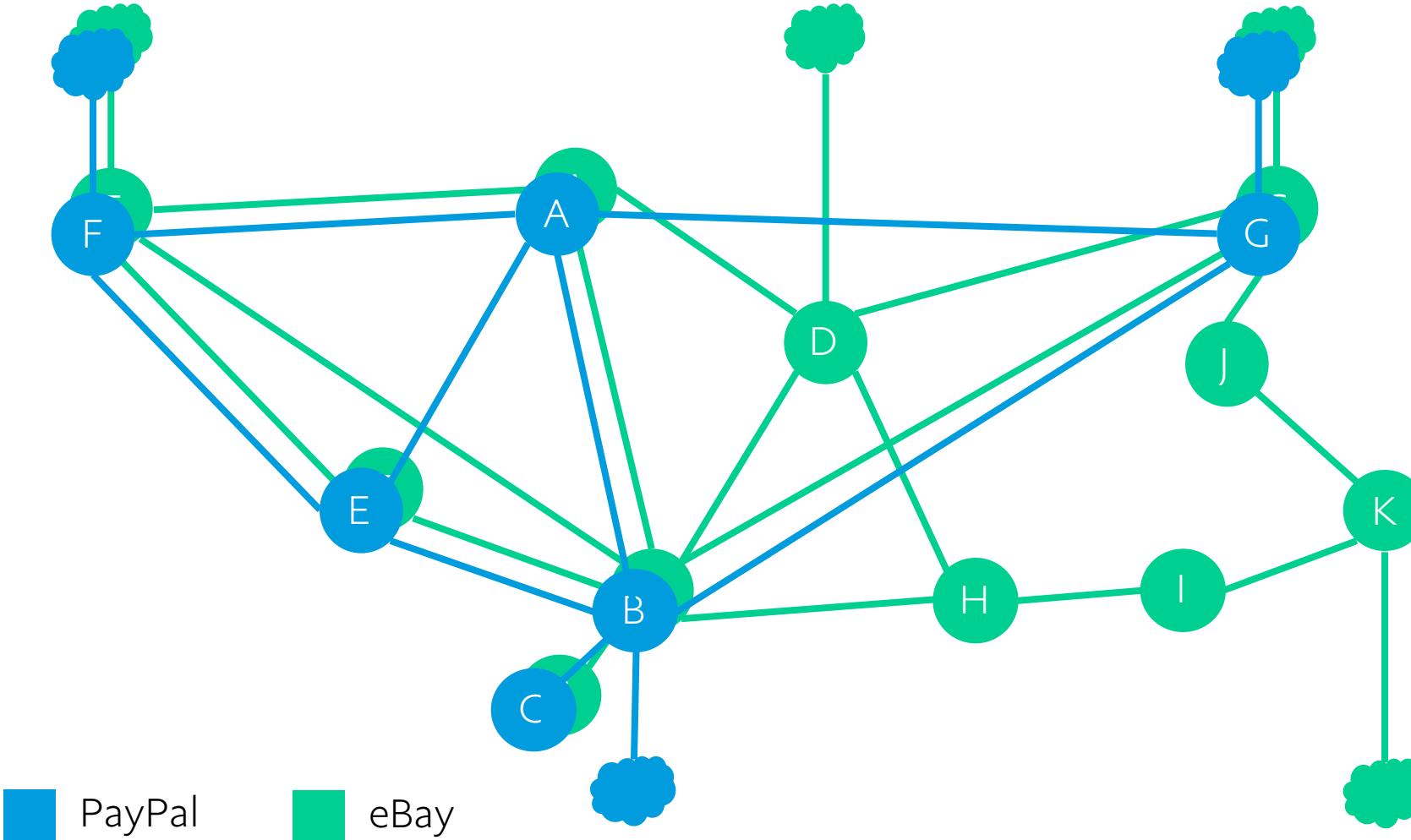


- Share datacenters through agreements (TSA/OA)
- x 10s DC rooms, 75% exclusive, 25% to separate
- 50% separated before day of split, 50% in the TSA
- Physical security protocols for shared rooms
- Stateless workload in shared rooms at both companies
- Each company owns one of two owned DCs
- Each company is hosting provider for other

TSA – Transition Service Agreement
OA – Operating Agreement

New PayPal Site Network

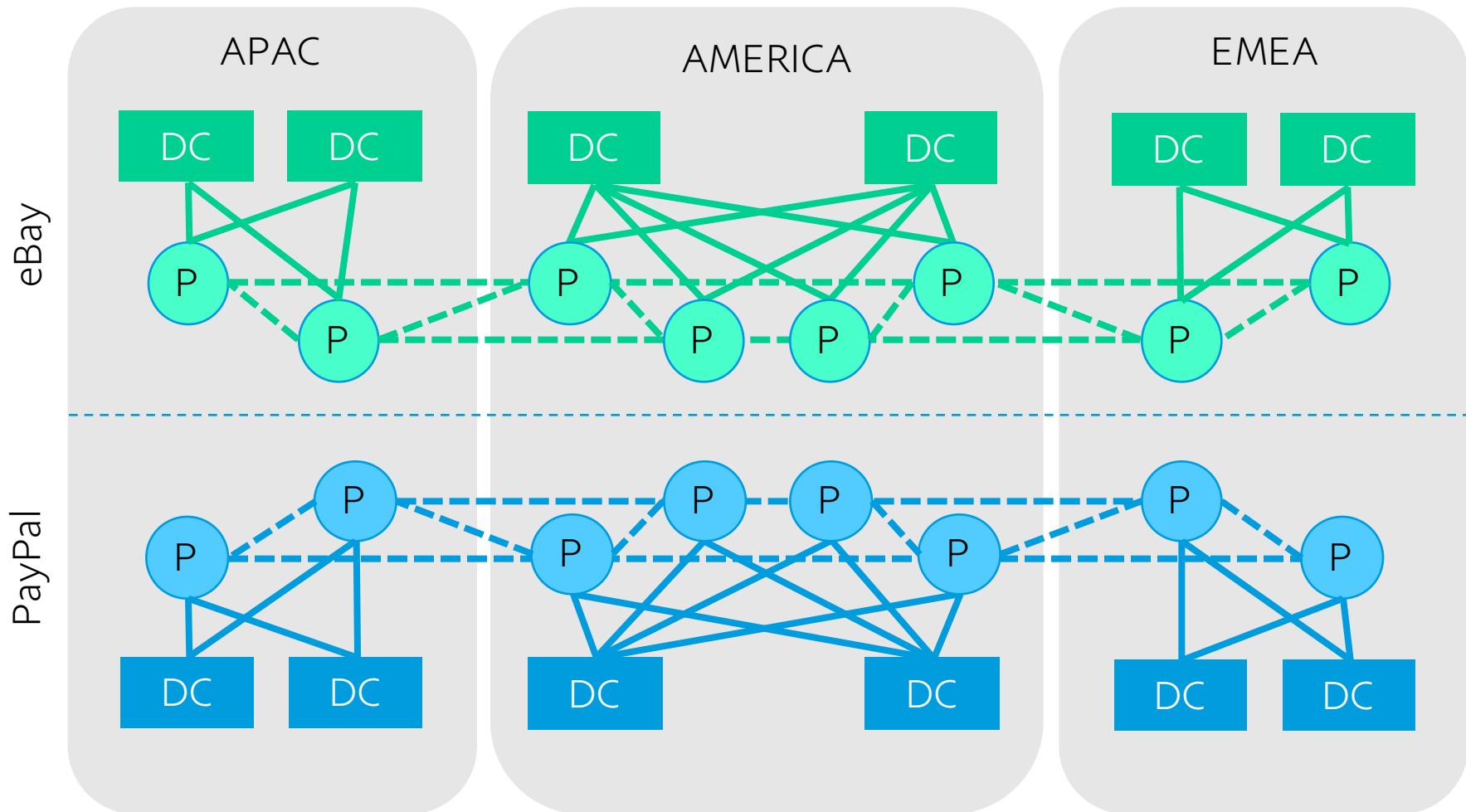
Changing the customer highway to PayPal without downtime



- Replicate a subset of the backbone in existing POPs
- Create a new border for Internet connectivity
- Create new security & scrubbing infrastructure
- Keep the two backbones connected for interim
- Shift replication / backend traffic to new backbone
- Shift all cross datacenter traffic to the new backbone
- Shift customer traffic to new internet connectivity
- Decouple the backbones to independence

New PayPal Corporate Network

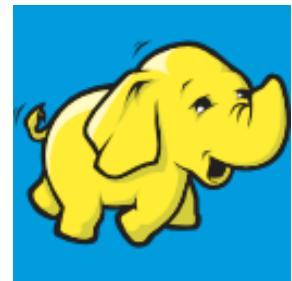
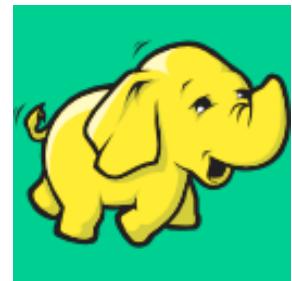
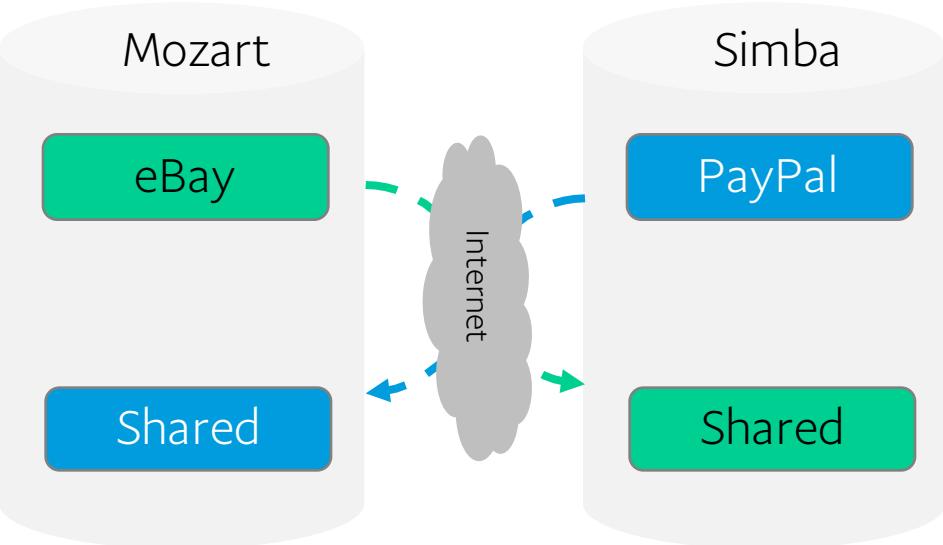
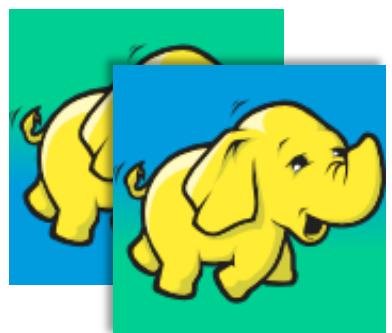
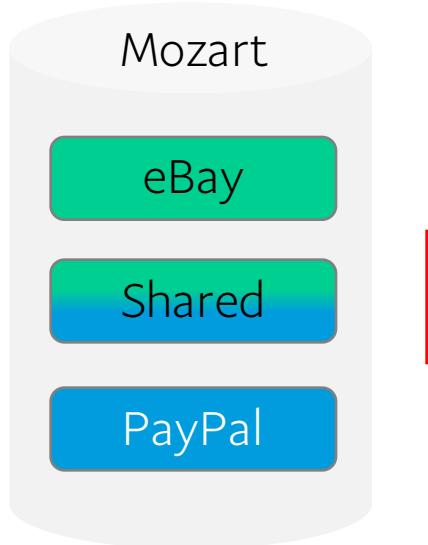
Connecting corporate datacenters and offices around the world



- Replicate the backbone in existing POPs
- Create a new border for Internet connectivity
- Create new security & scrubbing infrastructure
- Keep the two backbones connected for interim
- Setup new PayPal corporate network and Wi-Fi
- Move one office at a time to the new backbone
- Conduct a few controlled blackout tests to learn
- Decouple the backbones / network to independence

Analytics Infrastructure

Enterprise Datawarehouse, Hadoop & BI infrastructure



- x 100,000s tables and datasets rearranged
- x 10,000s jobs reoriented to the new systems
- x 1000s of tests for data quality verification
- x 100s of SDI addressed legally and technically
- x 10s petabytes of data moved to target systems
- 1 week of business process interruption only
- Provision system, dual target all sources, check quality, shift downstream

SDI – Shared Data Interface

100s of other products, services and processes

There were a million small things to consider

Engineering Platforms

New instance of Developer and quality infrastructure and host migration without impacting planned release cycles

New instances of collaboration tools like Jira, Github, Answerhub, Remedy and a dozen other tools

Creation of a new CMDB, PaaS portal, Change workflow tool etc.

Platform Services

Create a new media platform to service images

A new instance of services like mobile notifications and device detection

A new instance of the monitoring tools supporting logs and telemetry

Replicate emerging services like the crawler and elastic search

IT Services

Internal IT migrated over x 100s applications for the launch

Endpoint migration of all devices in the enterprise

Security modernization, finance system split, document share, intranet etc.

Moved to Office 365 for email and other productivity tools

A new HR system called Workday introduced

Others

Separation of over x 100s offices around the world and related employee moves & badging

IP portfolio separation across the two companies. Sharing where appropriate.

Minimizing the financial leakage on the maintenance ledger with x 100s vendors

TSA/OA work to ensure the companies continue to collaborate beyond launch

Relocating eBay Command center to a different campus

Waterfall? Agile? Its not an either or

Agile approaches at scale

From far it looks like a waterfall approach

- A large deliverable of separating eBay and PayPal
- Expectation: Plan, Design, Implement, Test, Launch
- A predetermined publicly known date of early Q3 2015

Reality

- A million deliverables that needed coordination
 - A very large number of variables, dependencies & risks
 - Very large corpus of unknowns
- Approach:
 - Plan for Known, Iterative discovery of unknown
 - Backlog oriented execution | Daily standups | Scrum of scrums | Milestone burn down
 - Launch every week, Learn from every release/milestone, Correct course

The Organizational Journey

It was a once in a lifetime experience

Organizational Journey

~ 2000 people in my crew – 60/40 split to eBay/PayPal – Balance across levels – While Executing

On announcement

- 180 degree turn - 3 Weeks to reorient, 3 Months to plan, 3 Quarters to execute

Connect, Communicate, Clarify

- Meeting people in small settings (1:1, small groups) and monthly all hands with handsome Q&A time
- Start with why, explain the intent, framework and constraints, motivate
- Bring in other executives to connect, clarify and inspire

Keep things simple and consistent (not democratic)

- The process of choosing people for each company was simple set of rules with minimal exceptions

Deliberate Change Management to Create a sustainable future for both companies

- Create a org change roadmap, be structured, bring people along, listen & make your crew THE agenda

Build Trust & Followership by promising answers and delivering the promise

- Be vulnerable, Be honest, Phase the change, Communicate it, Execute it like you promised
- Be ahead of your crew in thought, be amongst them in the journey – participate (live it, feel it)

Lessons

MS in execution | MBA in change management | PhD in crisis | An awakening in organizational leadership

Lessons in technical and human limits (or the lack thereof)

Its amazing what you can accomplish with intent, intellect and irrational tenacity

The Mechanics

Divide and Conquer

- Break it into smaller delivers, create patterns and repeatability

Manage Chaos: Be Organized

- Structure & Operating rhythms – convert entropy to symphony

Recruit the smallest number of people needed

- Business continuity 101: don't involve the whole company

Great is the enemy of good

- Ensure the journey does not become one of optimization

Train hard, fight easy

- Prepare³: Make execution look like a repeat performance

Each failure is a license to try again ... differently

- Make surprises a expectation, have a framework for Risk

Mission Orientation: Unwavering focus

- The most important thing is to keep the most important ...

The Force Multiplier (People)

The ONLY reason we succeeded

- Aligned group of people with purpose who went above and beyond

Autonomy created Accountability

- Empowering people with autonomy – they owned outcomes

Progress Flywheel

- Each success motivated people to do more

We developed a positive failure mindset (Grit)

- Stand up every time you fall, smart retry will lead to success

Abundant trust, team work & org collaboration

- Org barriers melt when the mission/purpose is strong

A gold mine of opportunity

- People grew to the occasion and performed at new levels

Crisis built character

- Intrinsic growth with explicit evidence of new levels of potential



Questions?

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Write me an email on your thoughts on multi region shared nothing architecture for peer to peer products