



Executing the digital strategy

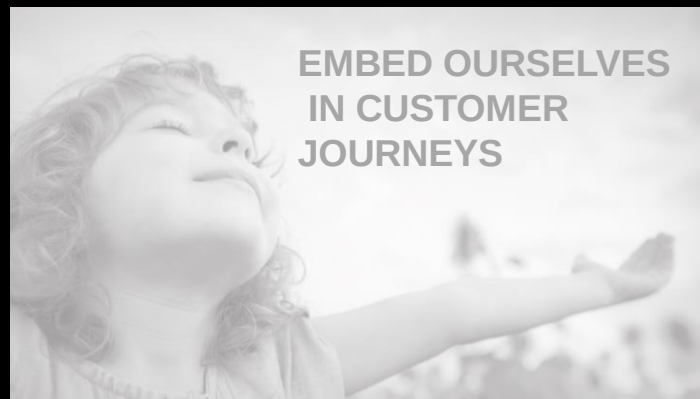
Dave Gledhill
Chief Information Officer

17 November 2017

The presentations contain future-oriented statements, including statements regarding the Group's vision and growth strategy in the light of anticipated trends as well as economic and market conditions. Such statements necessarily involve risks and uncertainties, which may cause actual performance in future periods to differ from projections.

Executing the digital strategy





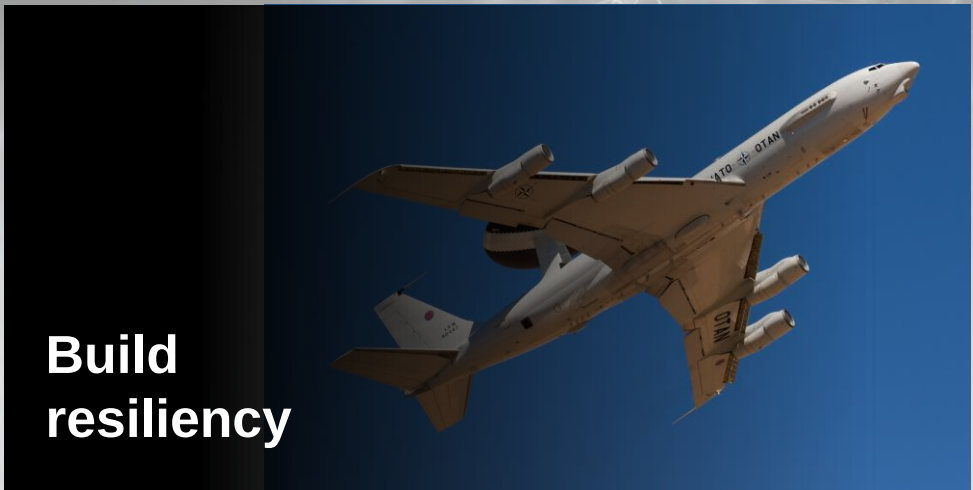
Phase 1

Fix the basics
(2009 – 2014)

A man, likely Mark Zuckerberg, is standing on a stage, holding a microphone and gesturing with his hands. He is wearing a dark t-shirt and dark pants. The background features a large screen displaying the text "MOVE FAST WITH STABLE INFRA" in orange, and a geometric, low-poly design on the left side of the stage.

MOVE FAST WITH STABLE INFRA

These foundation years were critical building blocks



**Build
resiliency**



**Data Centre
revamp**



**Start insourcing and
build engineering
bench strength**



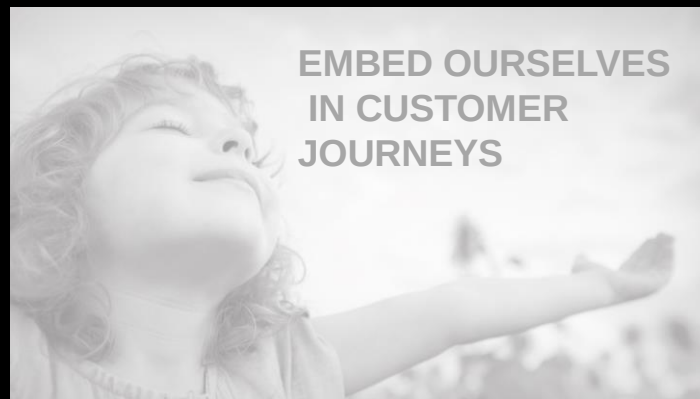
**Monitoring
centre**

Our application stack in 2009 needed a lot of work

		Buy Hold Sell Review	Singapore	Hong Kong	Taiwan	Indonesia	India	China	Overseas Branches
CHANNELS	Teller								
	Internet & Mobile Banking								
	Corporate IB								
	CRM								
PRODUCTS & SERVICES	Customer								
	CASA and FD								
	Private banking								
	Liquidity Management								
	Remittances								
	Unsecured loans								
	Secured loans								
	Trade Finance								
	Factoring								
	Markets								
ENABLERS	IBG MIS								
	Credit Approval								
	Finance								

And by 2014, we had fixed the basics and were ready to build a digital bank

		Buy Hold Sell Review						
		Singapore	Hong Kong	Taiwan	Indonesia	India	China	Overseas Branches
CHANNELS	Teller	Hold	Sell	Buy	Buy	Buy	Buy	Buy
	Internet & Mobile Banking	Buy	Buy	Buy		Buy	Buy	
	Corporate IB	Buy	Buy	Buy	Buy	Buy	Buy	Buy
	CRM	Buy	Buy	Buy	Buy	Buy	Buy	
PRODUCTS & SERVICES	Customer	Hold	Sell	Buy	Buy	Buy	Buy	Buy
	CASA and FD	Hold	Sell	Buy	Buy	Buy	Buy	Buy
	Private banking	Buy	Buy					
	Liquidity Management	Buy	Buy	Buy	Buy	Buy	Buy	
	Remittances	Buy	Buy	Buy	Buy	Buy	Buy	Buy
	Unsecured loans	Buy	Buy	Buy	Buy	Buy	Buy	
	Secured loans	Buy	Sell	Buy	Buy	Buy	Buy	
	Trade Finance	Buy	Buy	Buy	Buy	Buy	Buy	Buy
	Factoring	Buy	Buy	Buy	Buy	Buy	Buy	
	Markets	Buy	Buy	Buy	Buy	Buy	Buy	Buy
ENABLERS	IBG MIS	Buy	Buy	Buy	Buy	Buy	Buy	Buy
	Credit Approval	Buy	Buy	Buy	Buy	Buy	Buy	Buy
	Finance	Buy	Buy	Buy	Buy	Buy	Buy	Buy

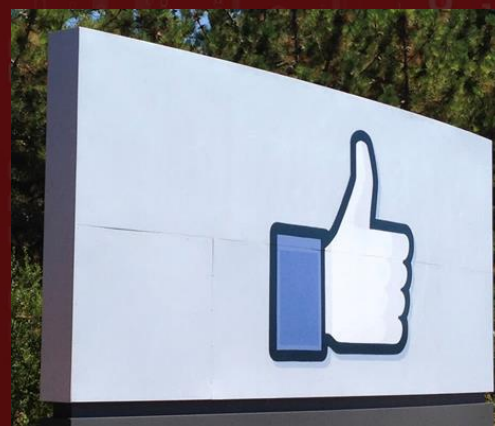


Phase 2

- Increase velocity
- Leverage on new technologies
(2014 onwards)



We went to deeply understand how the technology-driven giants built and operated



Being the D in

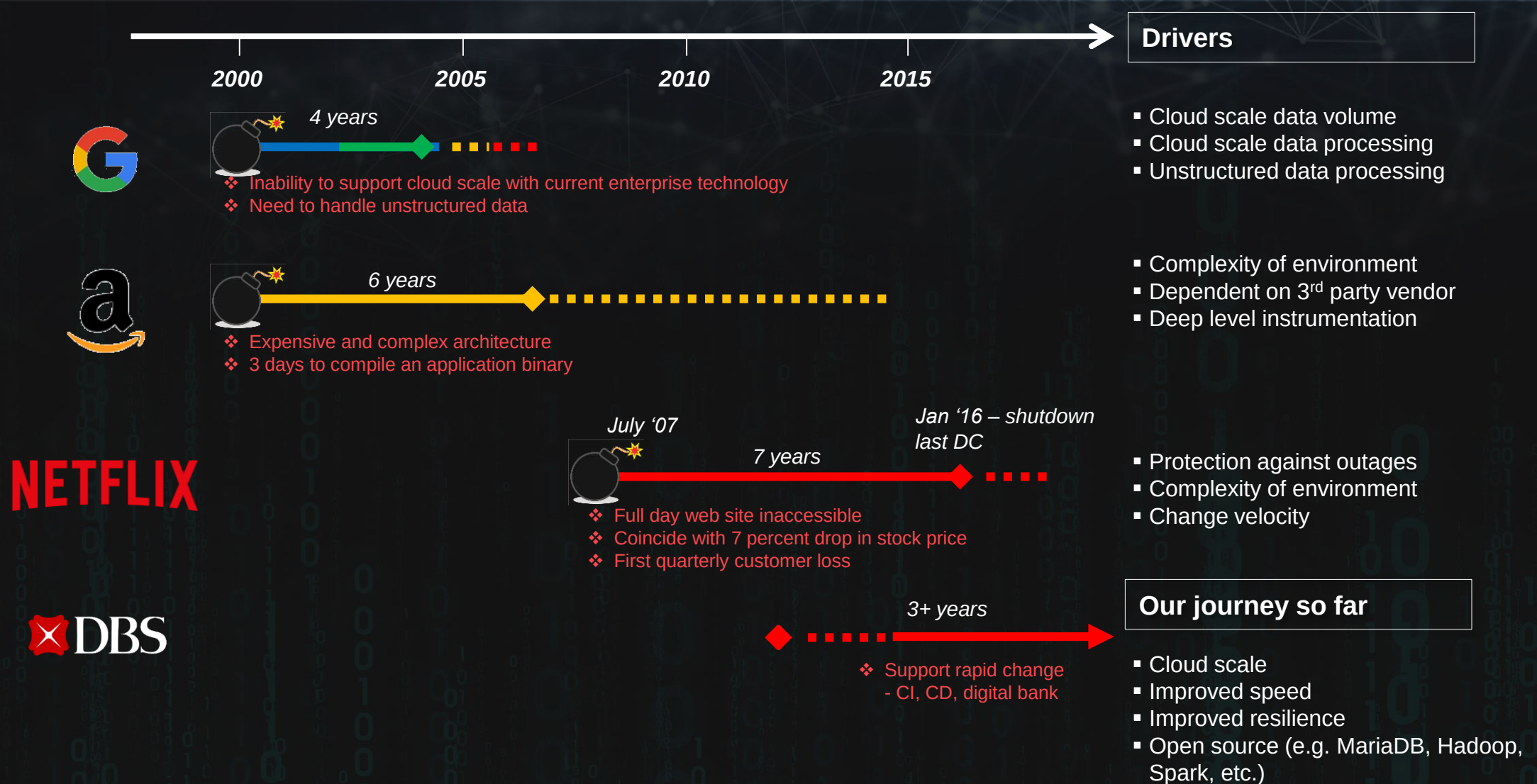


ND

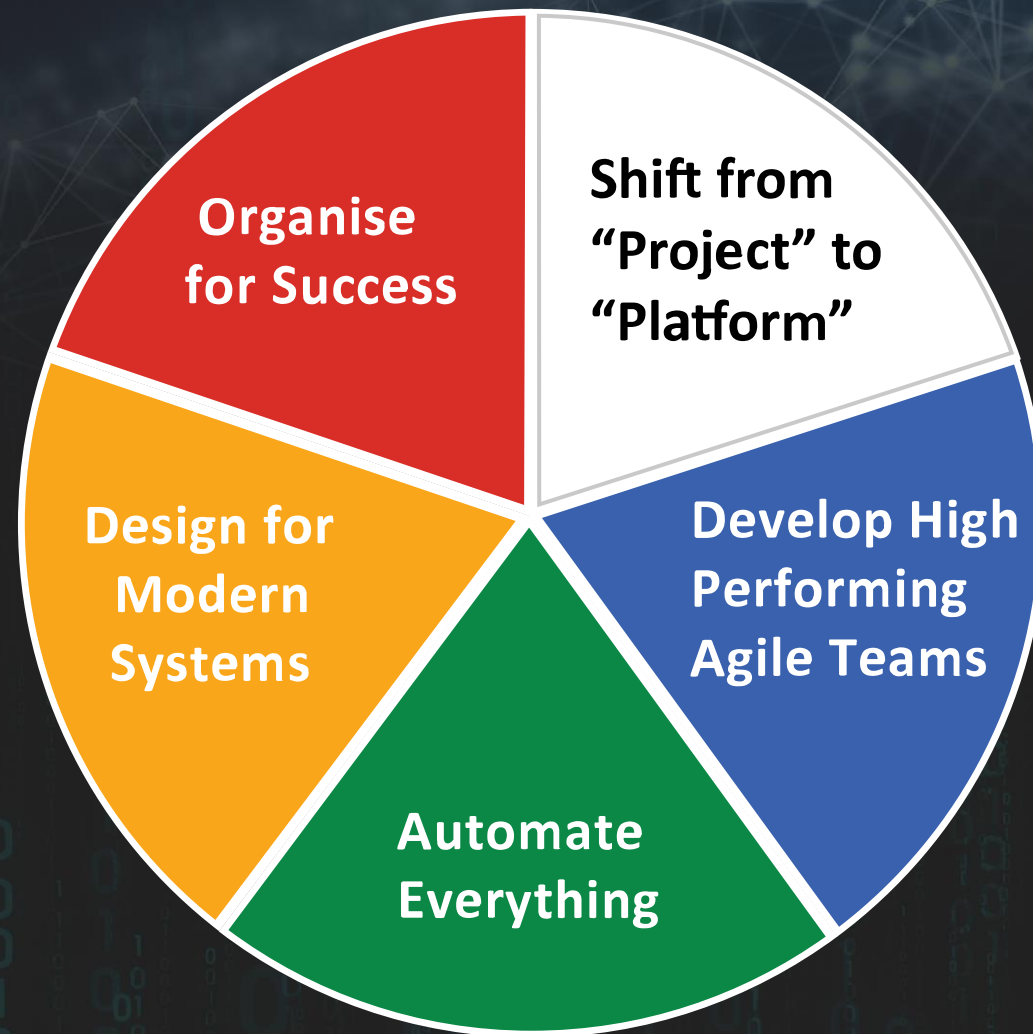


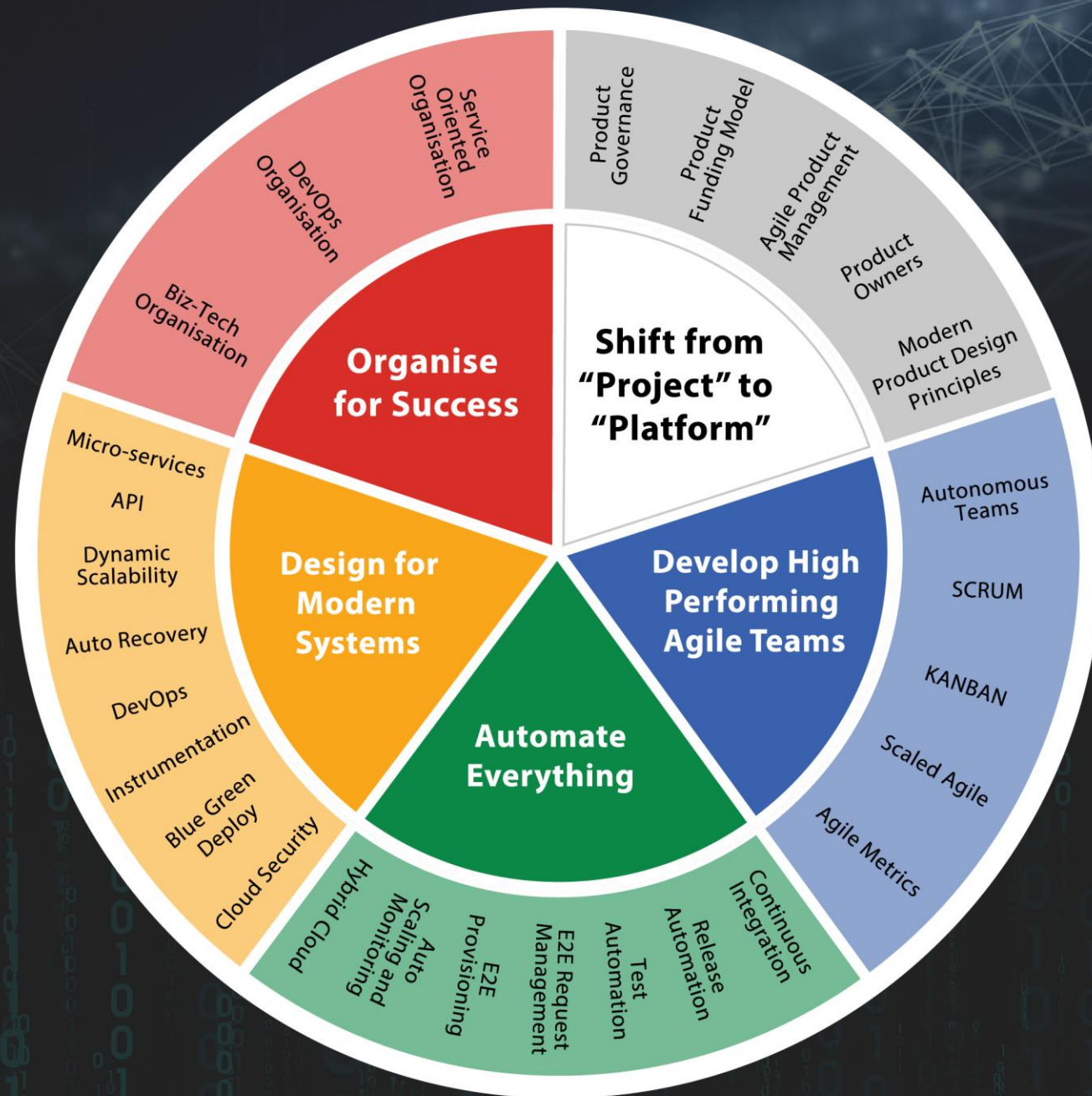
An outside-in look at the industry technology journeys (of Gandalf)

Technology transformation occurred to achieve cloud scale in data volume, processing and change velocity. Although the **business needs & transformation journeys vary**, these companies arrived at the **same end-state ideal architecture**



We embarked on a strategy of five key elements to drive change throughout the organization





Gandalf Transformation Targets by 2018



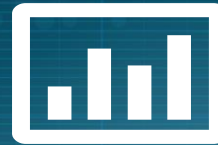
Become Cloud Native

Reduced Cost.
Improved Resilience
and Scalability



Increase Release Cadence 10x

Reduced
Time-to-Market



Build for APIs and Performance

Customer Centric.
Extending to Ecosystems



Data-driven Culture, Analytics-led Customer Science, Instrumentation and Experimentation

Customer Centric



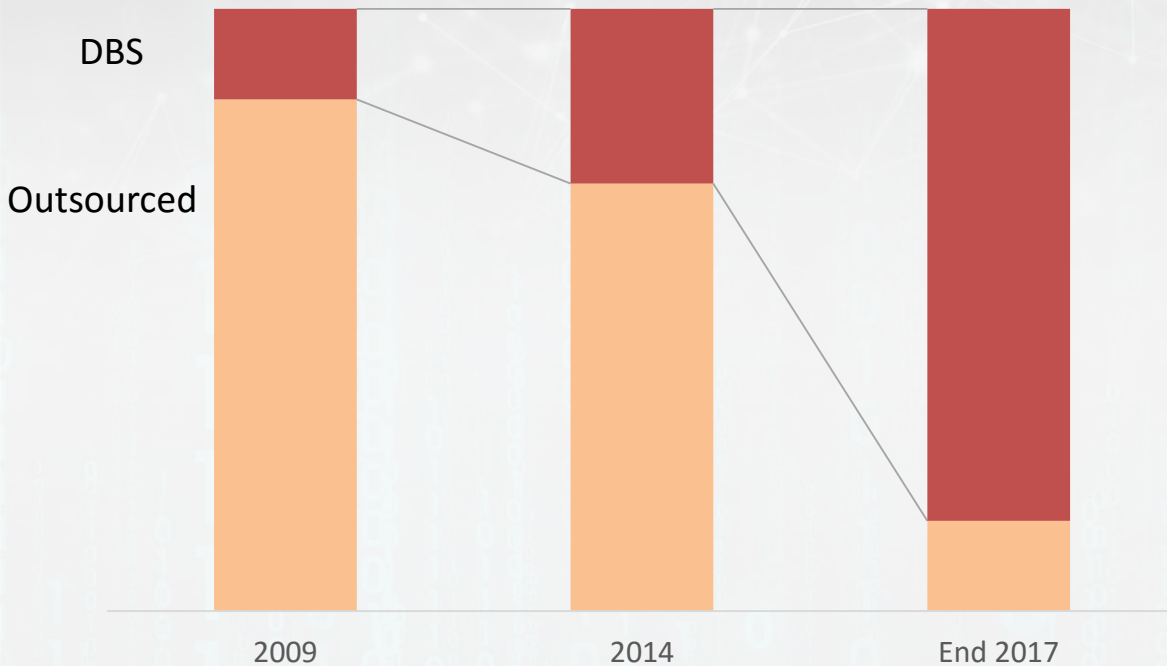
Business Benefits

- Cost efficiency
- Resilience
- Time-to-Market
- Ability to extend to ecosystems
- Ability to experiment for improved customer experience

Investing in People and Skills

To be a technology leader, we wanted to own and run our own technology

85% outsourced → 85% insourced



Objectives



Build technology DNA



Develop emerging skills (e.g. Agile, Cloud)



Increase velocity



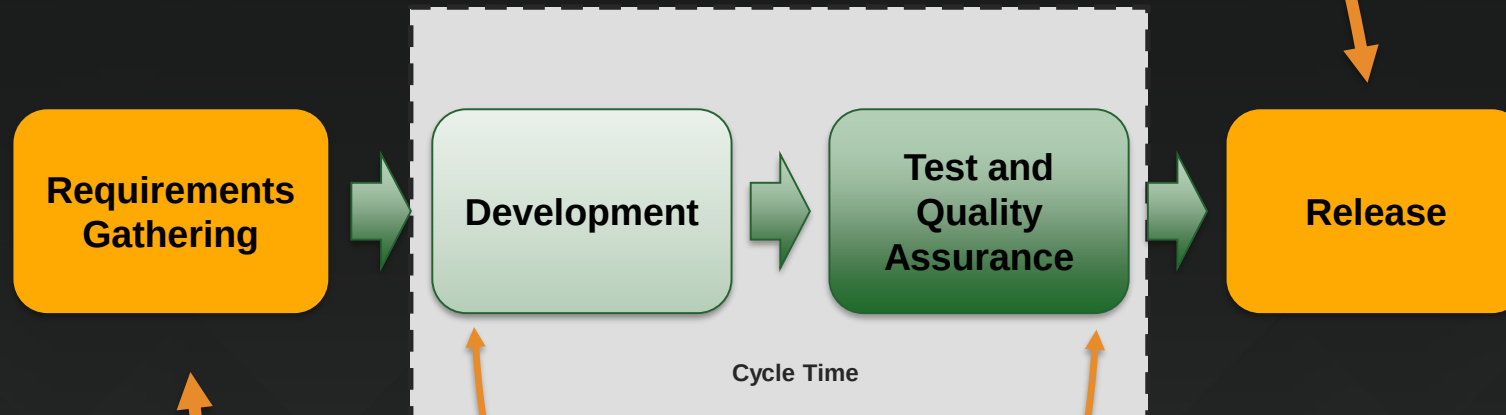
Realise tech cost savings



**What would
Jeff do?**

Knowledge is power

Lots of learning



Minimal learning

Some learning

Gandalf Transformation Targets by 2018



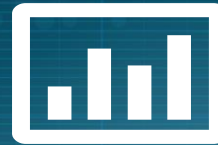
Become Cloud Native

Reduced Cost,
Improved Resilience
and Scalability



Increase Release Cadence 10x

Reduced
Time-to-Market



Build for APIs and Performance

Customer Centric,
Extending to Ecosystems



Data-driven Culture, Analytics-led Customer Science, Instrumentation and Experimentation

Customer Centric



Business Benefits

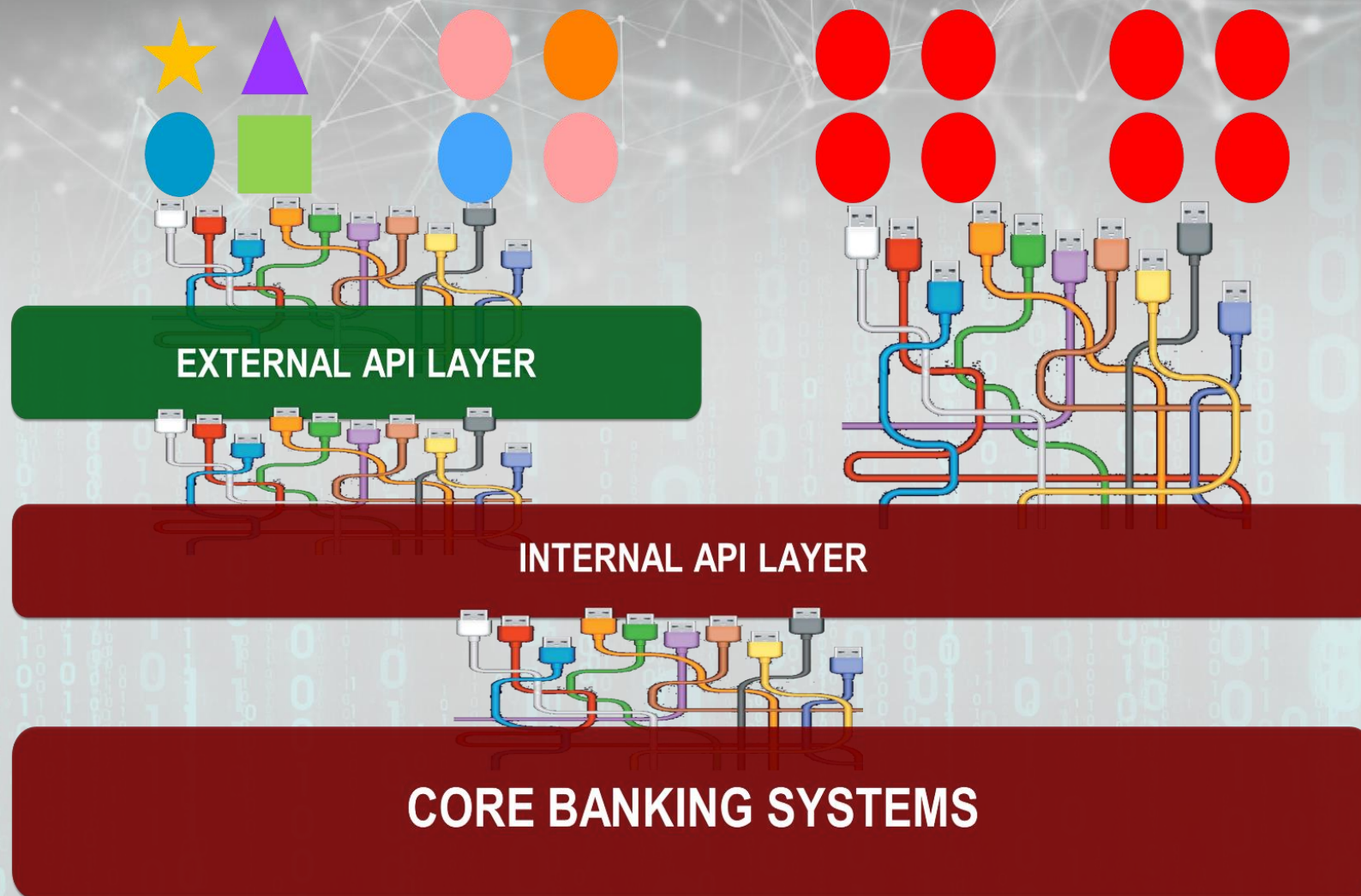
- Cost efficiency
- Resilience
- Time-to-Market
- Ability to extend to ecosystems
- Ability to experiment for improved customer experience

Investing in People and Skills





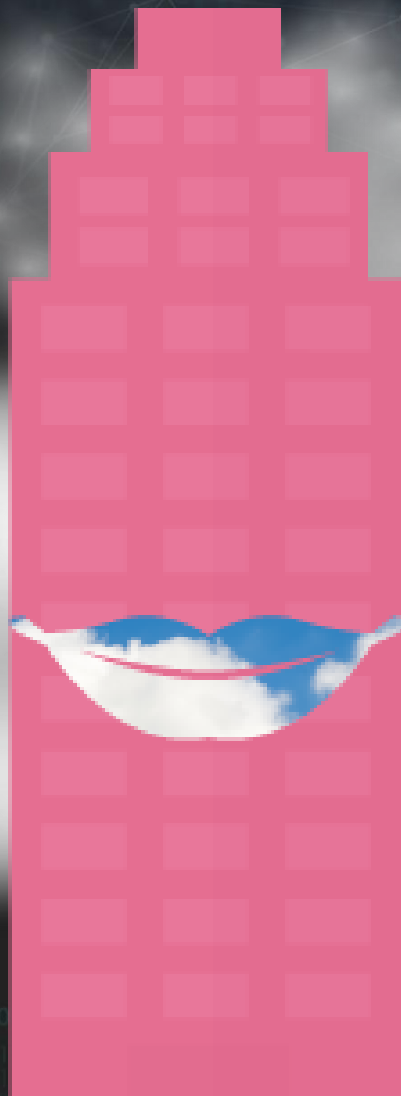
The design for modern systems – building connectors



Everyone has a cloud strategy, but not all are the same

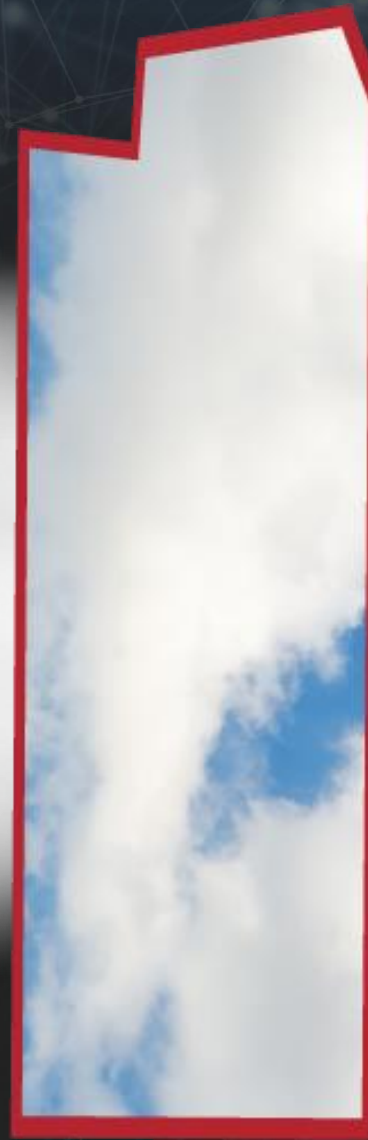
**CLOUD
LIPSTICK?**

Typical banks



**OR CLOUD TO
THE CORE?**

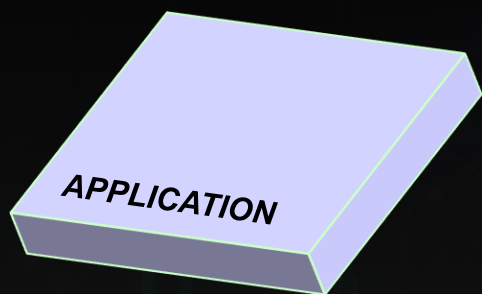
DBS Gandalf



How do we achieve cloud architecture?

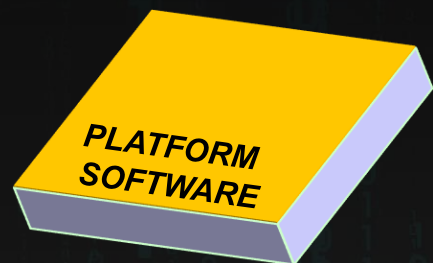
Traditional architecture

Cloud architecture



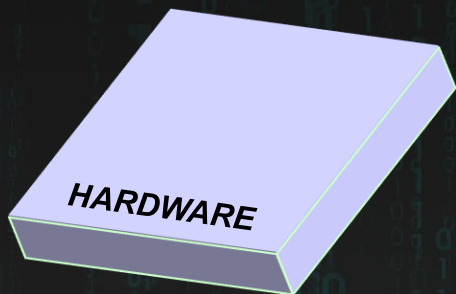
**Built for customised
Hardware and Software**

Built for Cloud



- One Supplier
- Customised per application

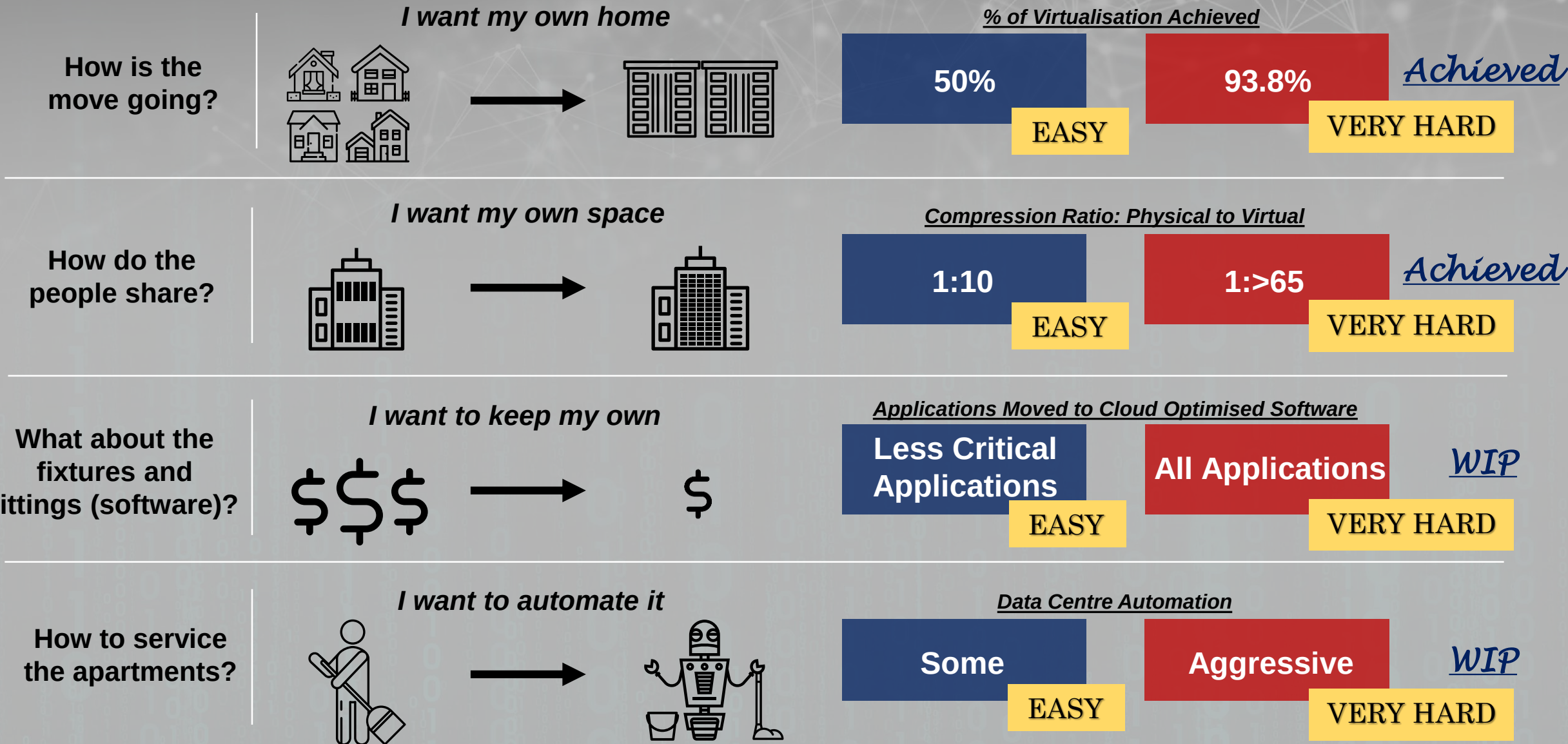
- Open source: inexpensive to scale
- Standard: fault-tolerant through automation



- Dedicated to one application
- One Supplier
- Customised

- Shared
- Many suppliers: inexpensive
- Standard: fault-tolerant through scale

How is DBS doing on Private Cloud journey?



Massive savings with DBS' Gandalf Cloud approach



* Technology infrastructure cost.

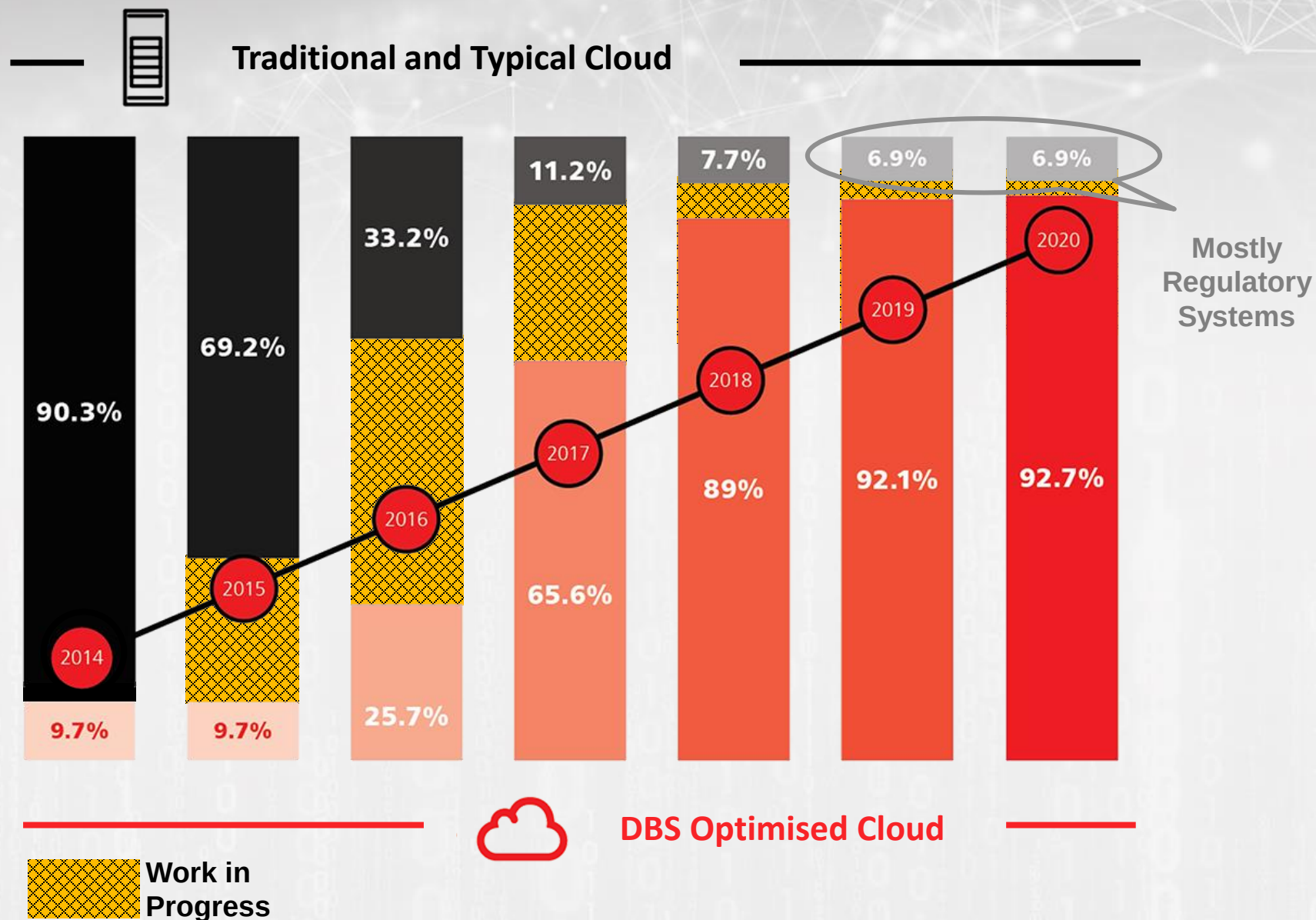
Hardware refers to compute and storage capacity, software refers to middleware and database software, people refers to administrator support

And 2018 target – able to run 50% compute on Public Cloud

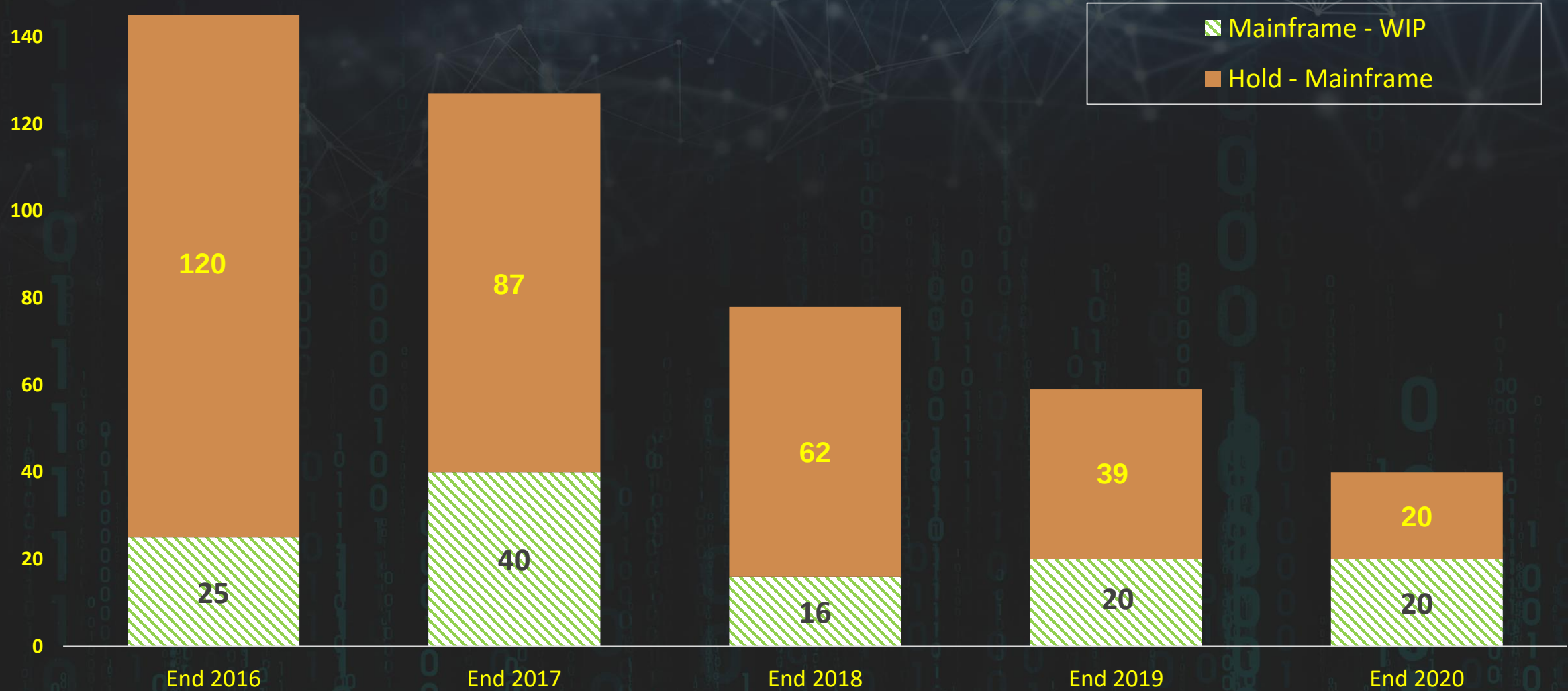


Visit our
Gandalf booth to get
the full experience!

How are we doing on our Applications transformation Journey?

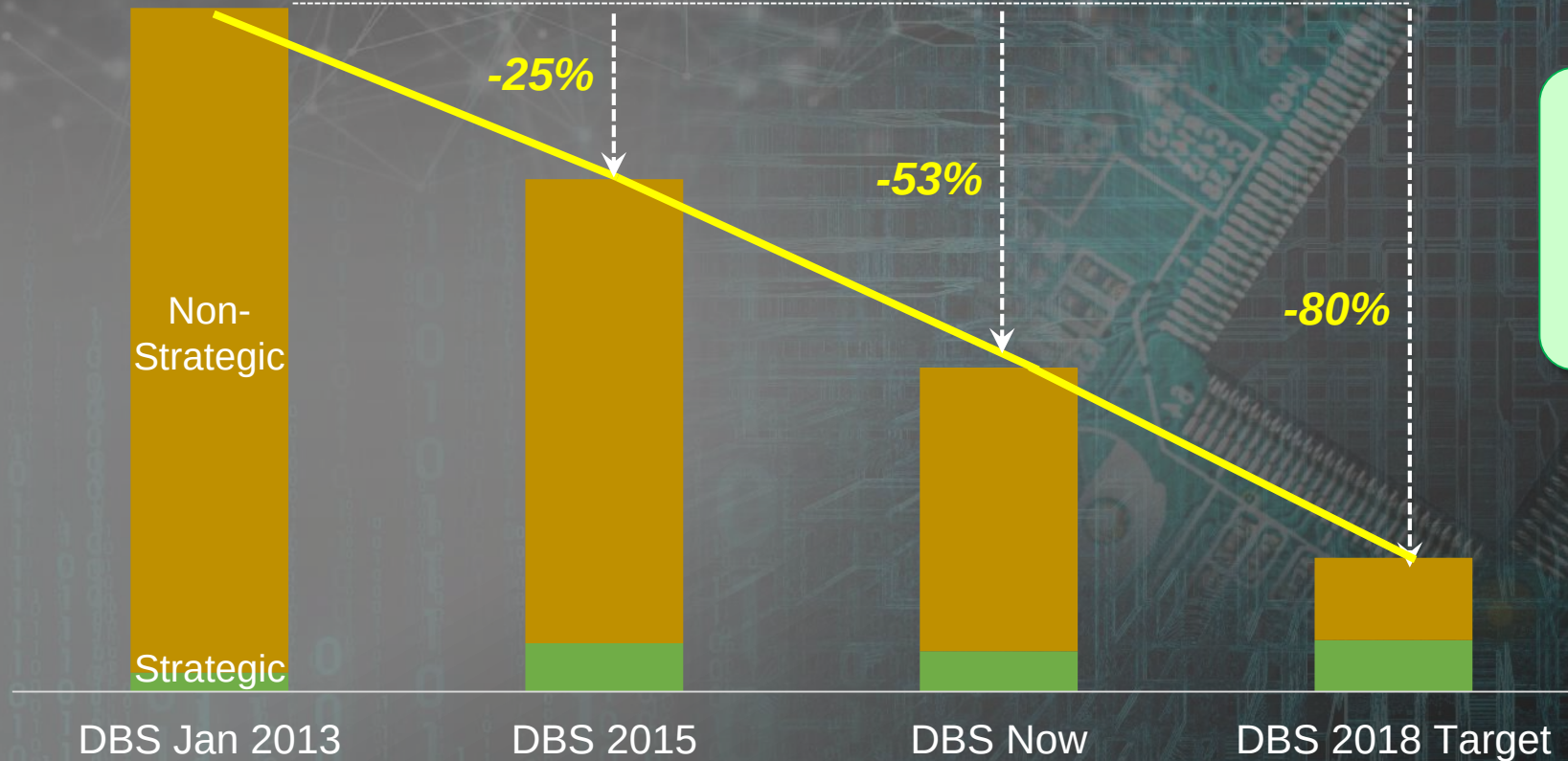


Modern technology must extend to Core Platforms, so we are gradually and gracefully exiting mainframe applications



We are therefore able to drive aggressive virtualisation and physical server decommissioning

Server footprint



- 80% reduction in server footprint
- 90% reduction in non-strategic

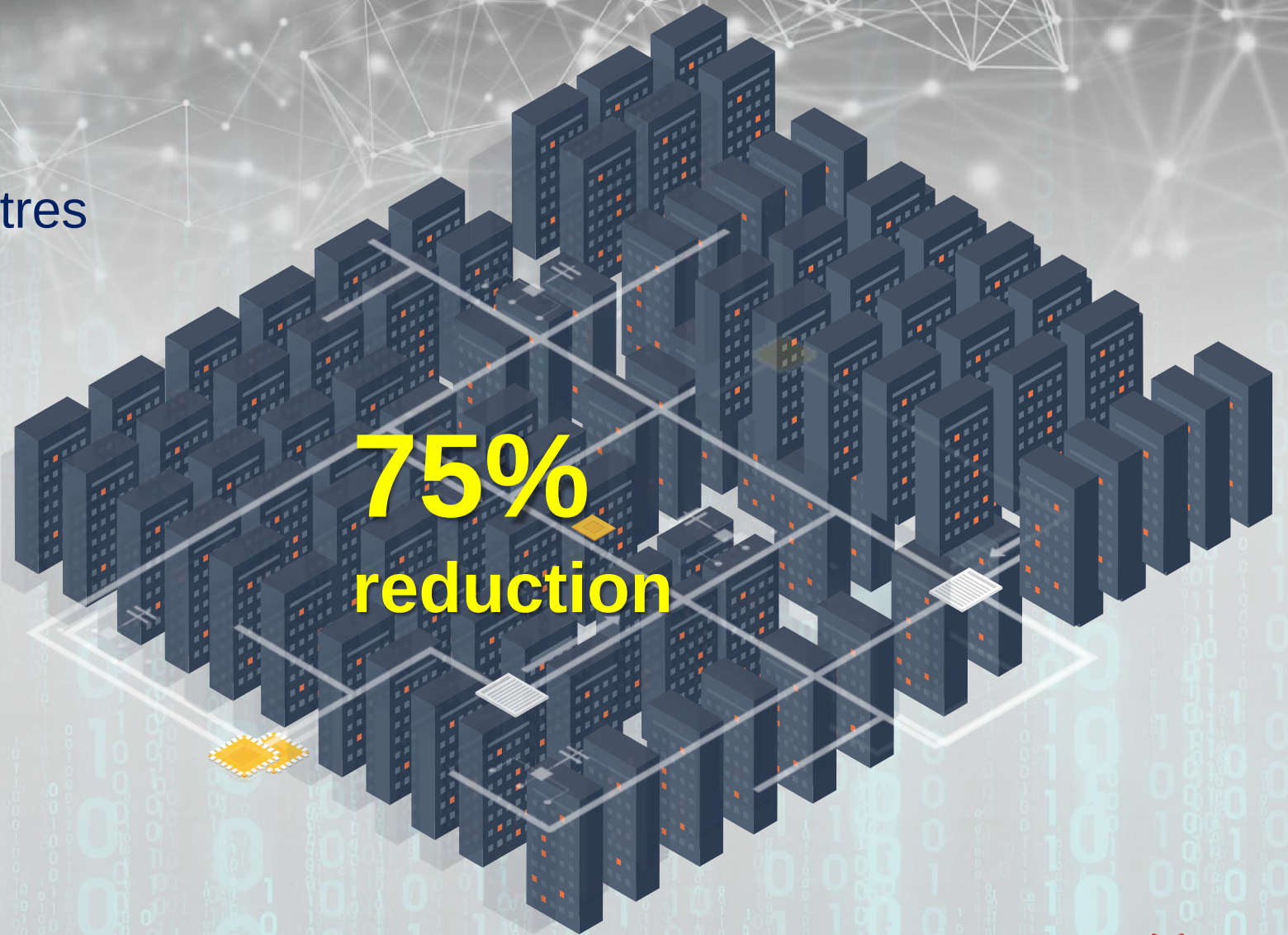
By early 2019, we would have shrunk our Data Centres
by 75%

Typical banks

Busy consolidating Data Centres
... and doing some cloud



Consolidated our physical
Data Centres years back ...
we're now shrinking



“For me 50,000 new customers need just 1 server”

Jack Ma (Alibaba) to Walmart –

“If you want 10,000 new customers, you have to build a new warehouse, hire people ... for me? 2 servers.”



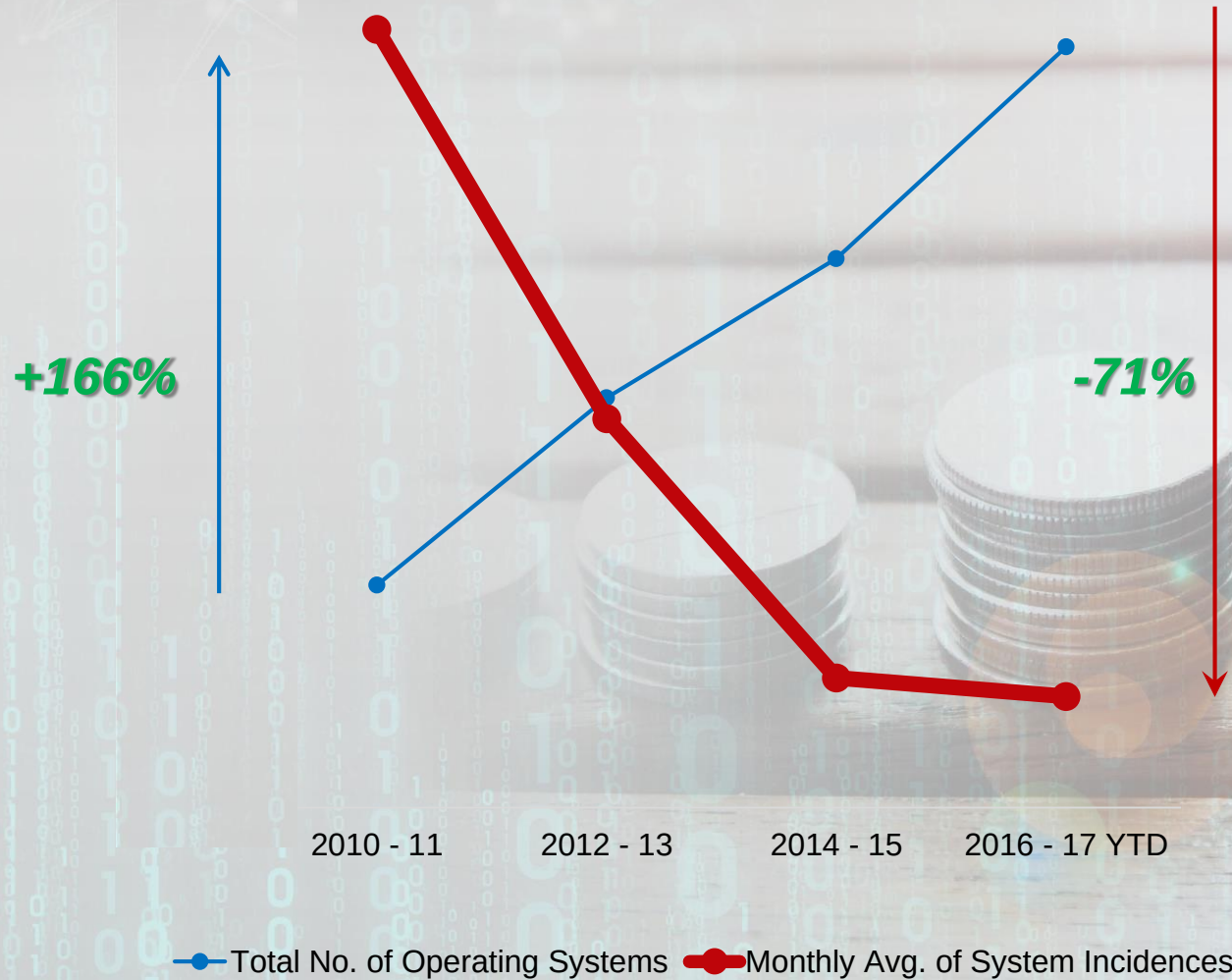
Dave Gledhill to Jack Ma –

*“You need 2 servers for 10,000 new customers ...
For me 50,000 new customers need just 1 server”*



*Image source: Forbes

Dramatic reduction in System Incidences, despite 166% increase in Operating Systems



**71% reduction in
System Incidences
(2010-2017 YTD)**

The DBS Security Recipe ...

Predictive

*"Frictionless"
controls, forward
looking to threat
trends*

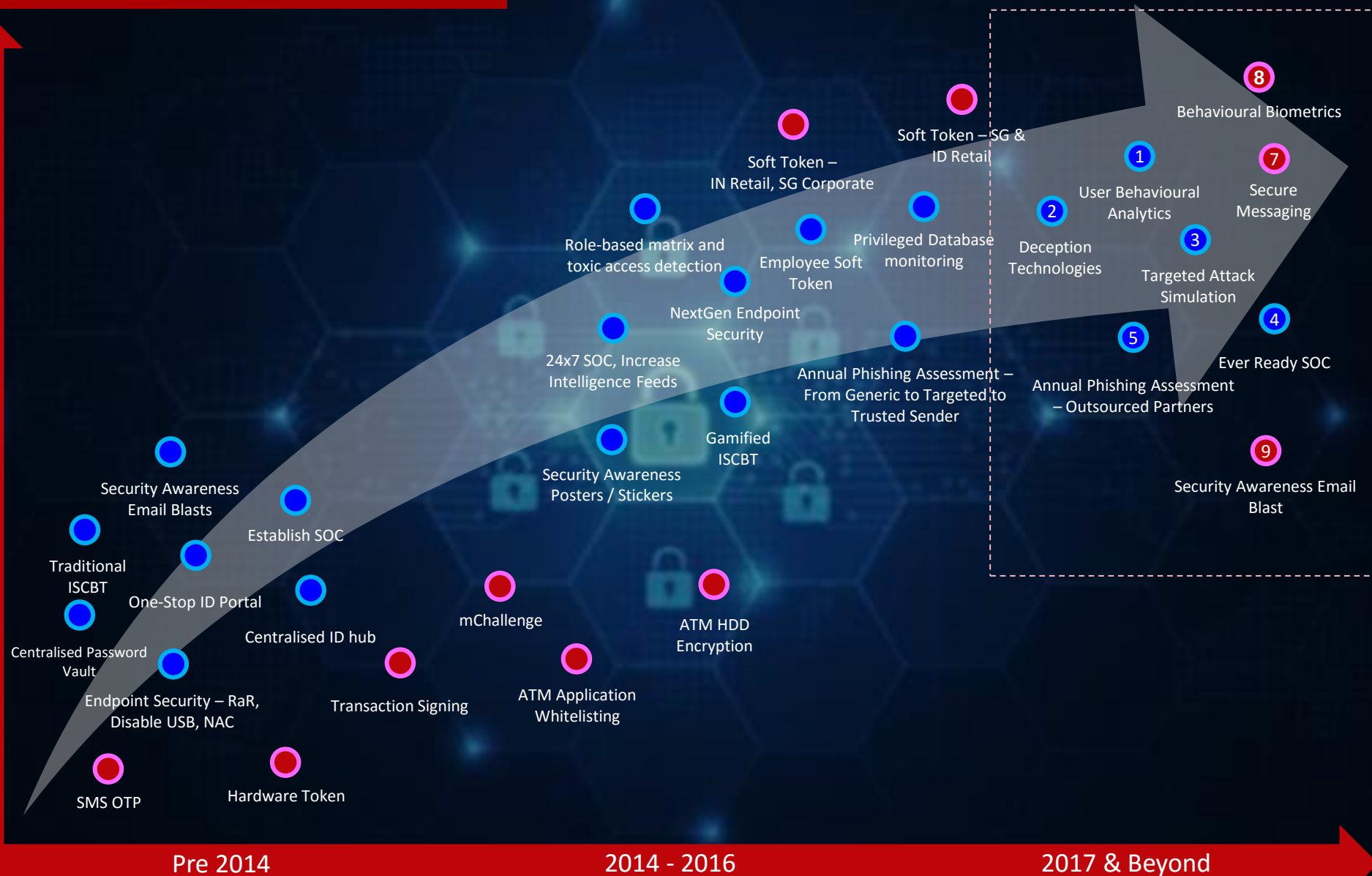
Proactive

*Less prominent and
more pre-emptive
controls*

Preventive

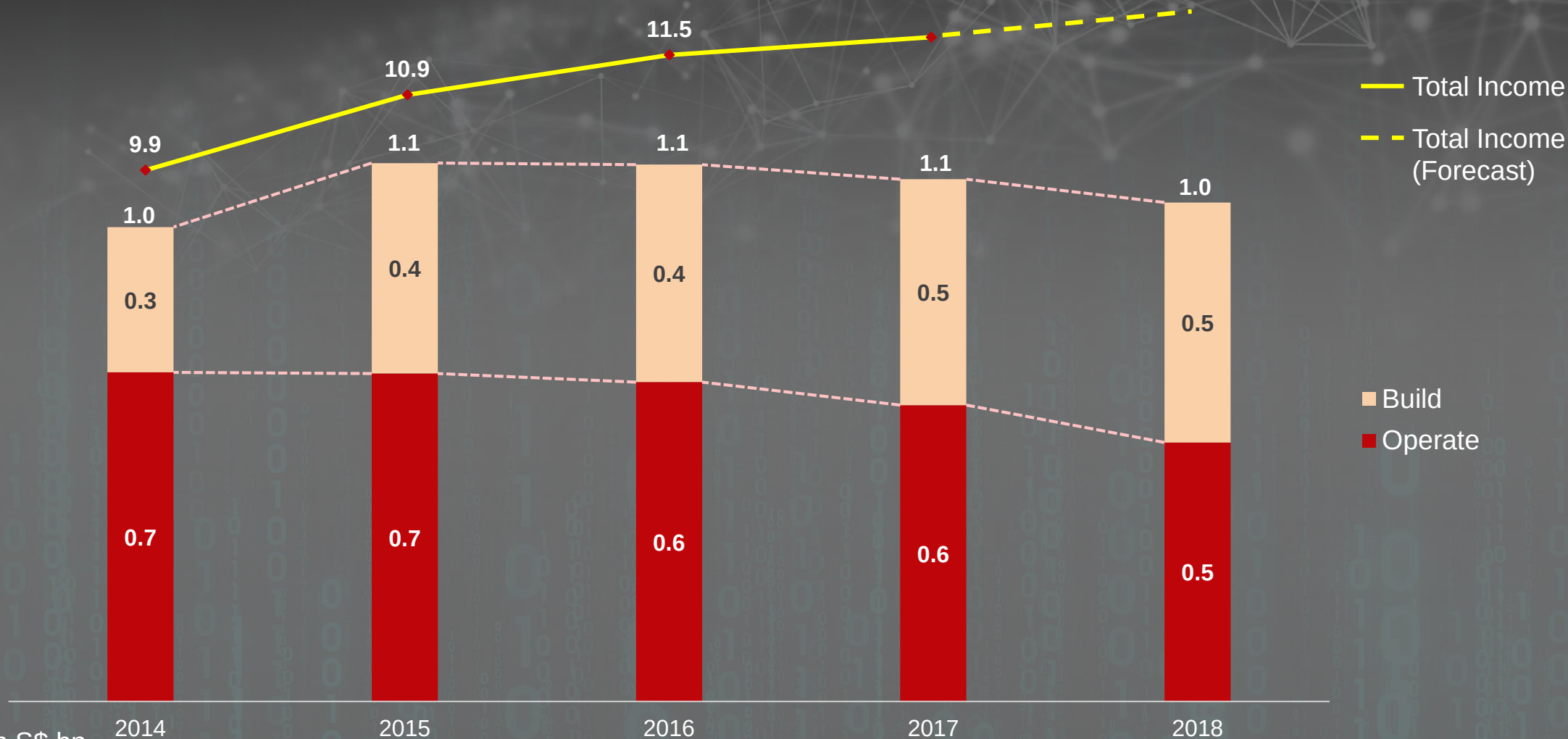
*Intrusive controls,
reactive to
business/regulatory
requirements*

This is where our focus is now



DBS' Technology Spend – Flat total spend in Phase 2

Shift happening from Operate to Build



All figures are in S\$ bn

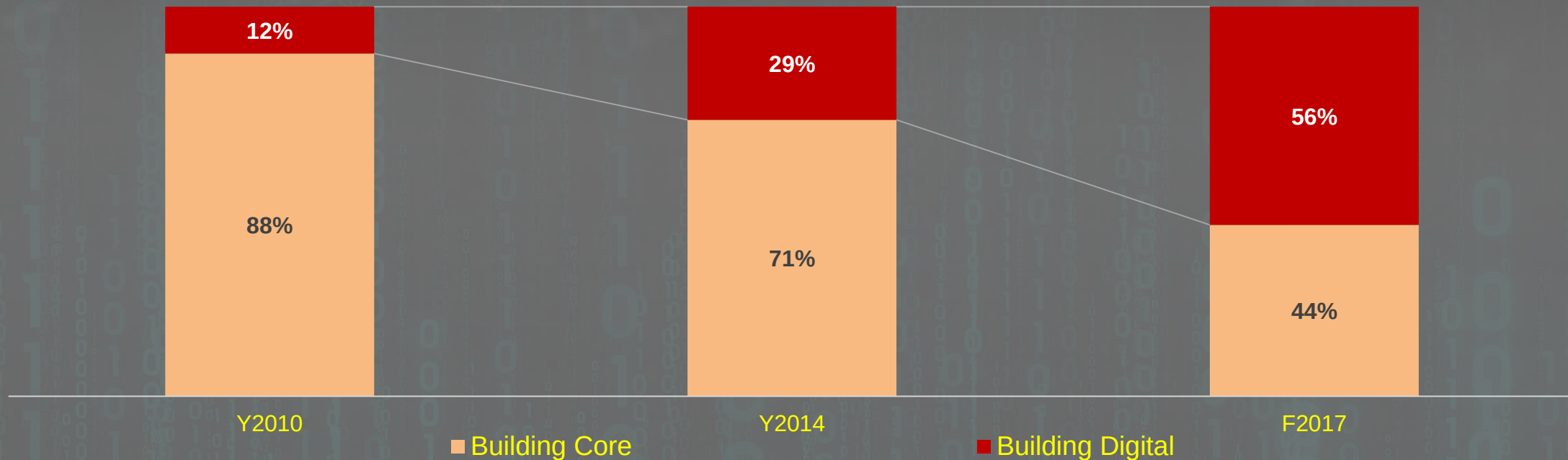
Operate: Includes all BAU and Production application support, data centre, network, hardware, data security/cybersecurity, laptop/desktop, maintenance fee for licence, tokens, POS peripherals and impairment cost

Build: Consists of IT development resources for IT Initiatives and Enhancements, depreciation and new licence cost

Well on track to deliver the Gandalf technology transformation targets, and focus even more on building for digital

- ✓ Core banking systems – built
- ✓ Capacity issues – addressed
- ✓ New platforms for new business – built
- ✓ Gen 1 Cloud journey – initiated

- ✓ Building digital channels and connectivity
- ✓ Developing digibank platform
- ✓ Building next gen infrastructure and network
- ✓ Starting the “GanDalf” Cloud journey



(1) Data above excludes Lantern integration expense in 2017

(2) Building Core: Includes all IT Initiatives for building core capabilities, platform, infrastructure, external regulatory demands and refresh of applications

(3) Building Digital: Includes building new electronic channels, data analytics, big data, digital customer journey, ecosystems and APIs

Gandalf Transformation Targets by 2018



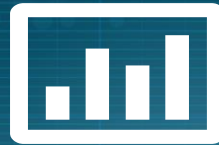
Become Cloud Native

Reduced Cost.
Improved Resilience
and Scalability



Increase Release Cadence 10x

Reduced
Time-to-Market



Build for APIs and Performance

Customer Centric.
Extending to Ecosystems



Data-driven Culture, Analytics-led Customer Science, Instrumentation and Experimentation

Customer Centric



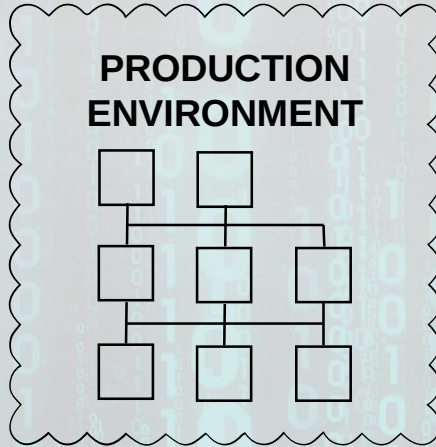
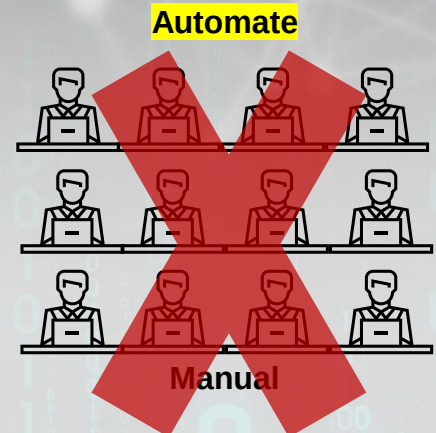
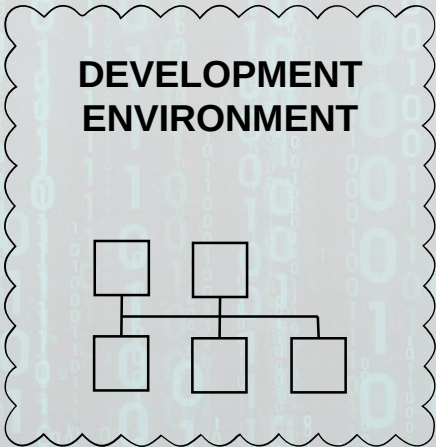
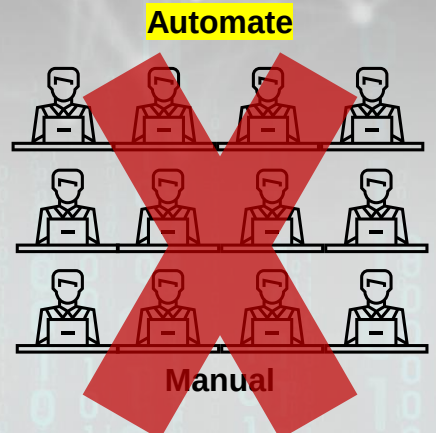
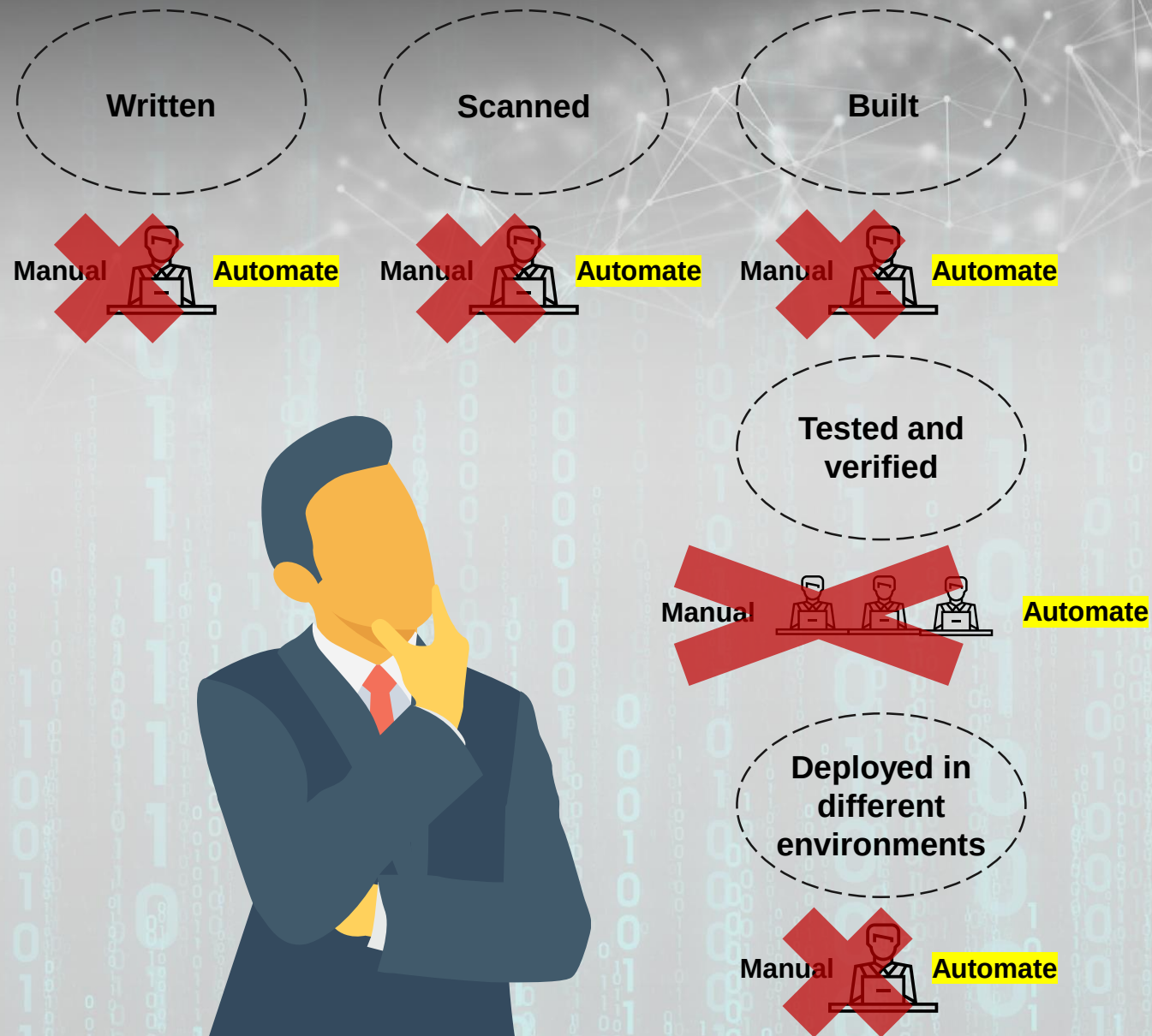
Business Benefits

- Cost efficiency
- Resilience
- Time-to-Market
- Ability to extend to ecosystems
- Ability to experiment for improved customer experience

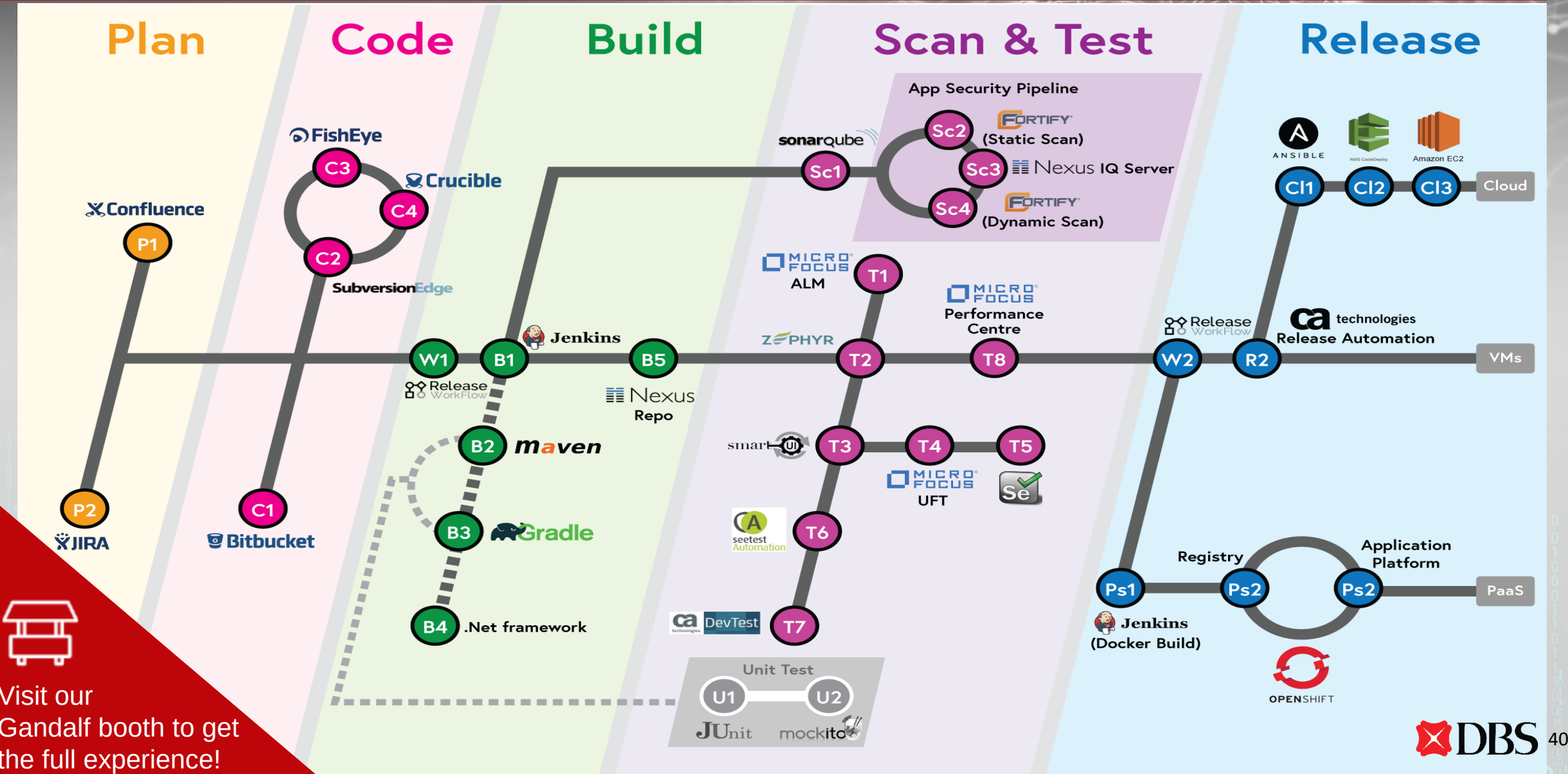
Investing in People and Skills



To introduce changes to production, code needs to be...



Enterprise DevOps Platform - First we had to build complete automation pipeline

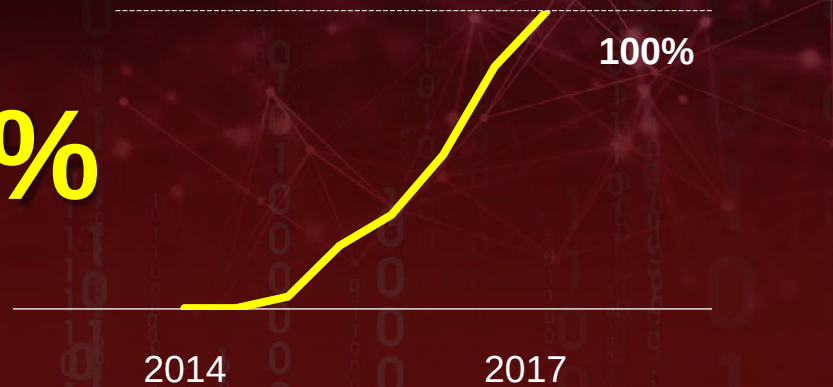


Visit our Gandalf booth to get the full experience!

Aggressive automation has enabled us to move much faster and increase efficiency

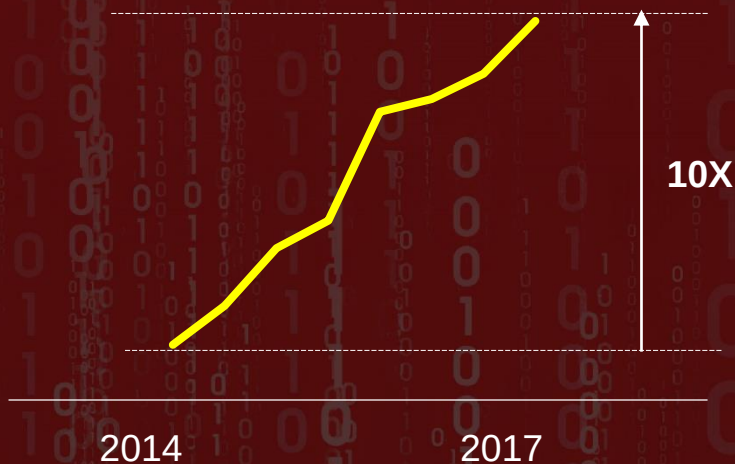
100%

DevOps: % of automated application releases



10x

Volume of automated test executions



Cadence – No. of monthly deployments

7.5x



A revolutionary new offering



**Entered into new markets
– with lots of unknowns**



We needed to move fast



**And have the ability to do
weekly releases**



Gandalf Transformation Targets by 2018



Become Cloud Native

Reduced Cost.
Improved Resilience
and Scalability



Increase Release Cadence 10x

Reduced
Time-to-Market



Build for APIs and Performance

Customer Centric.
Extending to Ecosystems



Data-driven Culture, Analytics-led Customer Science, Instrumentation and Experimentation

Customer Centric

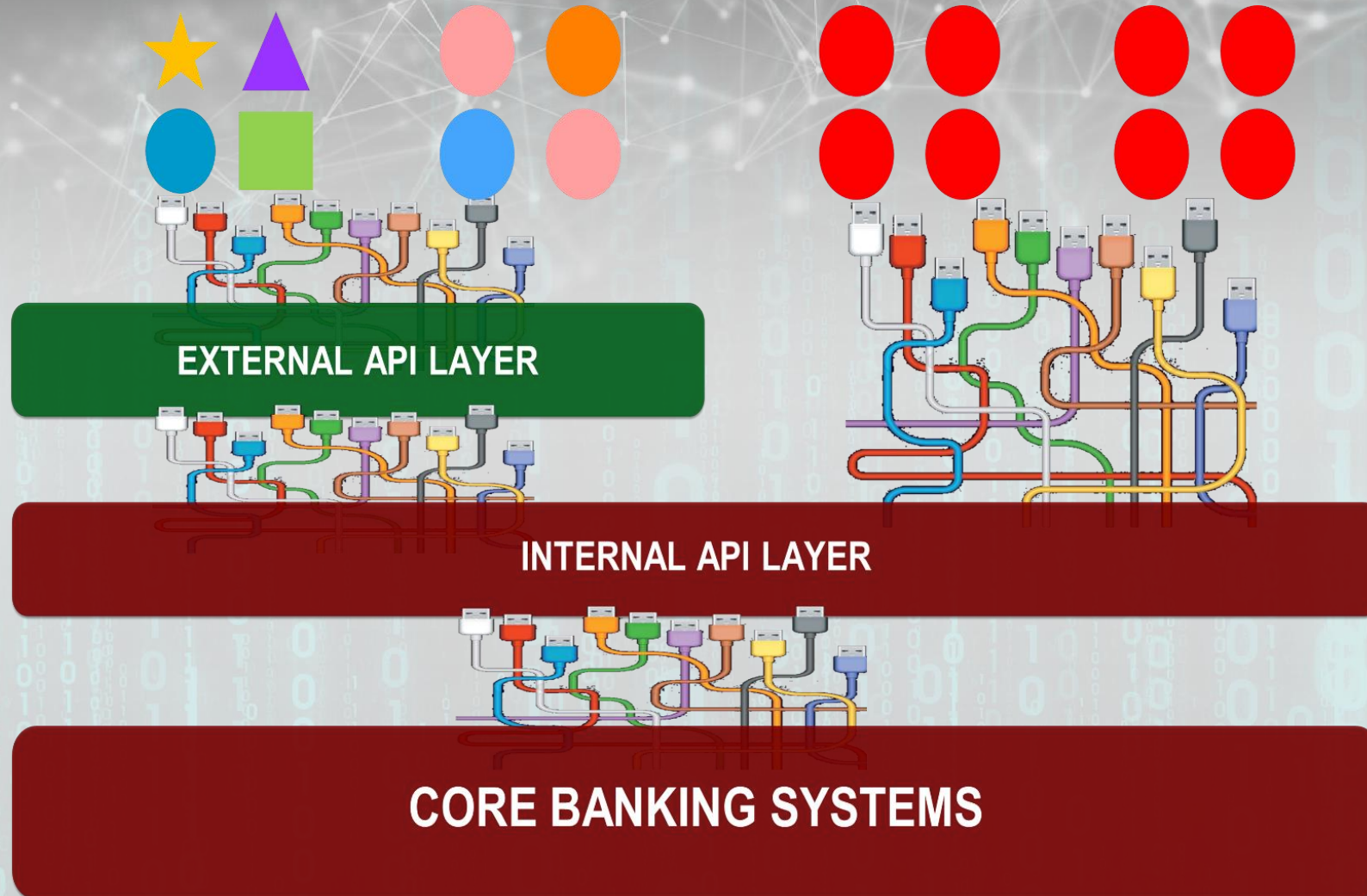


Business Benefits

- Cost efficiency
- Resilience
- Time-to-Market
- Ability to extend to ecosystems
- Ability to experiment for improved customer experience

Investing in People and Skills

Remember the API strategy – Enabling us to massively scale ... with ecosystem partners through APIs?



Towards Making Banking Invisible ... through APIs



POWER OF SIMPLICITY

- ✓ 8 million SMEs
- ✓ 30,000 salespersons
- ✓ DBS Inside

Get a **Connected Bank**
experience with your ERP

With DBS-Tally integrated e-Payment solution
experience the Power of Simplicity

Visit our Tally
booth to get
the full
experience!



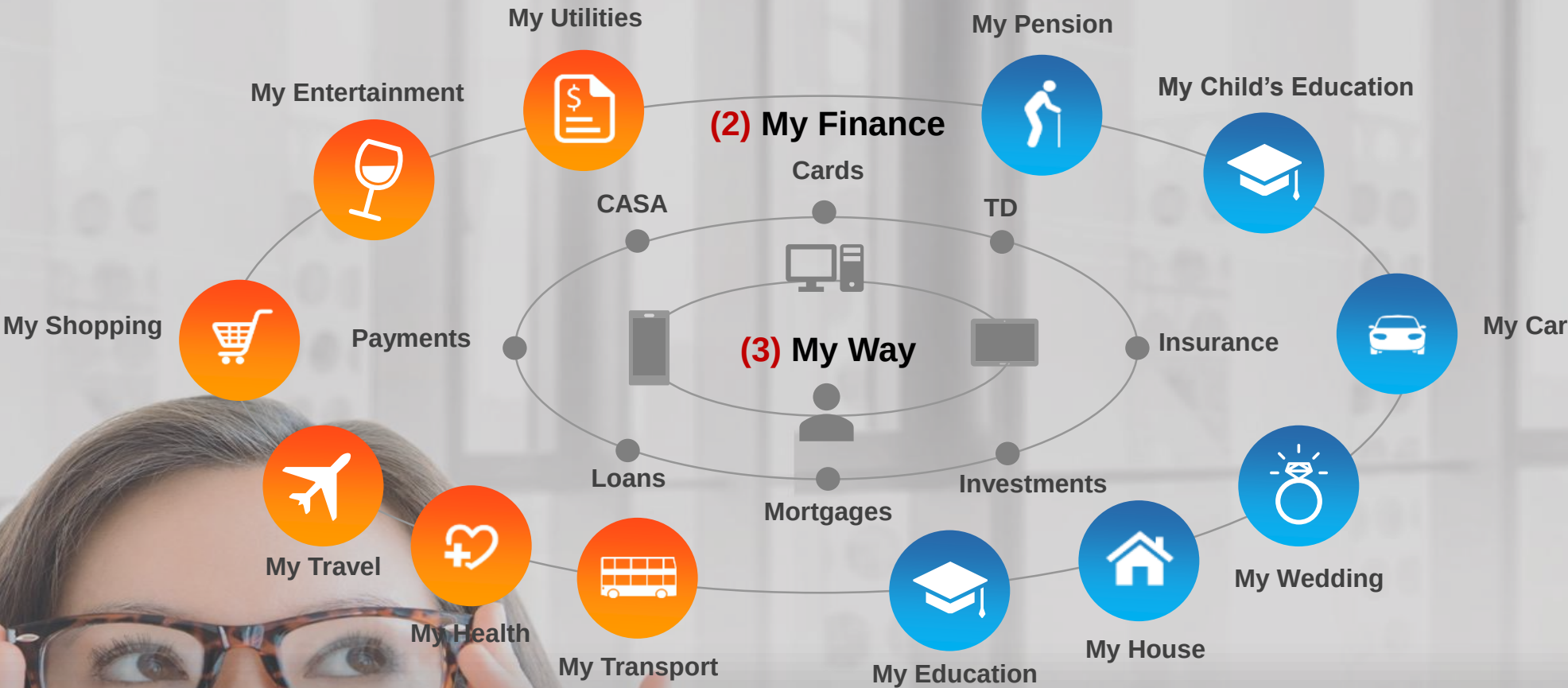
How could we do this at scale?



Thinking of Banking as a Solar System, we can't do it all alone

Make banking 'invisible'

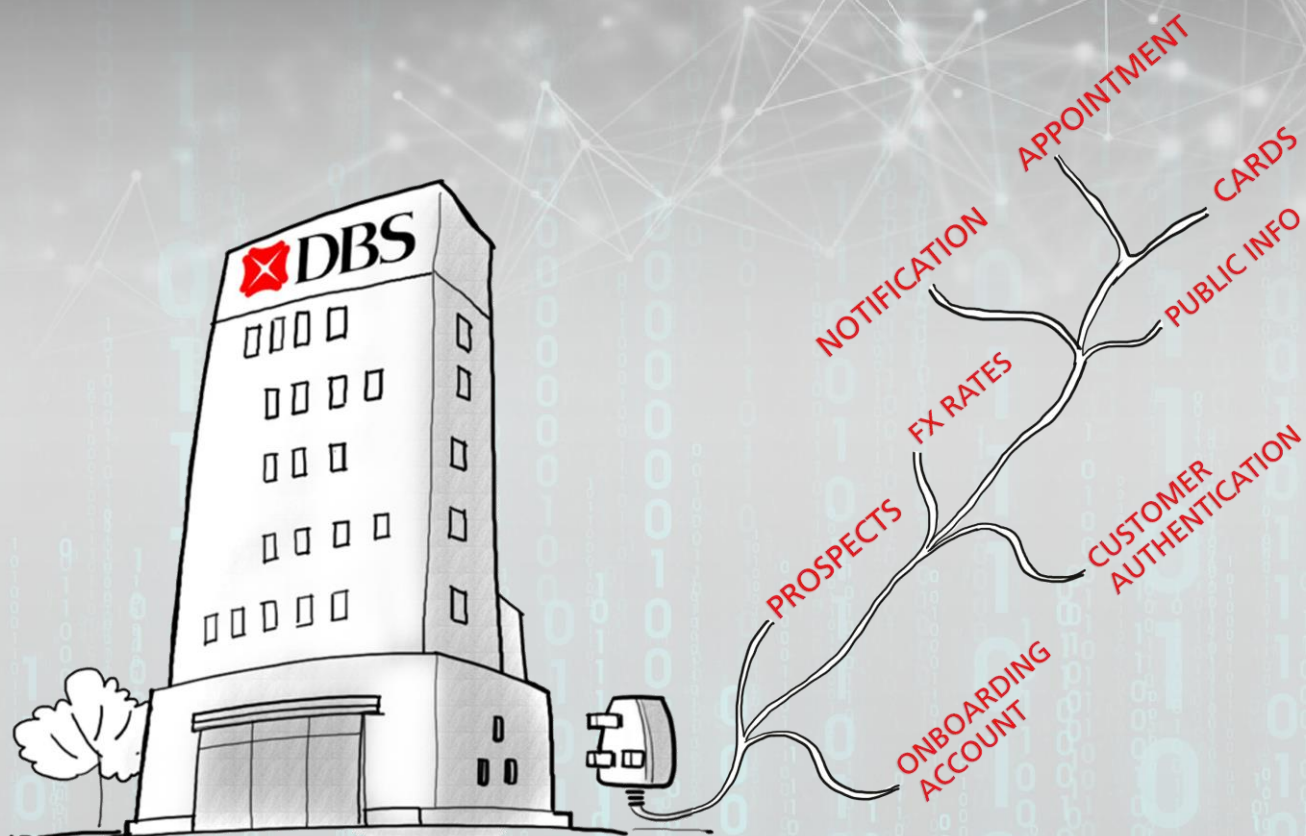
(1) My Everyday Life & Goals



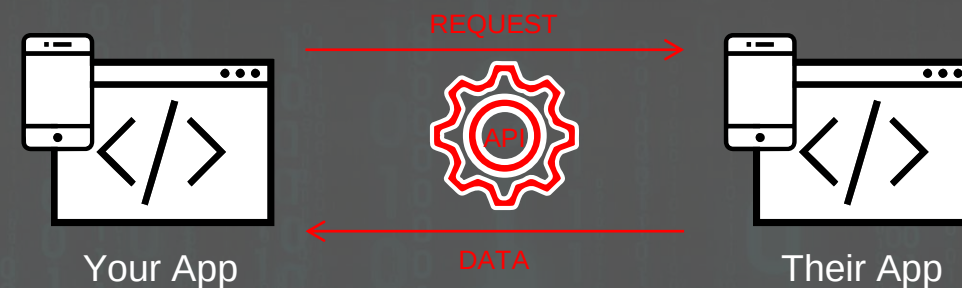
So, we needed to set up a platform...



... through which our partners can come and connect



OPEN API STRATEGY



... a standard way for one application to interface with another to get access to its data and / or functionality

**We launched the world's largest banking API platform
in early November 2017**

Visit our
APIs booth to
find out more!



[Discover APIs](#)

[How It Works](#)

[Support](#)

[LOG IN](#)



RE-IMAGINING EXPERIENCES

[Start Building](#)

150+
Live APIs

50+
Live
partners

150+ APIs available

More than 150 APIs to support your business and your customers' needs

Gandalf Transformation Targets by 2018



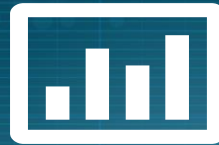
Become Cloud Native

Reduced Cost.
Improved Resilience
and Scalability



Increase Release Cadence 10x

Reduced
Time-to-Market



Build for APIs and Performance

Customer Centric.
Extending to Ecosystems



Data-driven Culture, Analytics-led Customer Science, Instrumentation and Experimentation

Customer Centric



Business Benefits

- Cost efficiency
- Resilience
- Time-to-Market
- Ability to extend to ecosystems
- Ability to experiment for improved customer experience

Investing in People and Skills



**Move from being
product-focused to
customer-centric**

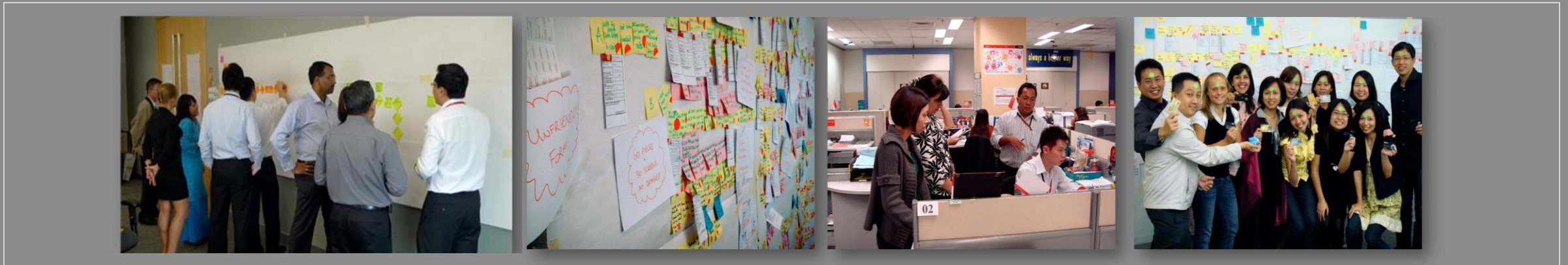
We were at rock bottom with our Customer Experience scores in 2009...

2009



Survey Ranking

Incremental improvements were made through RED programme, PIEs, Lean IT, and so forth



**And we were able to drive substantial productivity
saves for customers, as well as employees**

Customer Service

250

**million customer
hours saved**

Internal productivity

1

**million employee
hours saved**



Also saving customer hours now ;)



Google Search

I'm Feeling Lucky

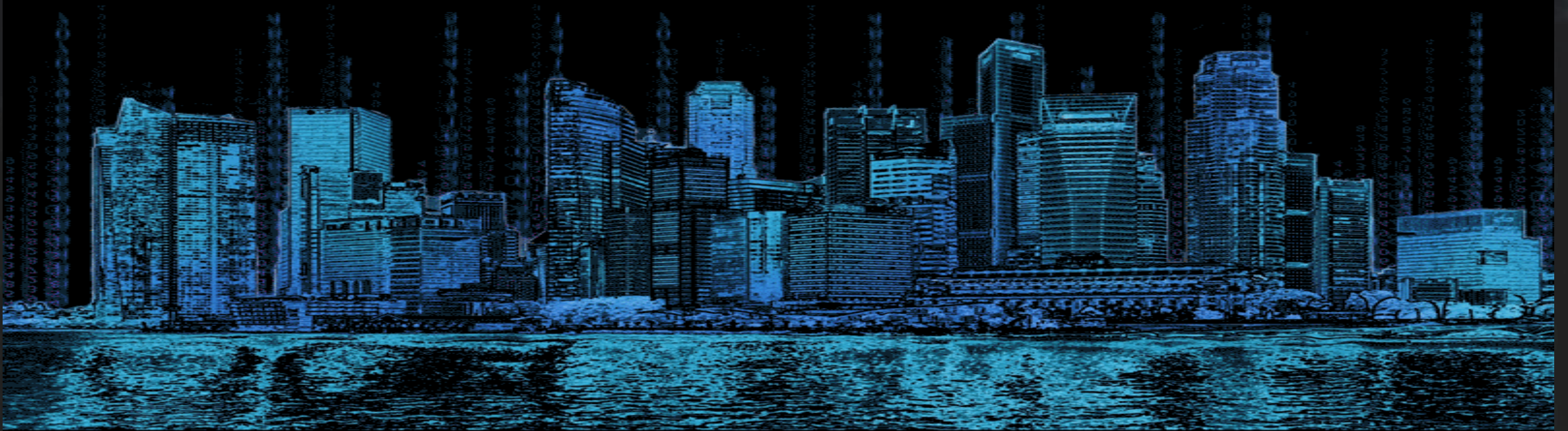
These initiatives drove us to hit the top of the chart in Customer Experience

2013



Survey Ranking

Making Banking Invisible





Customer Journey

Transaction Journey

REPORT CARD

A+

ATM online

A+

Fraud prevention

A+

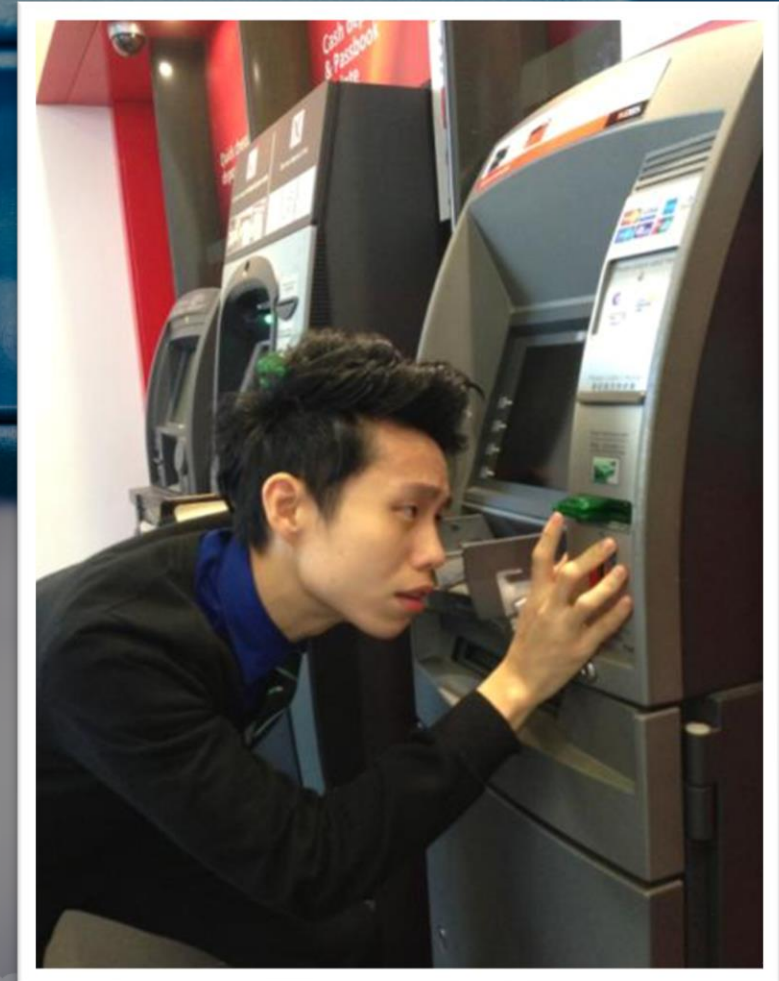
Retained Cards

A+

Card Theft

A+

Security



What is....

...1 less retained
card worth?

Card Retained

↓ 82%

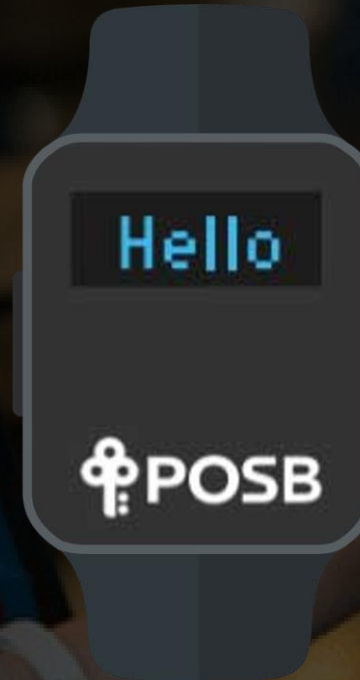
250

Employee Journeys
Customer Journeys



POSB Smart Buddy – Journey thinking at work

World's first in-school wearable tech and savings programme for children



Cash from parents' perspective ...



Transaction Journey



We want to eliminate cash



Customer Journey



Different perspective on cash

Discover



Define



Develop



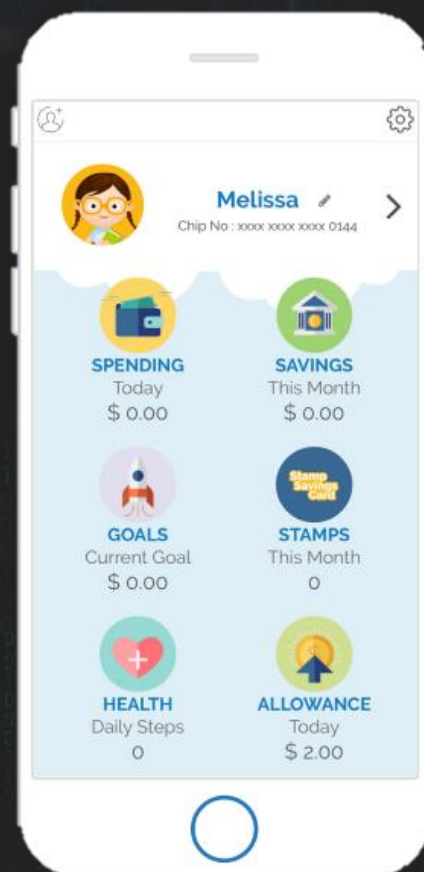
Deliver

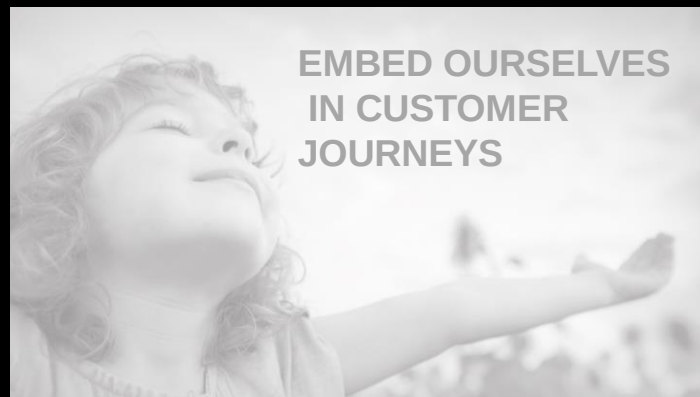
POSB Smart Buddy was born ...

Visit our POSB
Smart Buddy booth
to have the full
experience!



*A contactless payments ecosystem to **cultivate sensible savings and spending** habits among **young students** in an **interactive, engaging manner** !*





**Strengthen our people
and culture**

What makes a 22,000 start-up?



Customer Obsessed



Data-Driven



Take Risk & Experiment



Agile



Be a Learning Organisation

What makes a 22,000 start-up?



Customer Obsessed



Data-Driven



Take Risk & Experiment



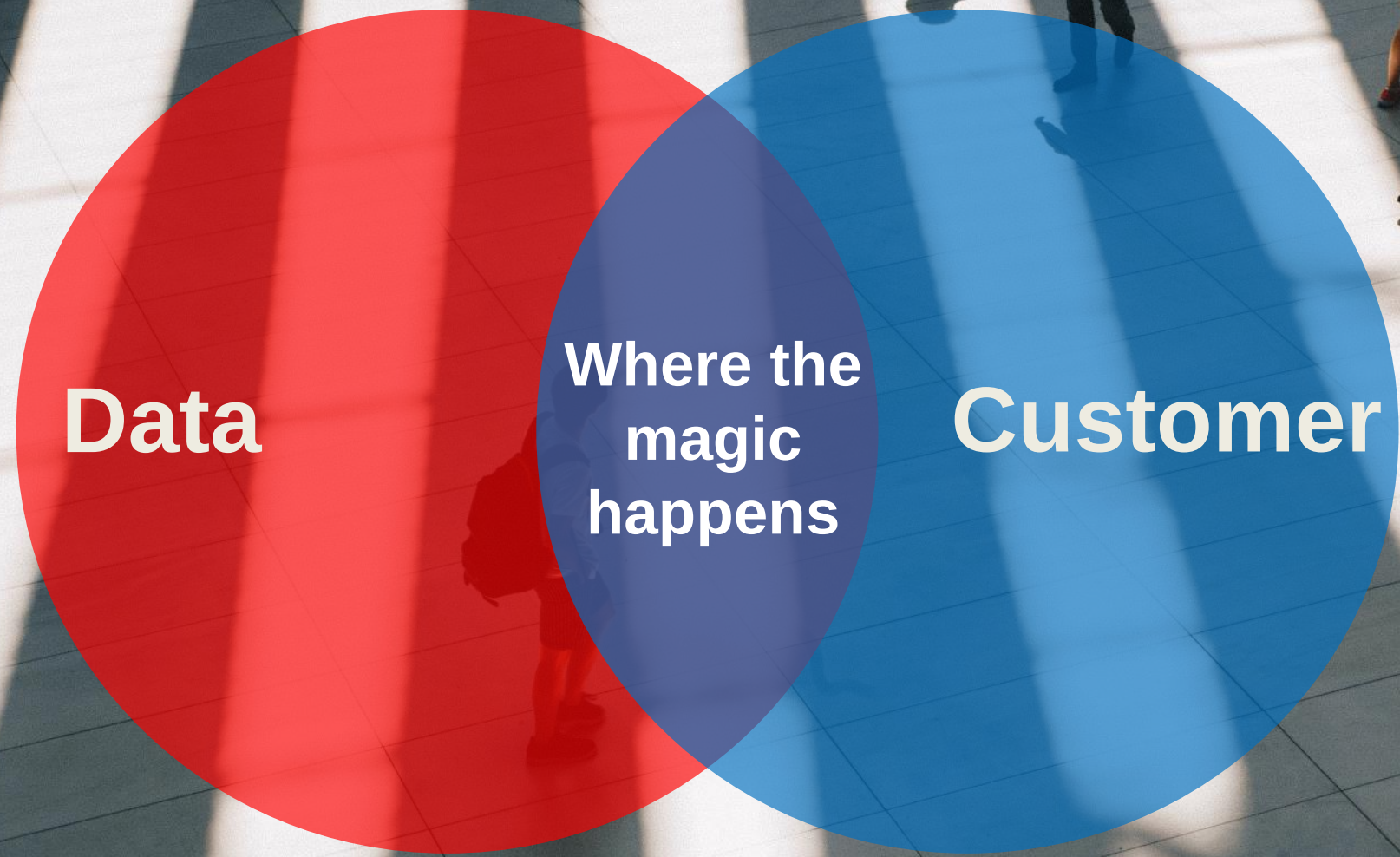
Agile



Be a Learning Organisation

**Where data and customer insights meet...
that's where the magic happens**

Visit our CYCLE
booth to have the
full experience!





We have the highest velocity ATMs in the world... how do we stop them from going “cash-out”?



*“Highest velocity in the world” **
20,000 transactions per month per machine

Average time between cash-outs

- 2010 → 3 months
- 2017 → **55 years**

Predicting when a salesperson is going to leave

Raw data

Training Data

- Number of trainings attended
- Days of training
- Mandatory / Non-mandatory

Branch details

- Branch location

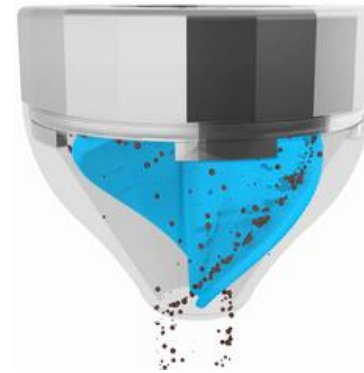
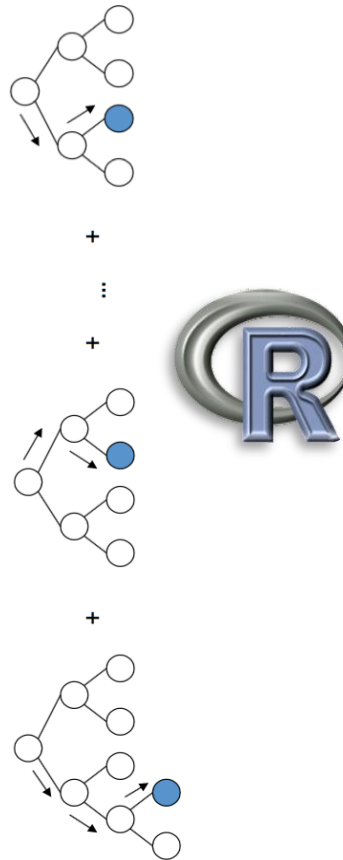
RM Revenue

- RM's monthly revenue dollar in first 8 months

Leave Pattern

- In initial months
- Over several consecutive months

Ensemble



Business Impact:

85%
predictive accuracy

Predicting which branch will have audit issues



Visit our Future of Auditing booth to have the full experience!



Raw data

Transaction Data

- Deposits
- Withdrawals
- Product purchases
- Non-financials



Branch
Data

Branch Service

Health Check data

- Quarters since last BHC
- Number of High, Medium and Low findings by BHC

HR Data

- New Hire
- Resignees
- Headcounts
- Span of control

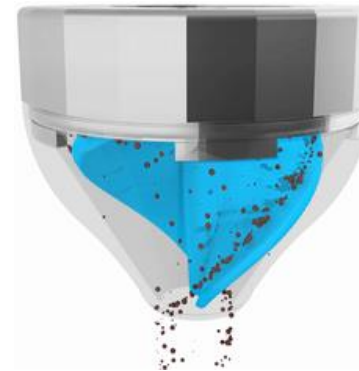
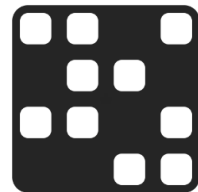
Risk Events

- Group Audit findings
- Risk findings in control self assessments.

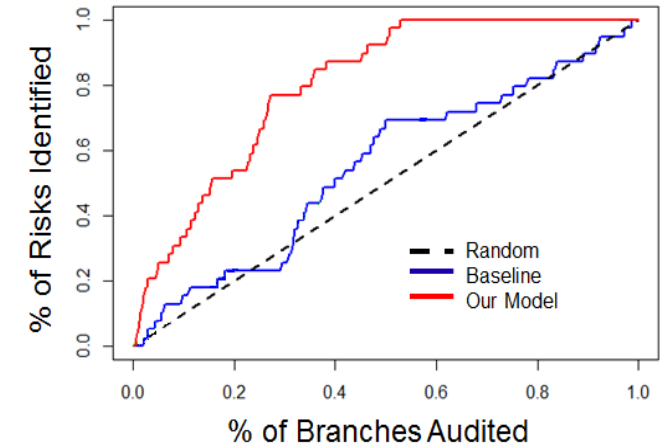
Customer complaints

Cash discrepancy

Ensemble



Business Impact:



**IES Prestigious
Engineering
Achievement Award 2015**

What makes a 22,000 start-up?



Customer Obsessed



Data-Driven



Take Risk & Experiment



Agile



Be a Learning Organisation

14,800 bank staff engaged in innovation programs



IMAGINARIUMS



UNI.CORN



DIGITAL MINDSET
HACKATHON



STARTUP XCHANGE



IDEA VAULT



HOTSPOT



DIGITAL IMMERSIONS



API PARTNERS



STRATEGY WORKSHOP



FINTECH ASSESSMENTS



CUSTOMER JOURNEYS



MAKERS' WORKSHOP



API HACKATHONS



DAILY
INNOVATION
BRIEFING



INNOVATION
BACKYARD



COMMUNITY EVENTS

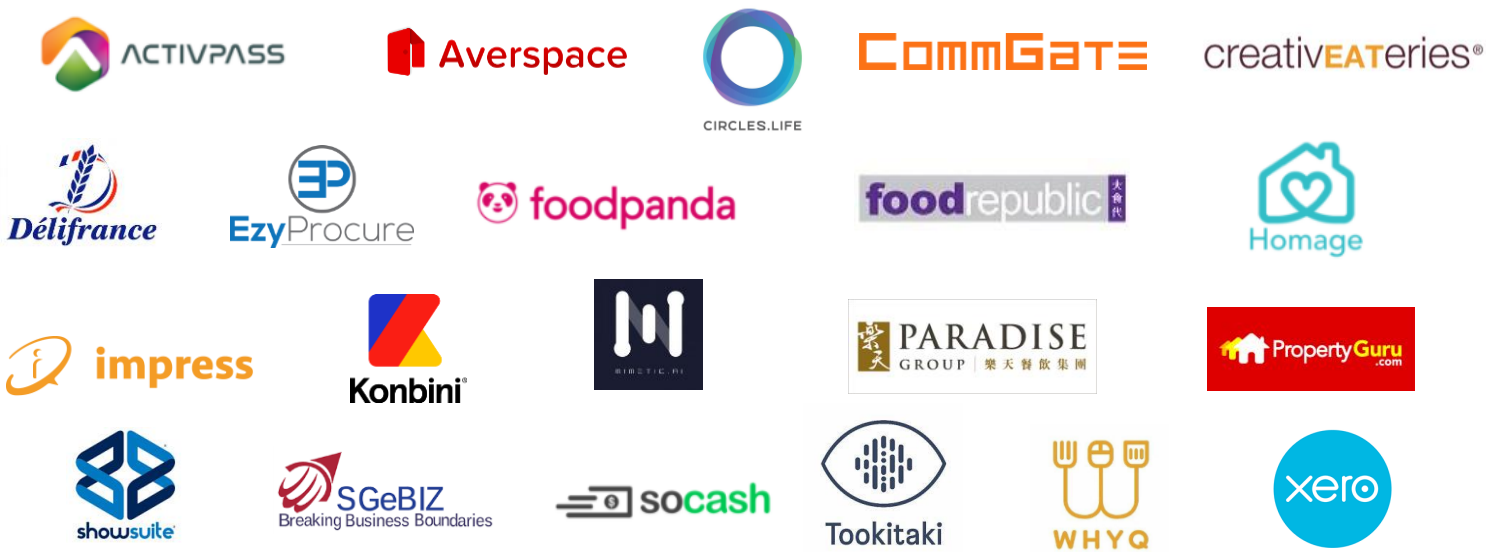
We got our people to work with industry partners and start-ups to develop innovative mindsets

30+ Biz Challenges | 100+ Start-ups introduced | 500+ Participants in community events

Corporate



Start-ups / SMEs



Universities



Government



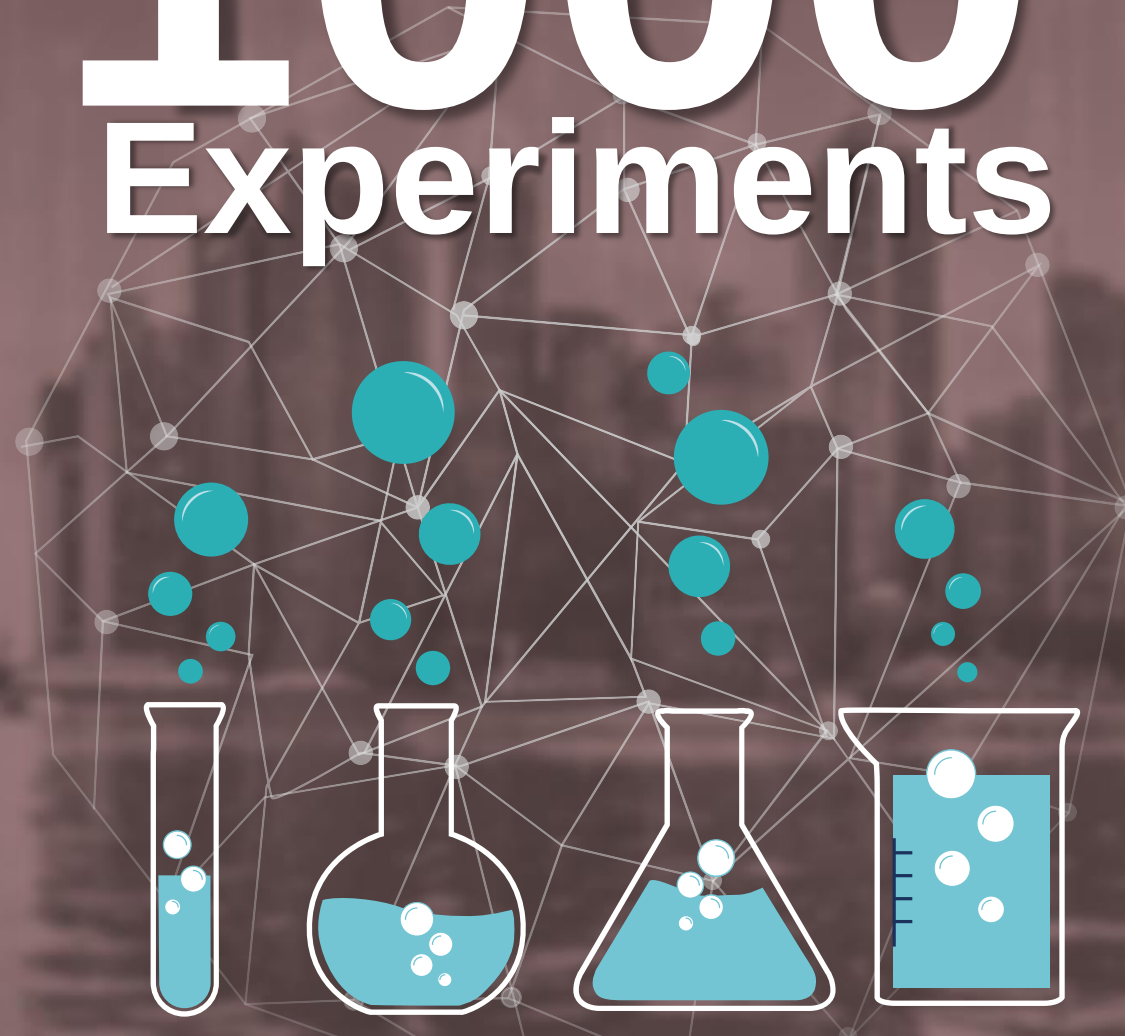
Regional



AND MORE

We set a target for ourselves... far exceeded that!

1000 Experiments



What makes a 22,000 start-up?



Customer Obsessed



Data-Driven



Take Risk & Experiment



Agile



Be a Learning Organisation

Business-led Agile... It's all about people!



Agile@Work



Wonderwalls



**Across
geographies**

The way we work ...



JOY SPACE



DBS Asia Hub 2, Hyderabad

Designed to define a 22k collaborative culture

What makes a 22,000 start-up?



Customer Obsessed



Data-Driven



Take Risk & Experiment



Agile



Be a Learning Organisation



Learning from Amazon... Starting with a press release

≡

Q

FINANCE TIMES

HOME WORLD US COMPANIES MARKETS OPINION WORK & CAREERS LIFE & ARTS

Sign InSubscribe

How markets learnt to stop worrying and sell the Swiss franc 51M AGO

May sticks to ending free movement from March 2019 1H AGO

Moody's raises concerns over UK consumer credit 2H AGO

Discovery Communications agrees to buy Scripps for \$14.6bn 2H AGO

May 2020

How DBS has transformed the way it learns: An interview with Dave Gledhill Managing Director and Head Group Technology & Operations DBS Bank



The Quarterly: How have you transformed the way you learn within your organisation?

“Continuous learning embedded into day to day life...”

Dave Gledhill: Learning at DBS has been evolving and it has been a journey. Continuous learning is a daily practice and not a one-off activity. Our curiosity-led learning culture is our competitive advantage. Individuals and teams are fully engaged in sharing insights, skillsets and mindsets as well as challenging each other through relentless reflection, dissension and disruptive practices. The impact has been increased employee engagement, alignment and empowerment to create sustainable value for customers, employees and the community. Teams’ joy of discovering that when they work and learn together towards a common purpose - it is more rewarding, fun and effortless. This operating rhythm is infectious and inspires others! It has got the organisation in a state of continuous learning.

“Multiple channels...”

“Curiosity and self-led learning...”

The Quarterly: How did you go about making these changes?

Dave Gledhill: We used experimentation to explore and embed new ways of learning:

- We ensured we were learning with a purpose. On both fronts – formal training and workplace learning – every activity has a clear purpose targeted to drive improved people performance and business outcomes.
- We recognised we needed to energise our natural curiosity and capacity to learn, adapt and improve iteratively. We supported experimentation with new ways of learning through daily learning rituals, team-curated playlists and designing learning journeys for “jobs to be done”
- In addition we increased the engagement of employees in self-directed and team-based learning which is mobile and social using technology as an enabler. Learning is accessible in byte-size chunks, on-the-go, just-in-time (and not just-in-case) via smartphone technology.

“Byte size, on the go...”

“Mobile and social learning using technology...”

The Quarterly: So what’s next?

Dave Gledhill: We are now a learning organization and well on the way to make DBS #BBIW by transforming our resources for future.

Learning in different ways across the region





Rajesh Koneru - DAH2



CRO - Monish



CRO Lunch & Learn



Rachelle DIMAPILIS



Rajan TIWARI - CST



CBGT - Rajeev Kumar JHA



Introducing the

GANDALF SCHOLARS

Learn and Teach Back



CRO - Rachelle DIMAPILIS



DBS Australia - Eddy MANAOIS

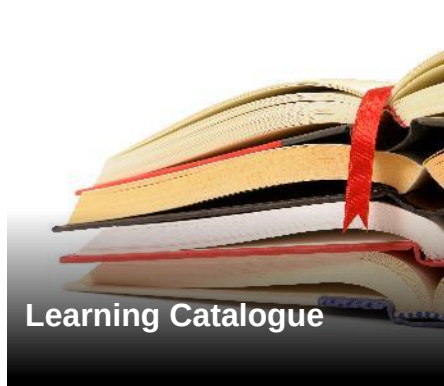


CBGT - Yin Yong TEE



CBGT - Yin Yong TEE

Transforming into Digital Bankers with gamified learning



DigiFY BETA
CREATE THE FUTURE YOU



Gandalf Technology and Culture Transformation

Moving from legacy company to tech company. Creating competitive advantage.

1 Gandalf Tech Transformation

Systematic multi-year effort to streamline tech infrastructure has enabled us to rapidly adopt digital technologies and build sustainable competitive advantage

2 Culture Transformation

Digital technology combined with customer focus and culture transformation improve market share through superior customer experience and create new markets through ecosystems

3 Tech-driven business

Accelerated income growth achieved with low marginal costs as a result of scale, speed and efficiency

Being the D in



ND





Executing the digital strategy

Dave Gledhill
Chief Information Officer

17 November 2017

The presentations contain future-oriented statements, including statements regarding the Group's vision and growth strategy in the light of anticipated trends as well as economic and market conditions. Such statements necessarily involve risks and uncertainties, which may cause actual performance in future periods to differ from projections.