The State of Software Quality Assurance (and Testing)

QA engineer walks into a bar
Orders 1 beer
Orders 0 beers
Orders -1 beer
Orders 2147483649 beers
Orders 1.3 beers
Orders NULL beers
Orders "" beers
Orders asnwikfjsdf
Orders 🍺 🥃
Orders U+1F37A
Orders ; DROP TABLE BILL;
Tries to leave without paying…

The Year That Software Bugs Ate The World

In 2017, bugs banned people from Twitter, secretly recorded them in their homes, and even caused a train crash. Is there anything they *can't* do?
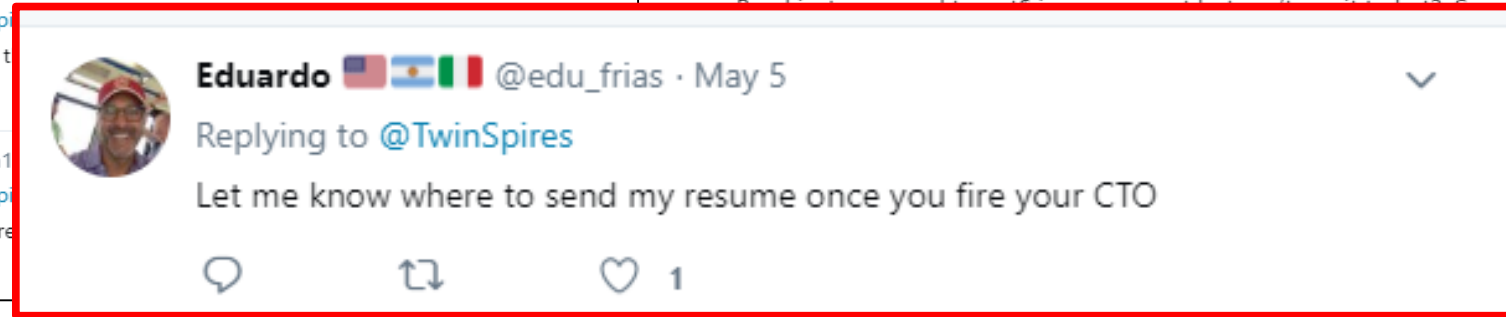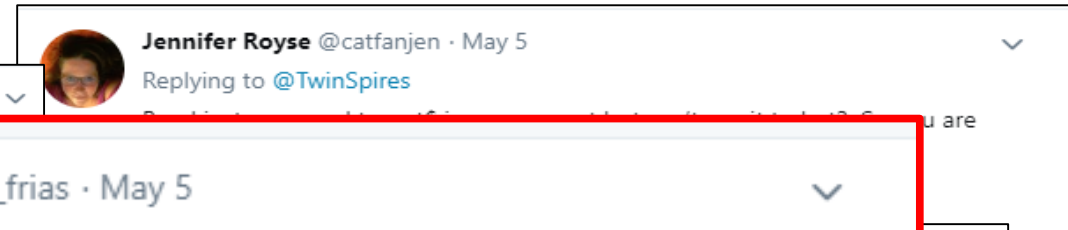

https://www.fastcompany.com/40505226/the-year-that-software-bugs-ate-the-world

BY HARRY MCCRACKEN

In 2017, it was fashionable to stress over the prospect of machines getting so smart that they render humans obsolete or maybe even decide to kill us all.

Look on the bright side, though: This also turned out to be a year that provided an inordinate number of reminders that what computers do is follow instructions given to them by people. And people have a tendency to write buggy software. When it fails, it can be startling, alarming, irritating, or darkly funny—or, sometimes, all of the above.

Before we look at the 2017 recap, let's look at a local one from 2018...

WDRB.com

keith @keith13k · May 5
Replying to @TwinSpires
This is ridiculous you guys are amateurs
💬   🔁   ♡ 6

Jennifer Royse @catfanjen · May 5
Replying to @TwinSpires

Kevin Hammer @KevinHammer1 · May 6
Replying to @TwinSpi
Xpressbet never has t
💬   🔁

Eduardo 🇺🇸🇦🇷🇮🇹 @edu_frias · May 5
Replying to @TwinSpires
Let me know where to send my resume once you fire your CTO
💬   🔁   ♡ 1

Jay Bohn @jaybohn1
Replying to @TwinSpi
No troubles with Xpre
💬   🔁

🔁 1   ♡ 5

Kate Large @kateisalady · May 5
Replying to @TwinSpires
Maybe your team can fix your interface from 1998 while they're at it
💬   🔁 1   ♡ 3

jmalcom @jmalcom · May 5
Replying to @TwinSpires
Unplug it and plug it back in.
💬   🔁   ♡ 6

THE BUG THAT MADE GMAIL DISRESPECT PERSONAL BOUNDARIES

Google

Danny van Kooten @dvkoot · 13 Feb 2017
Replying to @BrusselsGeek @gmail @googledevs
Gmail App is the worst. I disabled a bunch of app permissions and it keeps asking to re-enable, but works.
♡ 1

Wojtek Wiewiorowski @W_Wiewiorowski · 13 Feb 2017
Replying to @BrusselsGeek @gmail @googledevs
Tell me, it is fake news, please.
💬 2

Jennifer Baker @BrusselsGeek · 13 Feb 2017
Nope. :(

Technology Wales @technologywales · 13 Feb 2017
Replying to @BrusselsGeek @gmail @googledevs
They want to measure our stress levels so they can monitor how well they are screwing us over ;) #privacy
↻ 1   ♡ 1

call me garbage tell me get a job
@emm_fee
why do i need to turn on "body sensors" to use gmail? what is google after? pretty sick of them.
7:39 AM - Nov 17, 2017

The message was actually a bug that has lingered ~~around for a while~~ now, with the earliest user complaints dating back to 2015. ~~Pressing~~ "Cancel" on the pop-up does not seem ~~to~~ the pop-up ~~...~~

James Katt @jameskatt · 13 Feb 2017
Replying to @BrusselsGeek @gmail @googledevs
Don't use gmail if you want privacy.

Sylvie Fodor 🇪🇺 #FreeShahidulAlam @cepic_sf · 13 Feb 2017
Replying to @BrusselsGeek @gmail @googledevs
You need to change email client and use other services!
💬 1   ↻ 1

0:03   6,255 views

THE BUG THAT EQUIFAX PROBABLY WISHES IT HAD PATCHED

In September, credit-monitoring kingpin Equifax's website is breached by someone who makes off with sensitive information on up to **143 million Americans**.

LILY HAY NEWMAN   SECURITY   09.14.17   01:27 PM

EQUIFAX OFFICIALLY HAS NO EXCUSE

"As the security community processes the news and scrutinizes Equifax's cybersecurity posture, numerous doubts have surfaced about the organization's competence as a data steward. The company took six weeks to notify the public after finding out about the breach. **Even then, the site that Equifax set up in response to address questions and offer free credit monitoring was itself riddled with vulnerabilities.**"

Equifax Inc. (EFX)
Announces Significant Data Breach; -13.4% in After-Hours

BAIRD

Significant data breach obviously a material negative, but -13.4% after-hours seems like over-reaction based on our understanding of events. Our understanding is data retained by EFX primarily generated through consumer interactions was breached via the Apache Struts flaw (i.e., core databases not believed to have been breached). We expect near-term operating headwinds plus material event-related expenses. However, we believe EFX's access to key data sources are unlikely to be affected, and client relationships and EFX's brand are unlikely to be meaningfully impaired intermediate to long term.

- **Data breach impacts ~143mn U.S. consumers, an event garnering widespread press/media attention.** Information accessed includes names, social security numbers, birth dates, addresses, and in some instances driver's license numbers. A smaller number of credit card numbers (209k), dispute documents (182k), and information on UK and Canadian residents also accessed.
- **Key EFX databases are not known to have been breached** as part of the incident, including the consumer credit file, TWN, NCTUE, IXI, or its commercial credit database. Our understanding is that data entered (and retained) through consumer portals/interactions (consumers inquiring about their credit reports, disputes, etc.) and data around it was breached via the Apache Struts flaw.
- **Equifax reportedly first became aware of the incident July 29,** while the breach is believed to have occurred from mid-May through July (one of the most concerning things to us is that the unauthorized access occurred for ~2.5 months before being identified, raising concerns more broadly regarding EFX's data security/practices).
- **We expect disclosure timing to raise additional questions.** While the lag until public disclosure while EFX conducted an investigation and gained a better understanding of the breadth of the breach and root causes is understandable: (1) there were several executive stock sales outside of 10b5-1 plans on 8/1-8/2 (quite plausible execs did not know about the situation or its severity at that time), (2) a Congressman is already tweeting questioning the delay, and (3) damages incurred from illicit data usage in the interim may create additional liabilities.

LOWERING PRICE TARGET

1-Year Price Chart
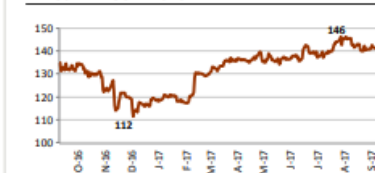
Stock Data

Rating:	Outperform
Suitability:	Average Risk
Price Target/Previous:	▼$141/$157
Price (9/7/17):	$142.72
Market Cap (mil):	$17,398
Shares Out (mil):	121.9
Average Daily Vol (mil):	0.49
Dividend Yield:	1.1%

Estimates

| FY Dec	2016A	2017E	2018E
Q1	1.23 A	1.44 A	1.59 E
Q2	1.43 A	1.60 A	1.79 E
Q3	1.44 A	1.53 E	1.71 E
Q4	1.42 A	1.52 E	1.69 E
Fiscal EPS	**5.52 A**	**6.08 E**	**6.77 E**
Fiscal P/E	25.9x	23.5x	21.1x

Chart/Table Sources: FactSet and Baird Data. Price chart reflects most recent closing price.

THE BUG THAT CONFIRMED EVERYONE'S FEARS ABOUT SMART SPEAKERS

Members of the media who got an early unit of Google's Home Mini smart speaker discovered that their Mini is recording audio 24/7…and storing it on Google's servers.

It turns out that a software glitch with the speaker's touch panel was to blame; Google reacts by simply disabling the option to talk to the Mini by pressing the touch panel.
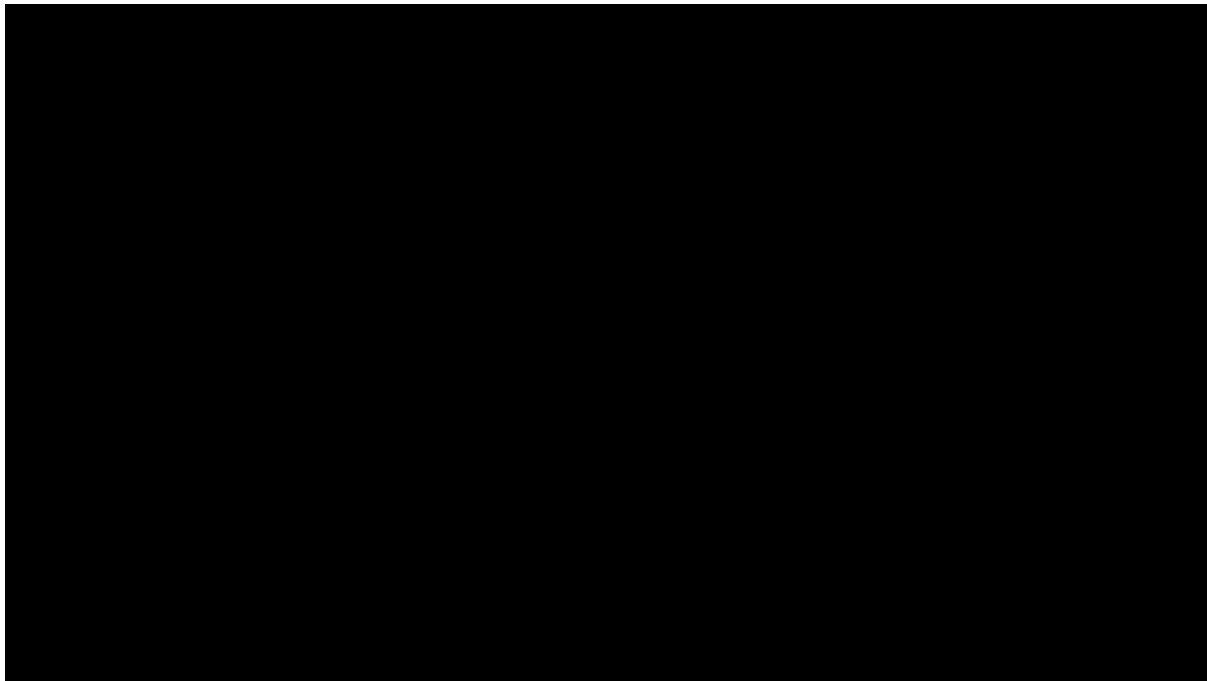
Twitter Support ✓ @TwitterSupport · 5 Nov 2017

We've identified an error with search results for certain terms. We apologize for this. We're working quickly to resolve & will update soon.

💬 172   🔁 342   ♡ 815

Twitter Support ✓ @TwitterSupport · 6 Nov 2017

1 / Late last week, we discovered a technical issue that affected search results: searches for certain words related to sexuality did not populate complete results. We apologize for anyone negatively impacted by this bug. It is not consistent with our values as a company.

💬 79   🔁 202   ♡ 361

Twitter Support ✓ @TwitterSupport · 6 Nov 2017

2 / As outlined in our media policy, media that may be considered sensitive is collapsed in places such as search results, meaning that images and videos would be presented as a link, not automatically populated.
support.twitter.com/articles/20169...

💬 7   🔁 83   ♡ 133

Twitter Support ✓ @TwitterSupport · 6 Nov 2017

3 / One of the signals we use to identify sensitive media is a list of terms that frequently appear alongside adult content. Many of these words on the list are not inherently explicit, which is why they must be used alongside other signals to determine if content is sensitive.

💬 6   🔁 77   ♡ 131

Twitter Support ✓ @TwitterSupport · 6 Nov 2017

4 / Our implementation of this list in search allowed Tweets to be categorized based solely on text, w/out taking other signals into account. Also, the list was out of date, had not been maintained and incorrectly included terms that are primarily used in non-sensitive contexts.

Twitter Support ✓ @TwitterSupport · 6 Nov 2017

5 / When all Tweets containing certain terms were incorrectly collapsed on the photos, video and news search tabs, the search results in those tabs returned an error message indicating that no content was available.

💬 8   🔁 79   ♡ 171

Twitter Support ✓ @TwitterSupport

Follow

@TwitterSupport

6 / We have audited the list and removed terms that should not have been included. We are making changes during the next 24 hours to correct this mistake. Once we are confident it is completely resolved, we'll share an update here.

8:44 PM - 6 Nov 2017

**98** Retweets **261** Likes

💬 39   🔁 98   ♡ 261

Twitter Support ✓ @TwitterSupport · 7 Nov 2017

7 / We have shipped changes to the English version of this list so that the terms related to sexuality will no longer return an error message in search results. In the coming days, we will be working to ensure these changes are reflected in all languages on the service.

THE BUG THAT ELIMINATED THE NEED FOR THOSE PESKY PASSWORDS

A bug in Apple's High Sierra OS provided access to Macs simply by entering the user name "root" and no password, permitting anyone who gets their hands on your computer to get at your files.

Within a day of the problem gaining widespread notoriety, Apple rushes out an auto-installing patch and apologizes.
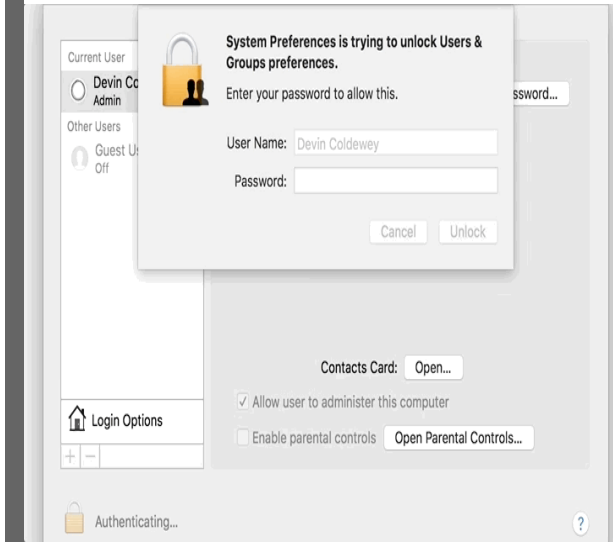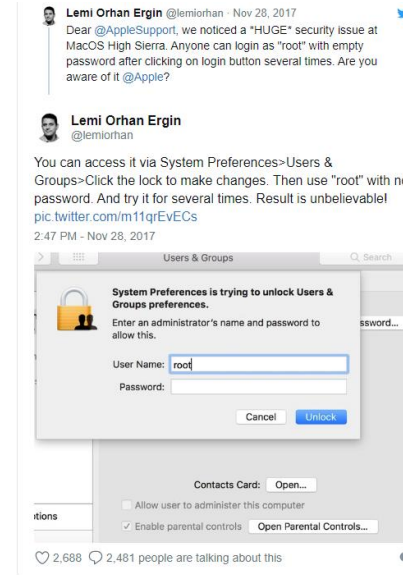
THE BUG THAT UNDID THE FIX FOR THE PESKY BUG THAT ELIMINATED THE NEED FOR PESKY PASSWORDS

The issue appeared to be fixed, but another update re-introduced the problem.

If MacOS update 10.13.1 was installed, the issue returned – and anyone could get into your computer, again. The patch could be reinstalled, and the computer rebooted to address (re-address) the issue.
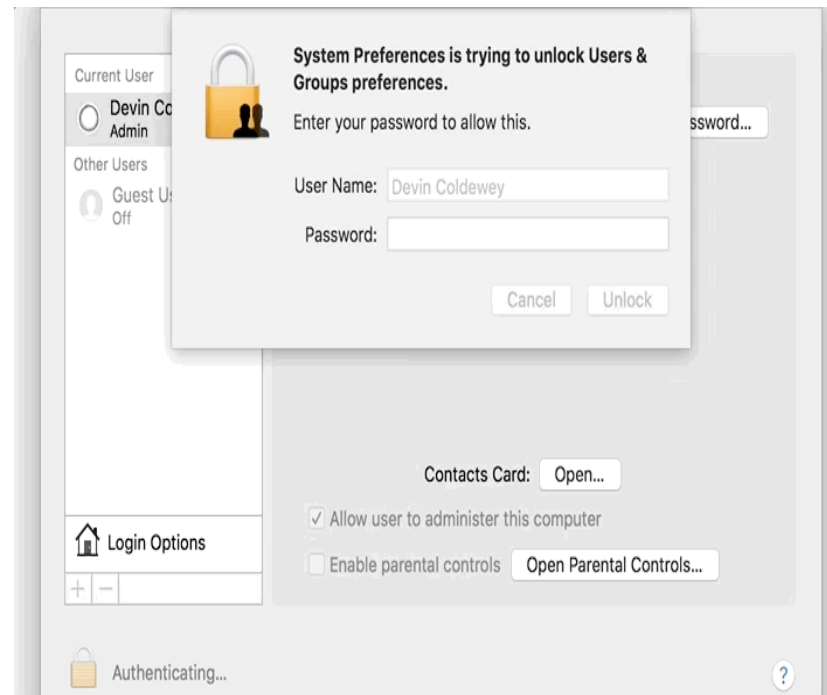
THE BUG THAT SHOWED YOUR FRIENDS YOU WERE RUNNING IOS 11

A problem with the autocorrect feature in Apple's newest mobile operating system caused iPhones to substitute an A and a strange character whenever users type "I," resulting in widespread typos on Facebook and Twitter.

Katie Couric
@katiecouric

Is a weird thing happening on your phone when you type a capital I? ⬇️ Another @realDonaldTrump prank? Help! @apple

if A ▤▤|

q w e r t y

10:12 AM - 3 Nov 2017

7 Retweets 31 Likes

13   7   31

If you type the letter "i" and it autocorrects to an "A" with a symbol

If you updated your iPhone, iPad, or iPod touch to iOS 11.1 and find that when you type the letter "i" it autocorrects to the letter "A" with a symbol, learn what to

Joanna Stern
@JoannaStern

I definitely should not have to learn anything to solve this bug.
support.apple.com/en-us/HT208240

11:10 PM - Nov 5, 2017

280   120 people are talking about this

Apple issues an "easy", 7 step, work around while they worked to create a patch:

1. Head to "Settings"
2. Click "General"
3. Navigate to keyboard
4. Select text replacement
5. Click the little "+" button to add a new text replacement
6. Type an upper-case "I" in the Phrase box
7. Type and a lower-case "i" in the Shortcut box.

THE BUG THAT COULD LET A STRANGER RANSACK YOUR HOME

In October, Amazon announced Amazon Key, a smart lock that lets its delivery people—or employees of Amazon partners such as housecleaning and dog-walking services—enter your home.

To make that idea less scary, their entry is recorded by the new Amazon Cloud Cam.

But security researchers soon show how a bad guy with Amazon Key access could use a Wi-Fi vulnerability to freeze the Cloud Cam's video feed, making it appear as if the door is closed when someone's opening it.

Amazon emphasizes that it's an unlikely scenario, but releases a patch to alert users when their camera has been shut off.

About the Amazon Home Services Happiness Guarantee

We want you to buy with confidence anytime you purchase a service on the Amazon.com website; that's why we guarantee service quality when you purchase services from an Amazon Home Services pro on Amazon.com. If the service was not completed according to the final scope agreed through Amazon's systems, or if your product or property was damaged as a direct result of the service, we'll work with you and the pro to correct the problem or we'll give you your money back.

If your Amazon Home Services purchase was of poor quality, please contact us to begin the process of filing a Happiness Guarantee claim. After collecting basic contact information and the required documentation of the problem, our support team will work quickly to resolve your case.

If your purchase is covered by the Happiness Guarantee, Amazon Home Services will make it right in one of these three ways

1) Work with you and the pro to correct the service.
2) Refund your money for the purchase, and cover related property damages up to $2,500.
3) Help you to file a claim against the provider's insurance.

THE BUG THAT SCARES THE BEJESUS OUT OF YOU

Gavin Hightower
@GavinHightower

Lying in bed abo
Echo Dot lets ou
chance I get mur

1:46 AM - Feb 26, 2

♡ 9,370 💬 2,01

Mac Mecoy
@MMecoy

the night it
that.

Diary of a Mad Nursing Student
@AnonEmpathRN

Was really considering an @amazonecho device but then the laughing horror story just changed my mind. I forgot people can hack those things. #nevermind

6:30 PM - Mar 7, 2018

♡ 👤 See Diary of a Mad Nursing Student's other Tweets

Aaron Levie ✓
@levie

Amazon Alexa is app
Which is basically the
needed in a news cycle right now.

5:01 PM - Mar 7, 2018

♡ 1,276 💬 335 people are talking about this

xa, Siri, my
ined reason,
it's going out the window.

5:09 PM - Mar 7, 2018

♡ 87 💬 35 people are talking about this

In 2017 the social network's AI research team turned translation services over to AI, completely

A Palestinian man was wrongly arrested by Israeli officials after Facebook mistranslated his post.

The construction worker posted a photo of himself by a bulldozer, with the caption "Good morning" written in Arabic.

Facebook translated the message to "Attack them" in Hebrew, and "Hurt them" in English.
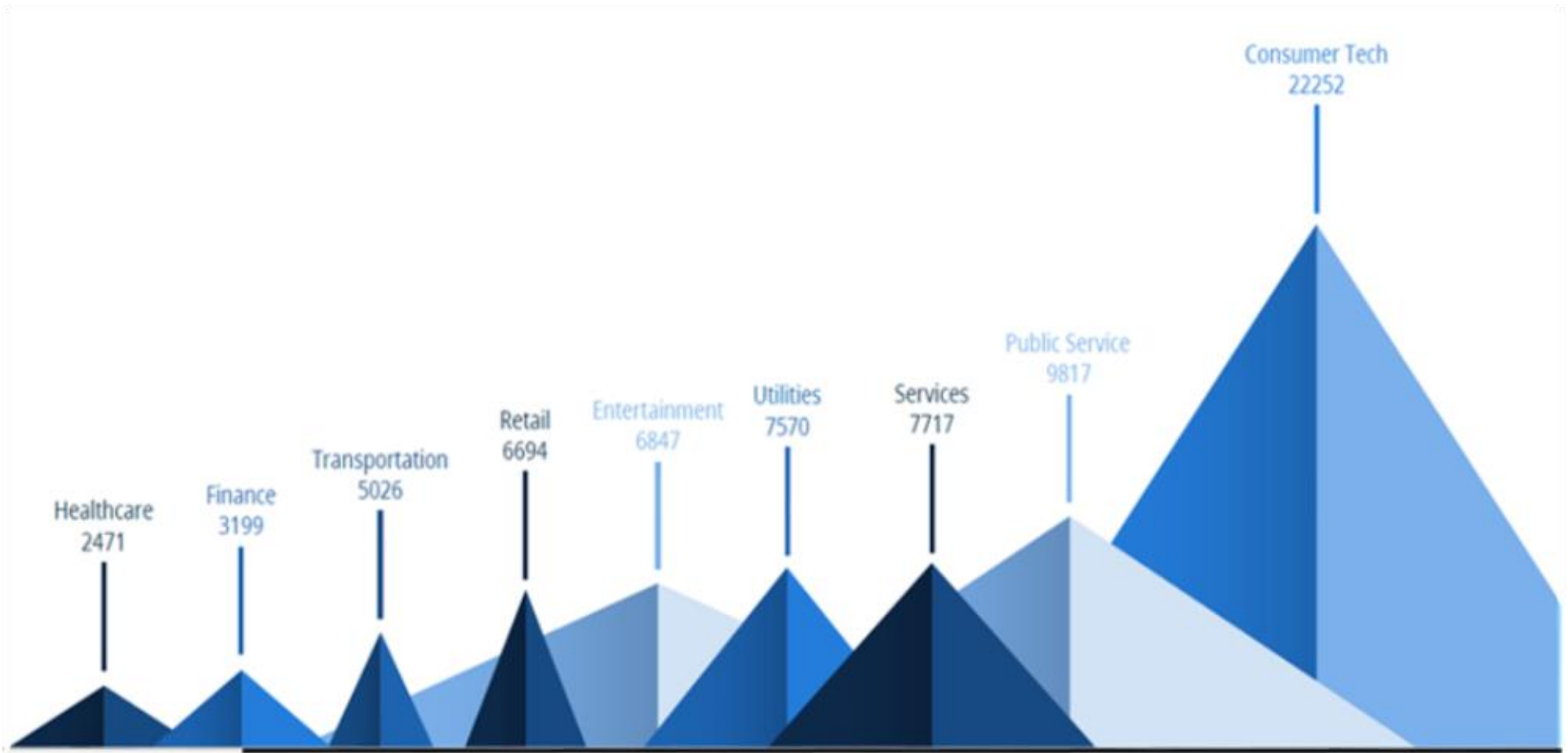
Facebook's translations are entirely powered by AI, and around 4.5 billion translations are made each day across the social network.

2017'S SOFTWARE FAIL WATCH TOTALS

606
SOFTWARE FAILS

1111
STORIES

314
COMPANIES

Brand Erosion Index

The Big Picture

LO$$E$ FROM SOFTWARE FAILURES (USD)

1,715,430,778,504

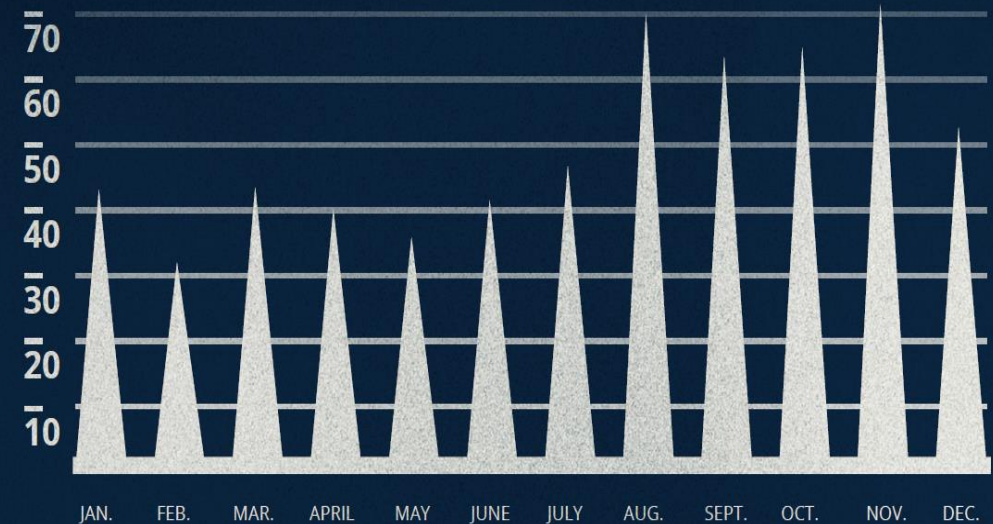ONETRILLIONSEVENHUNDREDFIFTEENBILLIONFOURHUNDREDTHIRTYMILLIONSEVENHUNDREDSEVENTY-EIGHTTHOUSANDFIVEHUNDREDFOUR

2017

Statistically, there is a very good chance that you have been personally impacted by a software failure over the past year – perhaps even in the last quarter, or week.
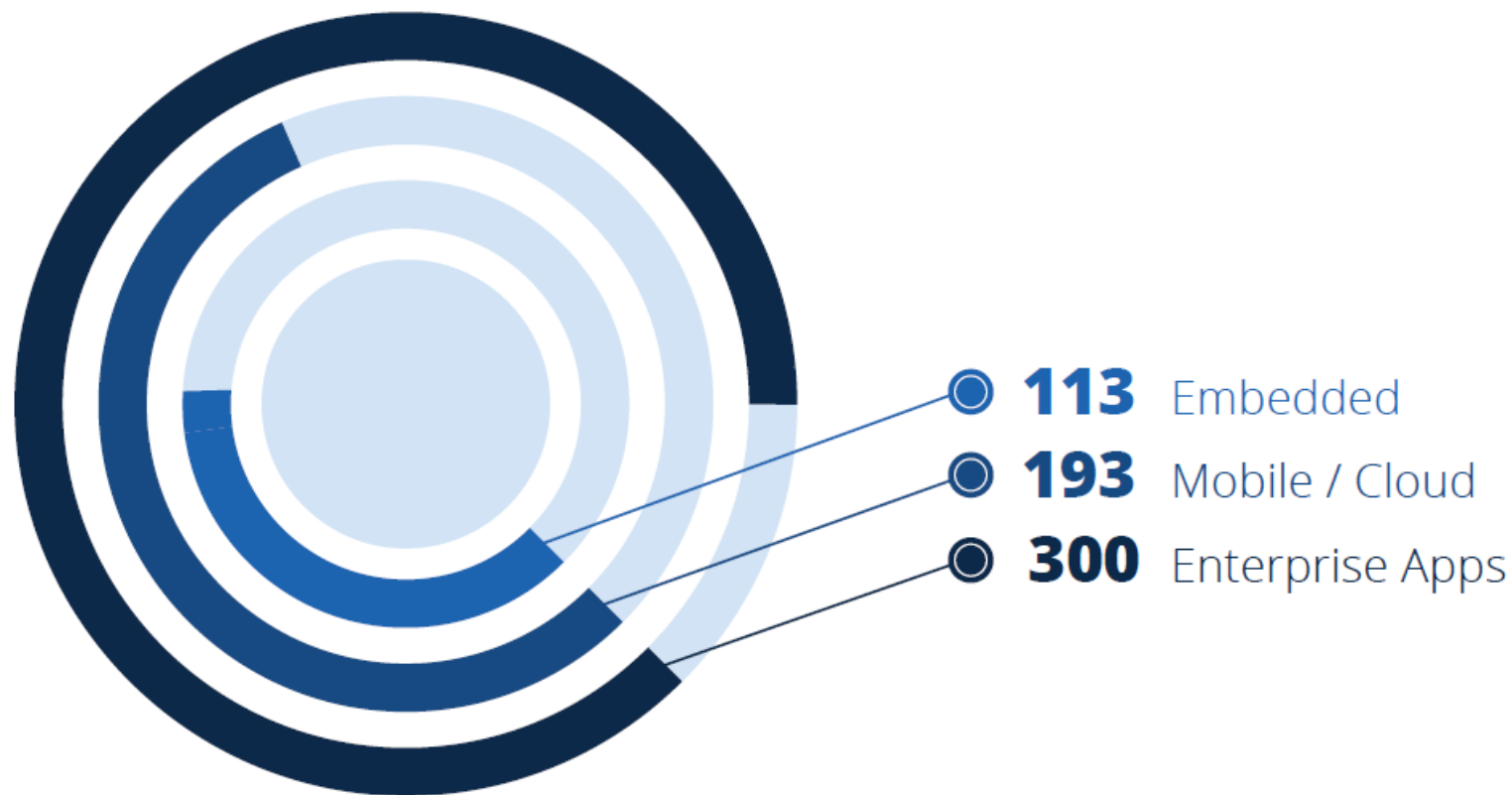
SOFTWARE TYPE

113 Embedded

193 Mobile / Cloud

300 Enterprise Apps

SOFTWARE FAILS BY TYPE
2017

"Embedded" includes all software that is built into a device or piece of hardware. If a casino's slot machine experienced a software glitch, or a car's airbag sensor malfunctioned, it was placed into this category. Transportation makes up the majority of this category, with 41 of 113 stories. This is unsurprising given that most Transportation software fails stem from a problem programmed in the vehicle itself, be it car, plane, or train.

"Mobile/Cloud" encompasses all web or app-based software. If a website crashed due to a software fail, it went into this category. While each industry was well represented (showing how even industries that traditionally run legacy software have jumped on the mobile boat), Retail and Consumer Tech predictably took the lead with 125 stories. Of those 125 stories, 72 featured hardware and smart phone manufacturers such as Apple, Alphabet, or Samsung.

"Enterprise Apps" encompasses all software that requires installation in a specific location. If an organization's internal system, such as an ERP (Enterprise Resource Planning) or accounting software crashed, it went into this category. Enterprise Apps software exists within every industry. However Public Services and Healthcare overwhelmingly dominates this list, making up 42% of the stories in this category.
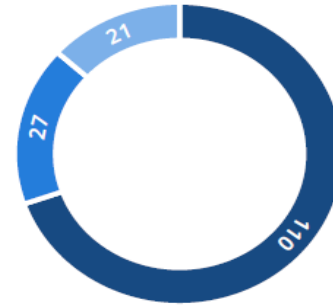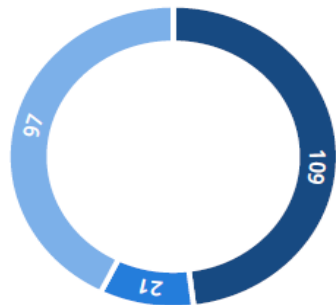
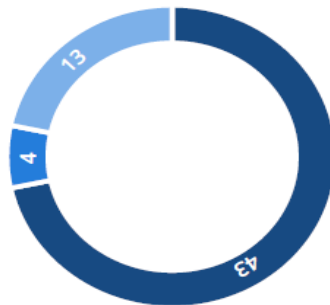# TYPE OF FAIL BY INDUSTRY
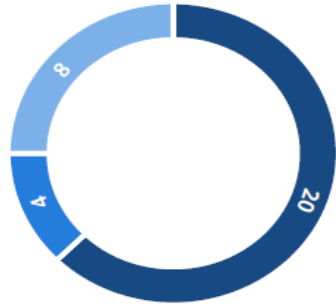
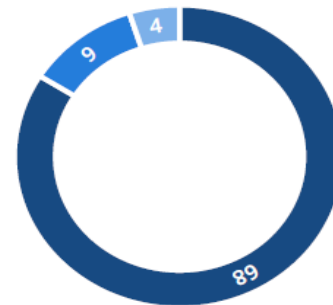ENTERTAINMENT
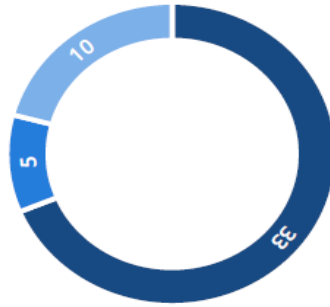
FINANCE

PUBLIC SERVICE AND HEALTHCARE

SECURITY VULNERABILITY   **USABILITY GLITCH**   **SOFTWARE BUG**

RETAIL AND CONSUMER TECH

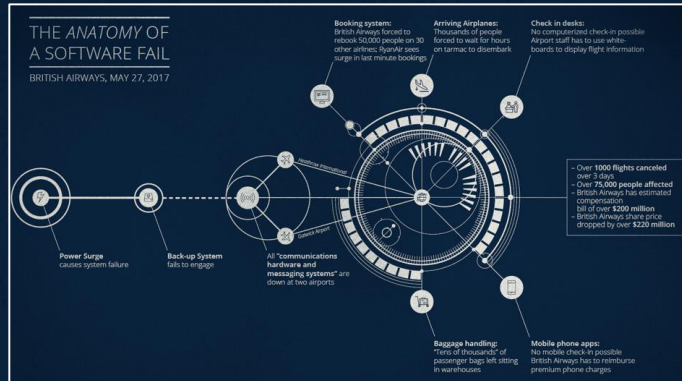SERVICE AND UTILITIES

TRANSPORTATION

TRANSPORTATION INDUSTRY FAILS

PER MODE OF TRAVEL 2017

ROAD 41

RAIL 21

AIR 14

SEA 5

THE *ANATOMY* OF A SOFTWARE FAIL
BRITISH AIRWAYS, MAY 27, 2017

Booking system:
British Airways forced to rebook 50,000 people on 30 other airlines; RyanAir sees surge in last minute bookings

Arriving Airplanes:
Thousands of people forced to wait for hours on tarmac to disembark

Check in desks:
No computerized check-in possible Airport staff has to use white-boards to display flight information

Power Surge
causes system failure

Back-up System
fails to engage

All **"communications hardware and messaging systems"** are down at two airports

– Over **1000 flights canceled** over 3 days
– Over **75,000 people affected**
– British Airways has estimated compensation bill of over **$200 million**
– British Airways share price dropped by over **$220 million**

Baggage handling:
"Tens of thousands" of passenger bags left sitting in warehouses

Mobile phone apps:
No mobile check-in possible British Airways has to reimburse premium phone charges

While vehicle recalls are the most ubiquitous of the Transportation industry-related software fails, the bugs that create the biggest uproar are certainly airline outages. While only 14 of the reported transportation stories pertained to air travel, the rage that these types of bugs elicit ensures broad media coverage and palpable brand damage. British Airways took one of the biggest hits, with 6 outages within 2017 – 3 of which took place in the span of 1 month. An outage in May 2017 spawned global chaos over the course of 2 weeks, causing a total loss of $200 Million and as much as a 4% percent drop in stock price that erased hundreds of millions from the company's value.

2017 also saw a surprising increase in train-related software bugs, 4 of which, oddly enough, took place in Denver, Colorado. The biggest train bug of the year took place in Singapore. A software safety mechanism failed, causing two metro trains at Joo Koon station to crash into each other. 38 people were injured, and the scheduled maintenance to fix the bug will impair train operations for over 6 months.

These types of bugs often occur as a result of routine software updates, a fact which underscores the necessity of end-to-end testing. This is particularly true within highly-complex system landscapes like transportation logistics, when the lives of customers—not just financials—are at stake.
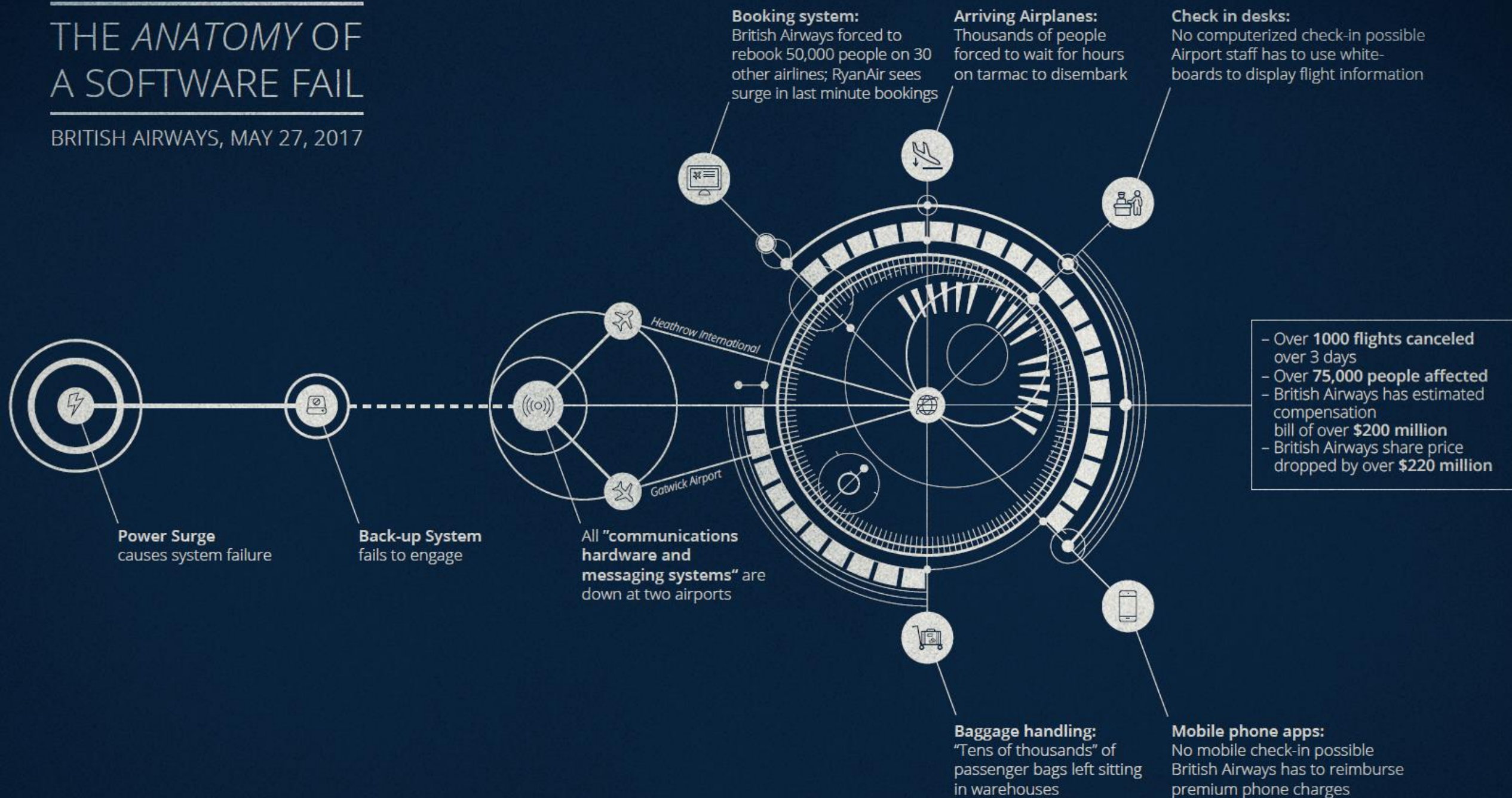
THE *ANATOMY* OF A SOFTWARE FAIL

BRITISH AIRWAYS, MAY 27, 2017

Booking system:
British Airways forced to rebook 50,000 people on 30 other airlines; RyanAir sees surge in last minute bookings

Arriving Airplanes:
Thousands of people forced to wait for hours on tarmac to disembark

Check in desks:
No computerized check-in possible Airport staff has to use white-boards to display flight information

Heathrow International

Gatwick Airport

– Over **1000 flights canceled** over 3 days
– Over **75,000 people affected**
– British Airways has estimated compensation bill of over **$200 million**
– British Airways share price dropped by over **$220 million**

Power Surge
causes system failure

Back-up System
fails to engage

All **"communications hardware and messaging systems"** are down at two airports

Baggage handling:
"Tens of thousands" of passenger bags left sitting in warehouses

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No mobile check-in possible British Airways has to reimburse premium phone charges

Calling Your Own Baby Ugly is Hard

# Cost reduction through effective QA

Based upon analysis of over 4500 projects:

- There is too large a disconnect between defect creation and defect discovery

- Roughly 80% of defects are created in the analysis and design phase but 70% of defects are found between implementation and deployment

- Fixing defects early in the lifecycle avoids a significant amount of costly re-work, re-test, regression testing, and re-deployment

- Defects found in production can have a major, and sometimes catastrophic impact on business operation – QA throughout the SDLC process reduces the risk of revenue loss/brand damage

Defect Fix Cost by SDLC Phase

SDLC Phase	Factor	Cost per defect
Production	x250	$50,000
User Acceptance Testing	x75	$15,000
System Testing	x30	$6,000
Integration Testing	x8	$1,600
Unit Testing	x4	$800
Requirements/Design	x1	$200

The "Shift Left"
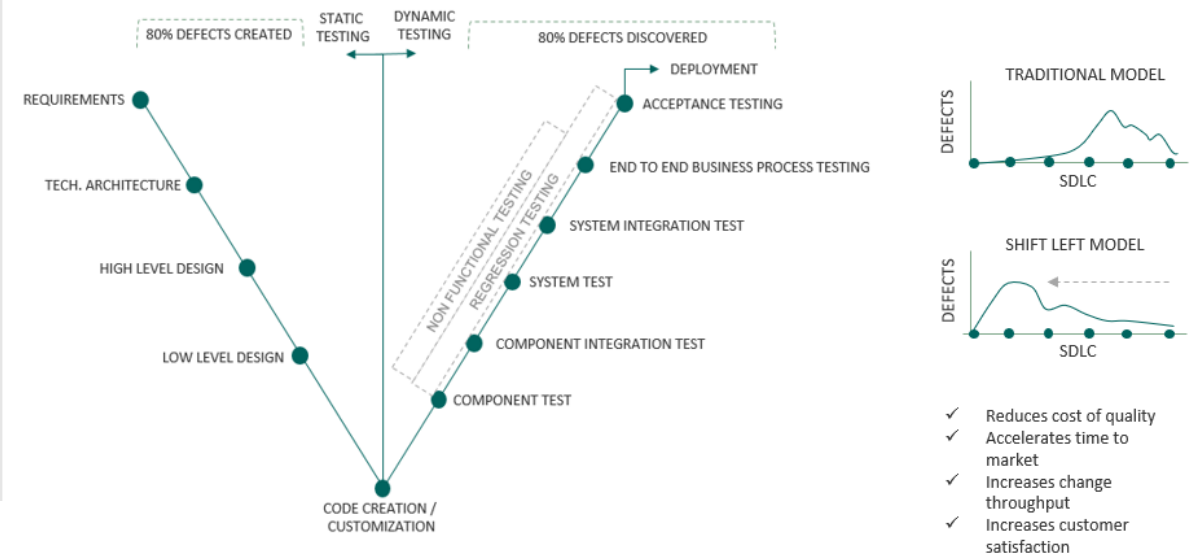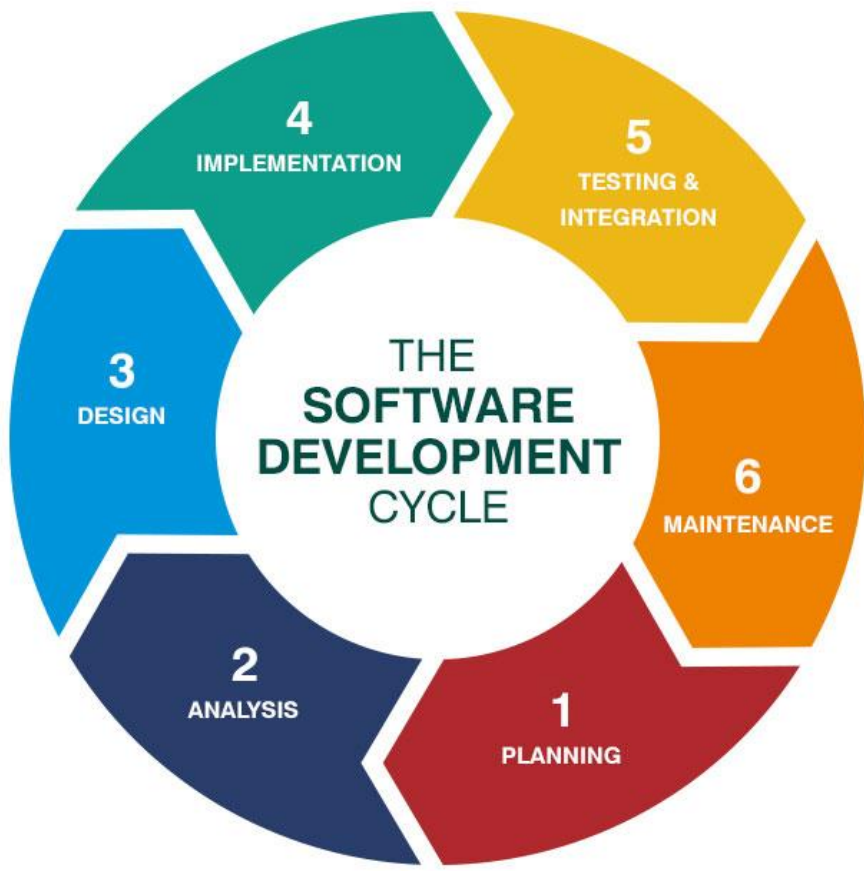
Software Development Lifecycle (SDLC)

- An SDLC is framework that describes the activities performed at each stage during a software development project

- The exact lifecycle/process varies from one model to another, and there are various kinds of software development models
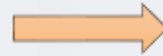
What is SQA

Software Quality Assurance (SQA) consists of the means of monitoring the software engineering processes and methods used to ensure quality

SQA encompasses the entire software development process, which includes processes such as requirements definition, software design, coding, source code control, code reviews, software configuration management, testing, release management, and product integration

Quality Assurance / Quality Control — Prevention / Detection

Quality methods can be segmented into two categories:

1) Preventive (QA) – *proactive (shift left)*

2) Detective (QC) - *reactive*

The key difference to remember is that Quality Assurance is interested in the process whereas Quality Control (testing) is interested in the product
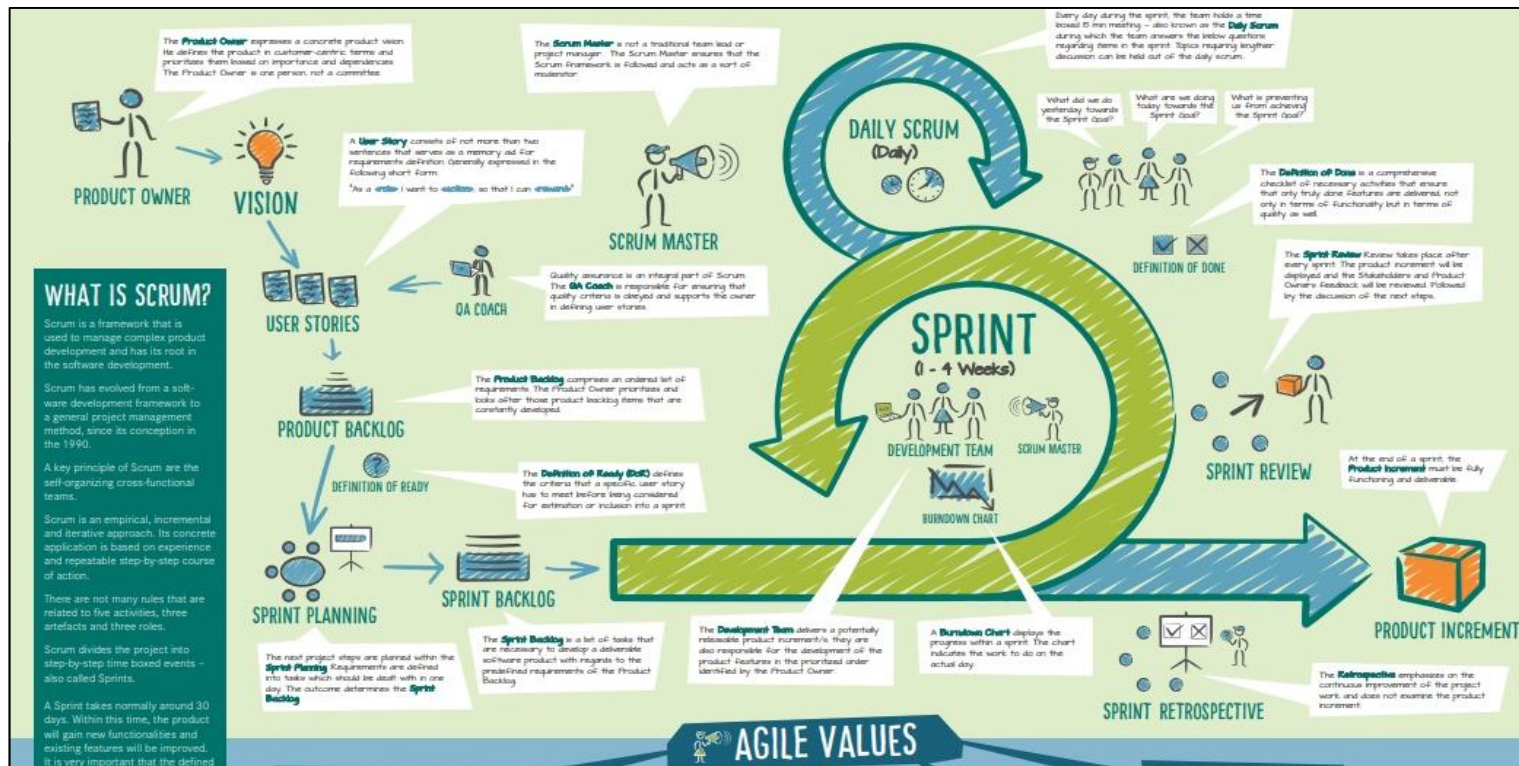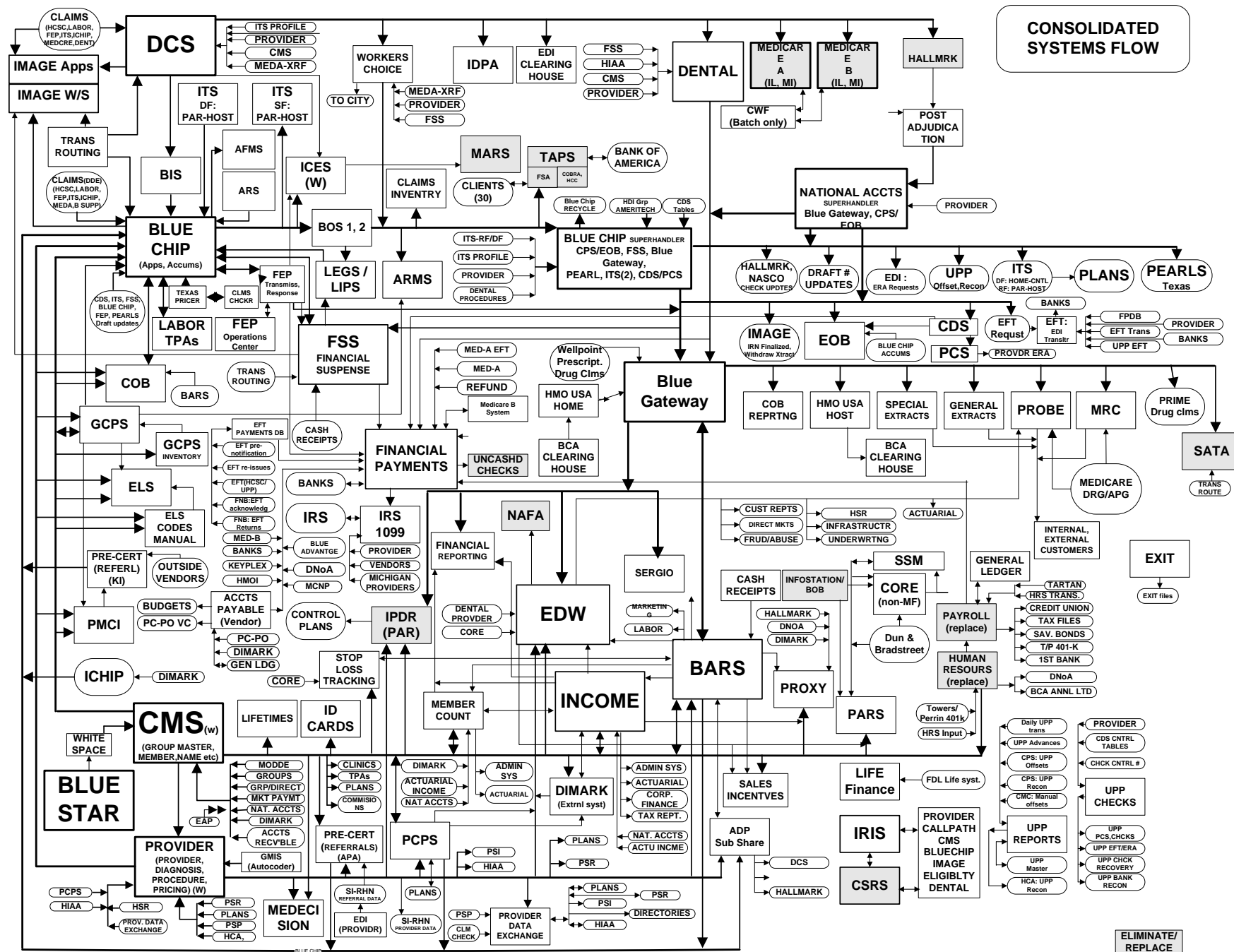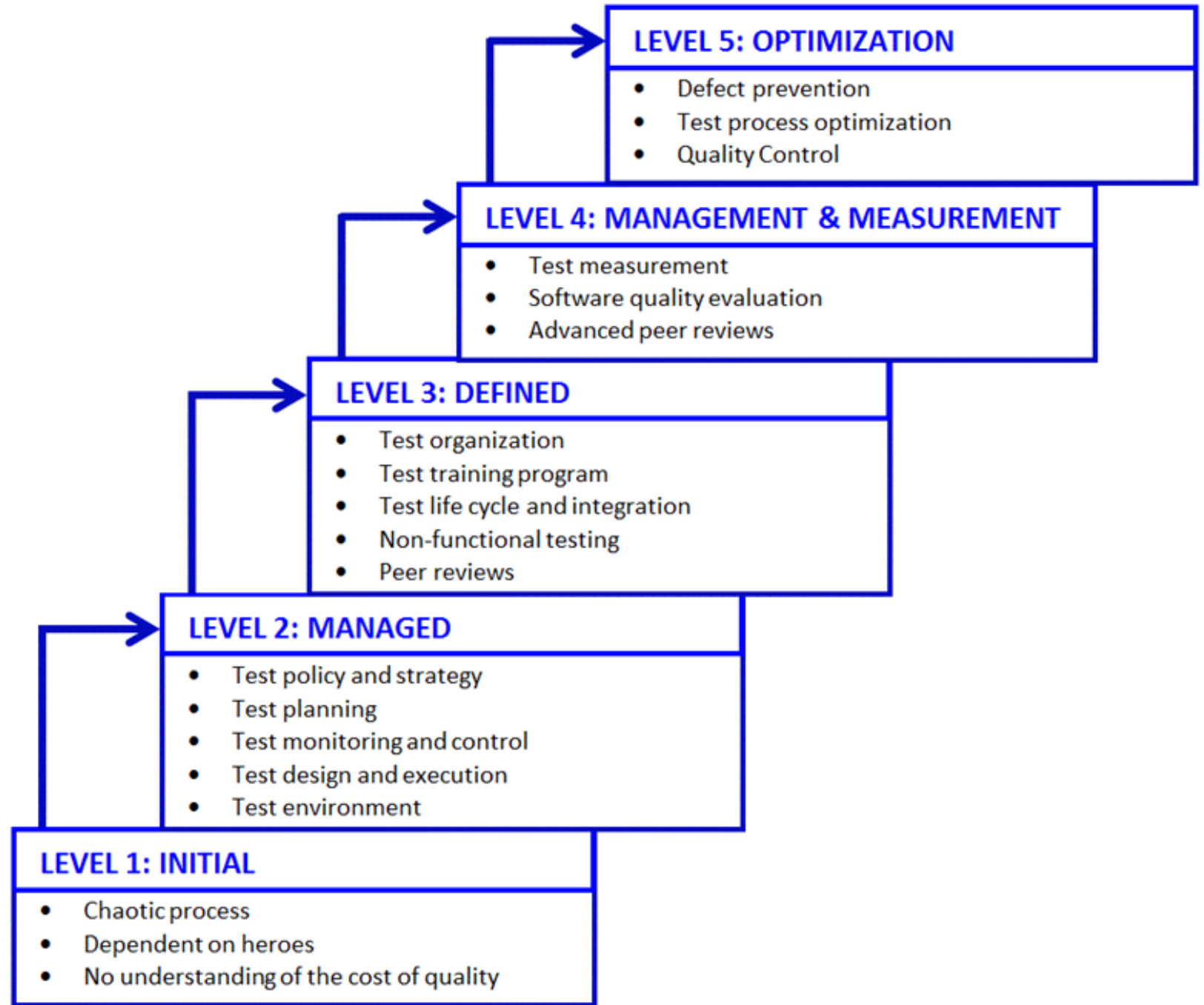
Both are needed, one is not enough

QC Vs QA

Product	→ Process
Reactive	→ Proactive
Line Function	→ Staff Function
Find Defects	→ Prevent Defects
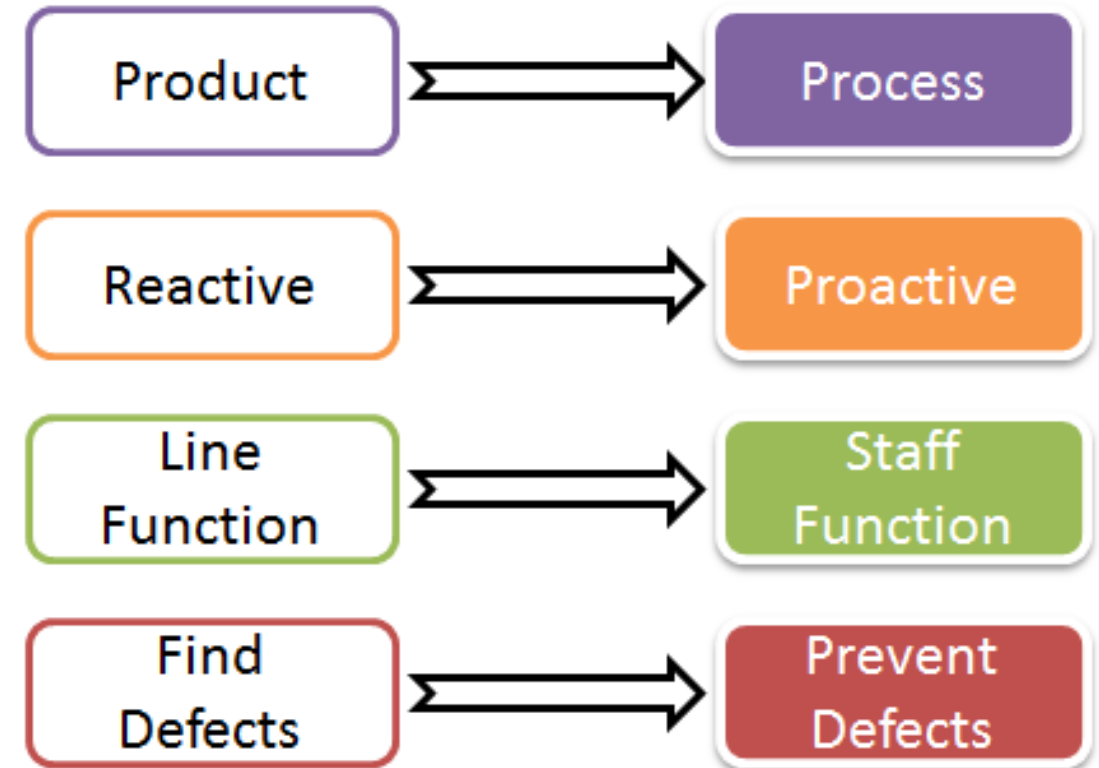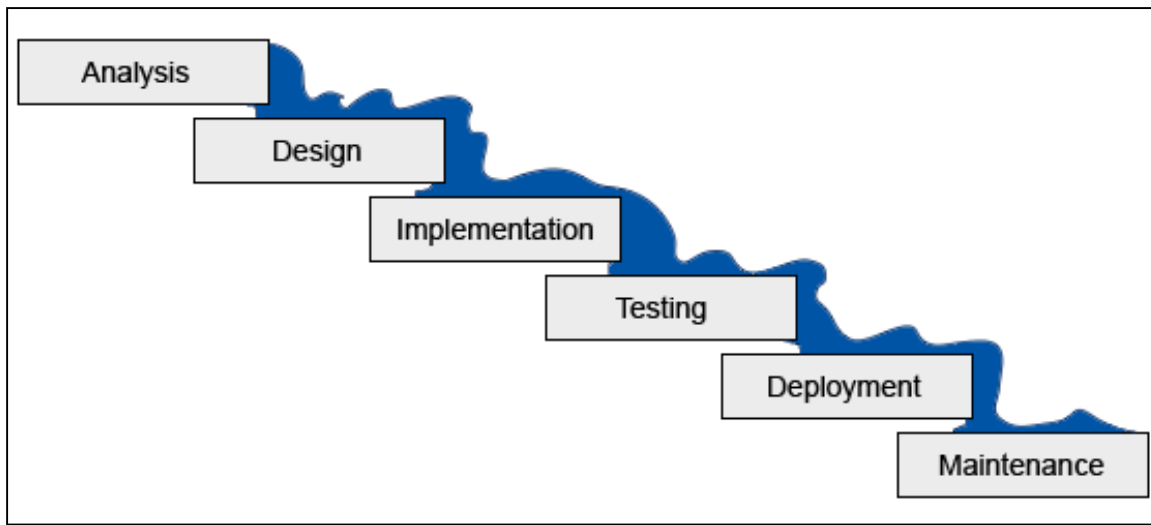
Chasing the new, shiny, thing…

CONSOLIDATED SYSTEMS FLOW
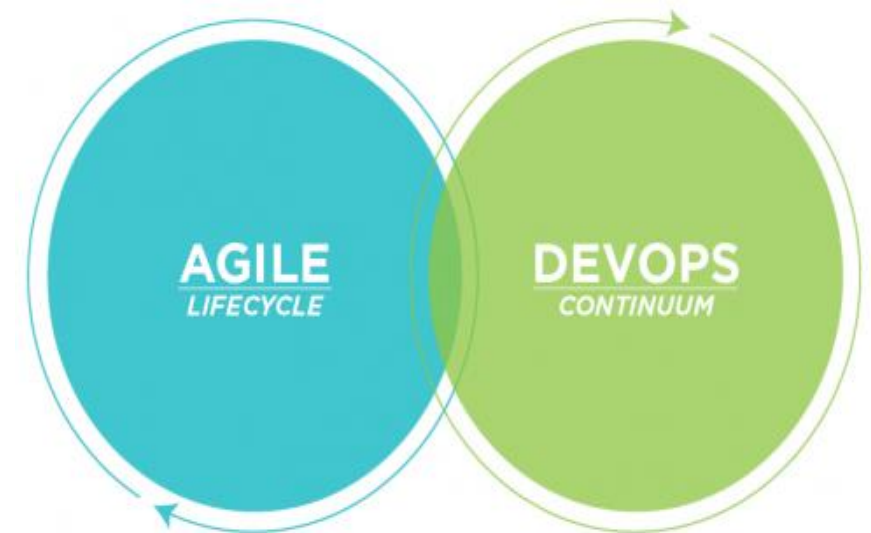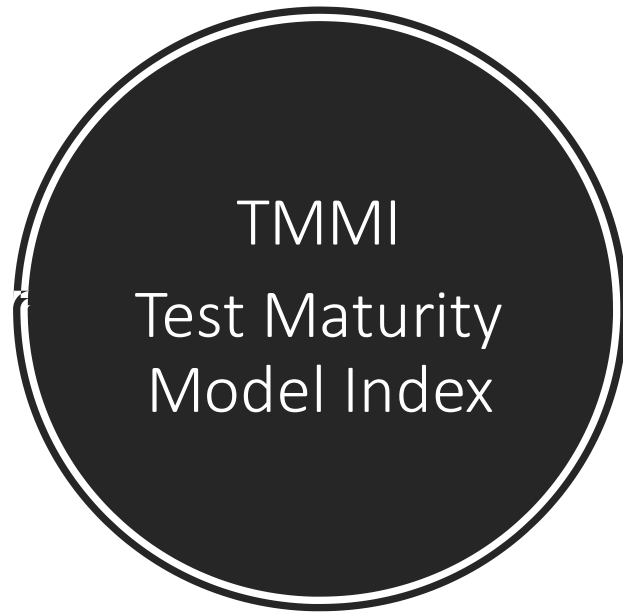
Name	Level	Department
Interviewee	Sr Mgr	IT Application Development
Interviewee	Dir	Network Operations
Interviewee	Sr Mgr	IT Application Development
Interviewee	Dir	Technical Business Office
Interviewee	Mgr	Information Technology
Interviewee	Dir	IT Application Development
Interviewee	Sr Mgr	App Development - Revenue Accounting
Interviewee	Dir	IT Application Development
Interviewee	Sr Mgr	Technology Business Office
Interviewee	Sr Mgr	Technology Business Office
Interviewee	Sr Mgr	IT Application Development
Interviewee	MD	IT Strategy & Business Management
Interviewee	MD	Tech Ops/Mnt Sys Technlgy
Interviewee	Sr Mgr	IT Application Development
Interviewee	Dir	IT Application Development
Interviewee	MD	Customer Travel Experience
Interviewee	Dir	Revenue Accounting - Program Management
Interviewee	Dir	IT Application Development
Interviewee	MD	Flight Ops & OCC Systems
Interviewee	Dir	IT Application Development & Governance
Interviewee	Analyst	IT Governance
Interviewee	MD	Service Management
Interviewee	Dir	IT Application Development
Interviewee	Sr Mgr	IT Application Development
Interviewee	Dir	IT Service Management Support
Interviewee	Sr Mgr	IT Engineering
Interviewee	MD	IT Infrastructure Program Management
Interviewee	Mgr	IT Engineering (EQA)
Interviewee	Dir	IT Engineering (EQA)
Interviewee	Sr Mgr	IT Engineering (EQA)
Interviewee	Principal Engineer	IT Engineering (EQA)
Interviewee	Mgr	IT Engineering (EQA)
Interviewee	Sr Mgr	IT Engineering (EQA)
Interviewee	Sr Mgr	IT Engineering (EQA)
Interviewee	Sr Analyst	IT Engineering (EQA)
Interviewee	Sr Mgr	IT Engineering (EQA)

Name	Level	Department
Interviewee	MD	Marketing & Sales
Interviewee	MD	IT Security & Risk Management
Interviewee	Sr Mgr	Cyber Security Intelligence
Interviewee	Dir	IT Application Development
Interviewee	Dir	IT Application Development
Interviewee	Sr Mgr	Network Engineering
Interviewee	Dir	IT Engineering
Interviewee	MD	IT Corporate Systems
Interviewee	Sr Mgr	eCommerce and Reliability
Interviewee	MD	IT Cust Con Cnt & App Dev
Interviewee	MD	Finance and Accounting Management
Interviewee	Dir	Digital Strategy and Ops
Interviewee	VP	Infrastructure Ops and Engineering
Interviewee	MD	Service Delivery & IT Facilities
Interviewee	Dir	Data Architecture & Engineering
Interviewee	Dir	IT Application Development
Interviewee	Sr Mgr	IT Service Management Service Delivery
Interviewee	VP	CTO
Interviewee	MD	Airport Operations & Management Systems
Interviewee	Dir	IT Cmplex Event Processing Division
Interviewee	VP	Ops Tech
Interviewee	Dir	IT Application Development
Interviewee	Sr Mgr	IT Application Development
Interviewee	Sr Mgr	Problem Management Office (PMO)
Interviewee	Dir	IT Application Development
Interviewee	Dir	IT Business Services Development
Interviewee	MD	IT Operations
Interviewee	Dir	IT Application Development
Interviewee	Sr Mgr	IT Application Development
Interviewee	MD	IT Platform Engineering
Interviewee	MD	Marketing Systems

In this example, the overall testing maturity level at the client is currently quite low. Several common themes were discovered as contributing factors to the current state.

QA can take advantage of several opportunities to change current perception. By choosing specific, initial projects, QA can demonstrate value and stand as an independent reliable quality practice, providing standardized processes and specific skills across all projects.

Dimensions	People	
Skill sets defined across org	🟡	2.0
Right sized-staffing	🔴	1.5
Training needs identified	🔴	1.5
Project on-boarding process	🔴	0.5
Clearly defined roles	🔴	1.0
Consistent approach to work inputs, effort	🔴	1.0
Leadership vision	🔴	1.0
Governance is centralized	🔴	1.0
AVERAGE	🔴	1.2

Dimensions	Process	
Well defined	🔴	0.5
Consistently applied	🔴	0.5
Training	🔴	1.0
Governed/Enforced	🔴	1.5
Adaptable	🟡	2.0
Collaborative not competitive	🟡	2.5
AVERAGE	🔴	1.3

Dimensions	Tools	
Standardized	🔴	1.5
Effectively leveraged	🔴	1.0
Used to drive process	🔴	1.0
Customized/integrated for enterprise use	🔴	1.5
Centrally administered	🟡	2.5
Data synched/consistent	🟡	2.0
Test environments	🔴	1.0
AVERAGE	🔴	1.5

Strengths

- Existing test resources exhibit sound skills in a manual testing capacity
- Best in breed testing tools already exist
- Widely held belief that testing is a necessary part of the development process and that a centralized testing organization would be of great value
- IT organization is generally open to change
- Introduction & embracement of agile methodology into the SDLC is a positive

Weaknesses

- Existing test resources do not posses testing skill sets necessary to perform robust test automation, L&P, or mobile testing
- Test tooling is not effectively leveraged or standardized
- Overall inconsistency of process across the application portfolio
- Lack of individual project visibility at the program level
- Lack of coordination across project teams
- Lack of governance for key SDLC areas

🟢 3.0-5.0: Good
🟡 2.0-2.9: Fair
🔴 0-1.9: Poor

1.3 Overall rating

People

Skill Sets Defined Across Org.	Right Sized Staffing	Training Needs identified	Project On-Boarding Process
Clearly Defined Roles	Consistent Approach Work inputs/Effort	Leadership Vision	Centralized Governance

Process

Well Defined	Consistently Applied	Defined Training	Enforced Governance
Adaptable	Collaborative Not Competitive		

Tools

Standardized	Effectively Leveraged	Used To Drive Process	Customized For Enterprise Use
Centrally Administered	Consistent Data Processes	Test Environments	

Suggested Approach - People Review

Understand the current QA organizational structure, staffing levels, staff skill sets, and overall roles/responsibilities in a typical project/program. Overall focus would entail the following:

- Current QA/IT organization and staffing
- Roles of the key players on a typical project/program
- Current skill sets of the QA staff
- Interactions and handoffs between QA and all preceding/proceeding groups
- Training needs

Focus Area – People
Dimension – Right sized Staffing

Top Findings

- Currently only 2 FTEs reside in the "testing" organization along with a few contractors. This number is too small to support an IT organization of this size.
- Contractors are brought in as needed to support projects, typically late in the development process. This makes them little more than rented testers asked to follow whatever process or activities used by that project.

Recommendations

- FTEs should be established as Test Leads on one or more simultaneous projects to be involved from project initiation. These leads can then work with additional team members as needed to transfer project knowledge and mentor/manage staff on department processes and standards.
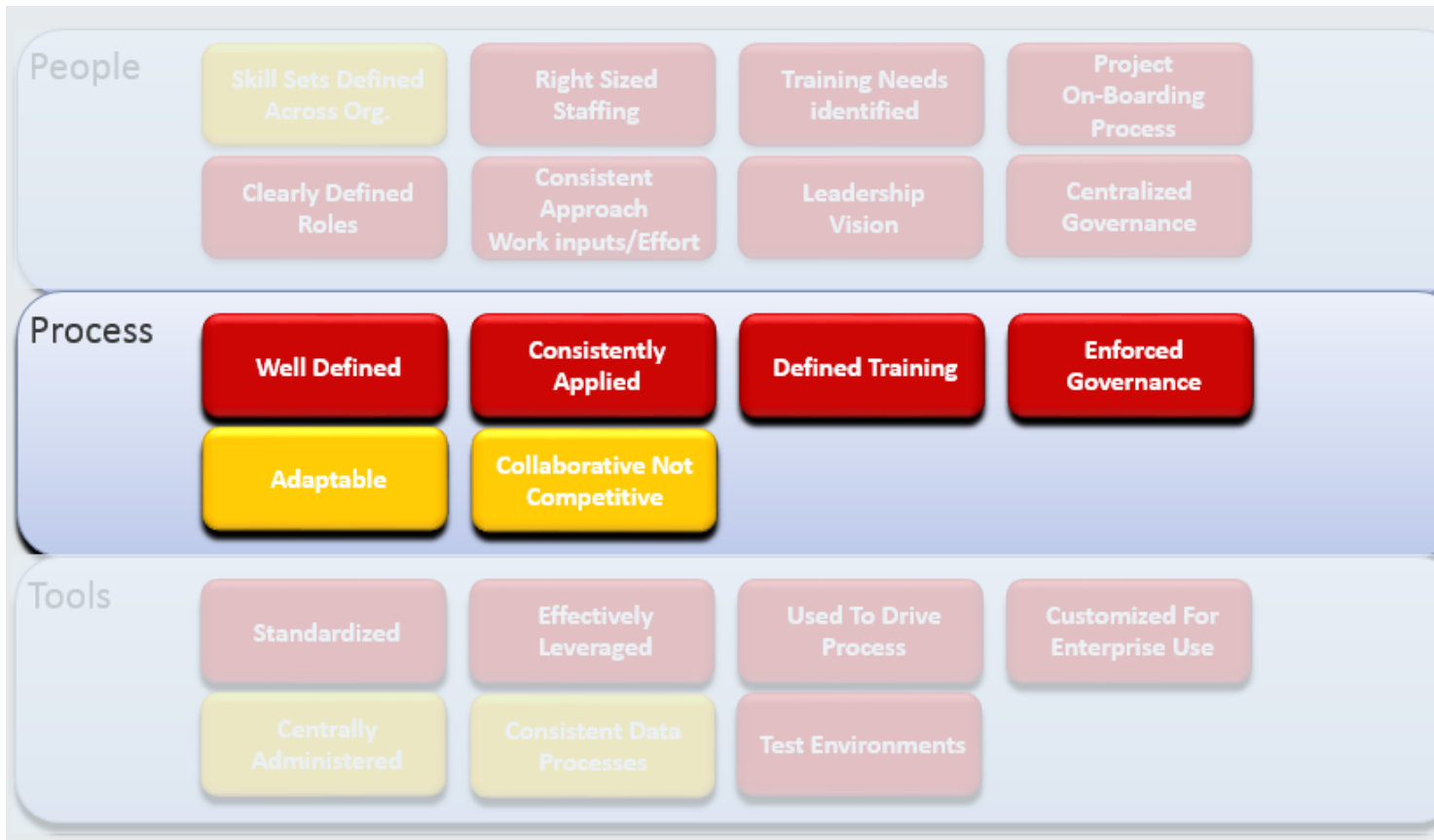
Suggested Approach - Process Review

People
- Skill Sets Defined Across Org.
- Right Sized Staffing
- Training Needs identified
- Project On-Boarding Process
- Clearly Defined Roles
- Consistent Approach Work inputs/Effort
- Leadership Vision
- Centralized Governance

Process
- Well Defined
- Consistently Applied
- Defined Training
- Enforced Governance
- Adaptable
- Collaborative Not Competitive

Tools
- Standardized
- Effectively Leveraged
- Used To Drive Process
- Customized For Enterprise Use
- Centrally Administered
- Consistent Data Processes
- Test Environments

SDLC review, along with QA work input drivers and schedules, review of current quality definitions, measurements, metrics, and current business analysis and non-functional requirements processes.

- Determining what to test/test objectives
- Test methodology
- Test planning
- Development/Testing/Production phase gates
- Types of tests executed (unit, system, parallel, integration, UAT, etc.)
- Load and performance test planning/design
- Test Automation planning/design
- Reporting & metrics
- Requirements process and decomposition
  - Review of existing processes, practices, standards, structure, and capabilities relating to business analysis, requirements elicitation, and requirements management
  - Reviews of requirements deliverables (BRDs, use case models, business process diagrams, etc.)
- Go/no go decision making

Focus Area – Process
Dimension – Well Defined

Top Findings

- No QA process exists in the QA dept. at this time.
- Some degree of process is defined by project teams at the BA or PM level. The level of definition and degree of rigor depends solely on the person in the role considered responsible for testing.

Recommendations

- A formal testing process is required. The process must be comprehensive, and include no ambiguity as to how QA activities will be conducted (i.e. what inputs are needed, what deliverables will be created, etc.).
- The process must be documented, circulated, and approved. All documents should provide standardization for all phases of testing allowing customers to understand what services will be provided by the QA team when engaged.
- When planning for testing activities, use ISO 25010 as a guideline for quality attributes.

Full spectrum testing using ISO standards

ISO 25010 CAN BE USED TO ENSURE ALL QUALITY ATTRIBUTES ARE CONSIDERED

25010 CAN ALSO BE USED TO SUPPORT QUALITY REQUIREMENTS SPECIFICATIONS
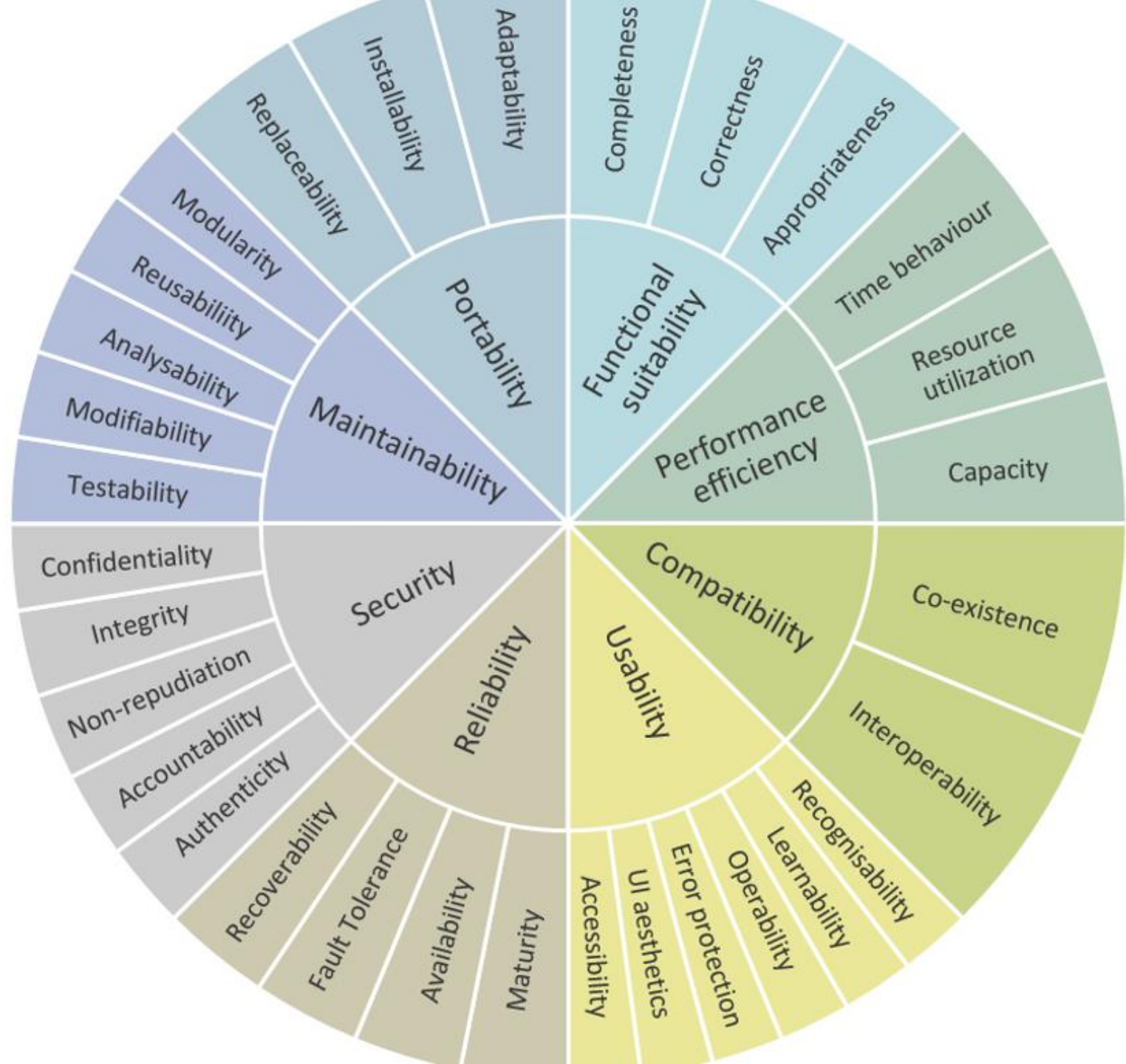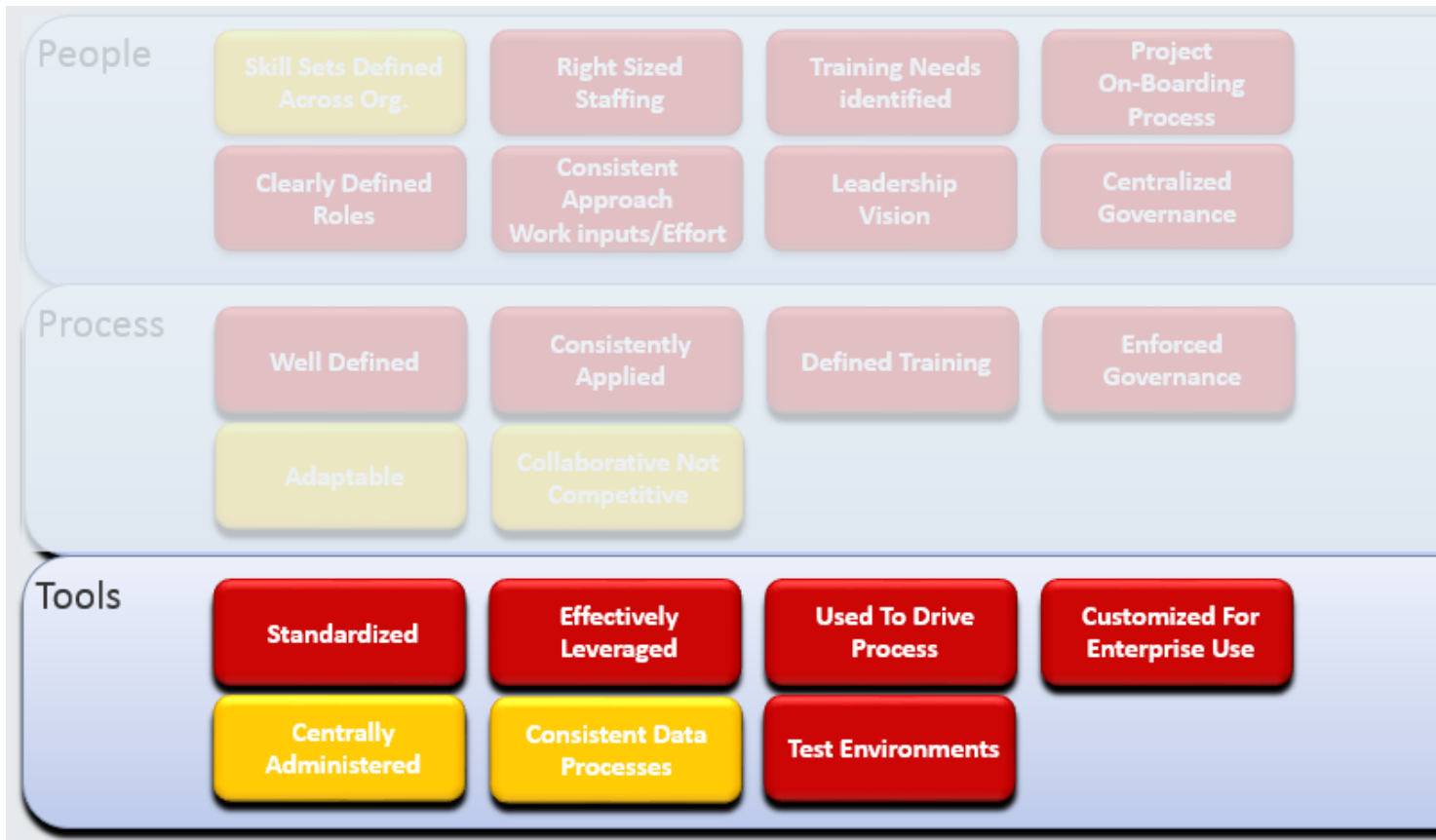
Suggested Approach - Tools/Tech Review

Review of technical tools and network environments including development process, infrastructure & test environments, supporting technology, and applications that would fall within the scope of a typical QA engagement. Overall focus would entail the following:

- Test Management Tools
- Test Automation Tools
- Load & Performance Test Tools
- Defect Tracking & Reporting Tools
- Test Data
  - Test Data population and data management
  - Test Data refreshing
- Requirements Management Tools
  - Requirements management and versioning
  - Requirements traceability
- Test Environments
  - Primary/Secondary use of the environment and access/control
  - Back up plans/schedule
  - Data population for the environment?
- Technology base for the applications most commonly tested

Focus Area – Tools
Dimension – Customized for Enterprise Use

Top Findings

- Tools are configured very "vanilla".
- Tools are not currently integrated and do not share data via synchronization.

Recommendations

- The QA team has demonstrated that fairly basic enhancements (custom fields, added list values, etc.) to the tool set would streamline many basic testing activities.
- If tool evaluation and streamlining dictates that Tool 1 and Tool 2 must coexist, data should be synchronized between systems. This will allow development and QA to leverage tools designed to allow each group to utilize best practices. If only one tool is kept, extensive customization may need to be performed to support all teams.

Tools and Tech Diagrams

Tools and Tech Diagram
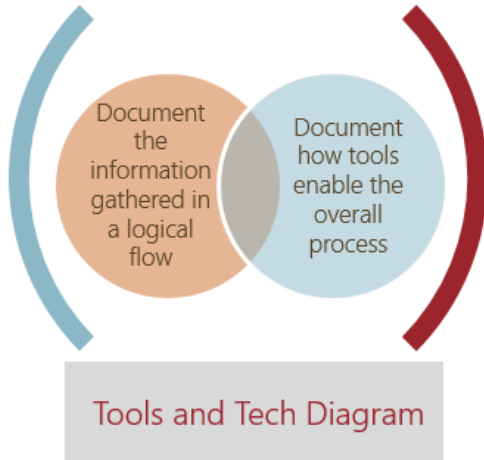
High Priority App view

- Web Apps, End Mobile Apps, User Computing and Mobility

Tools and Tech Diagrams
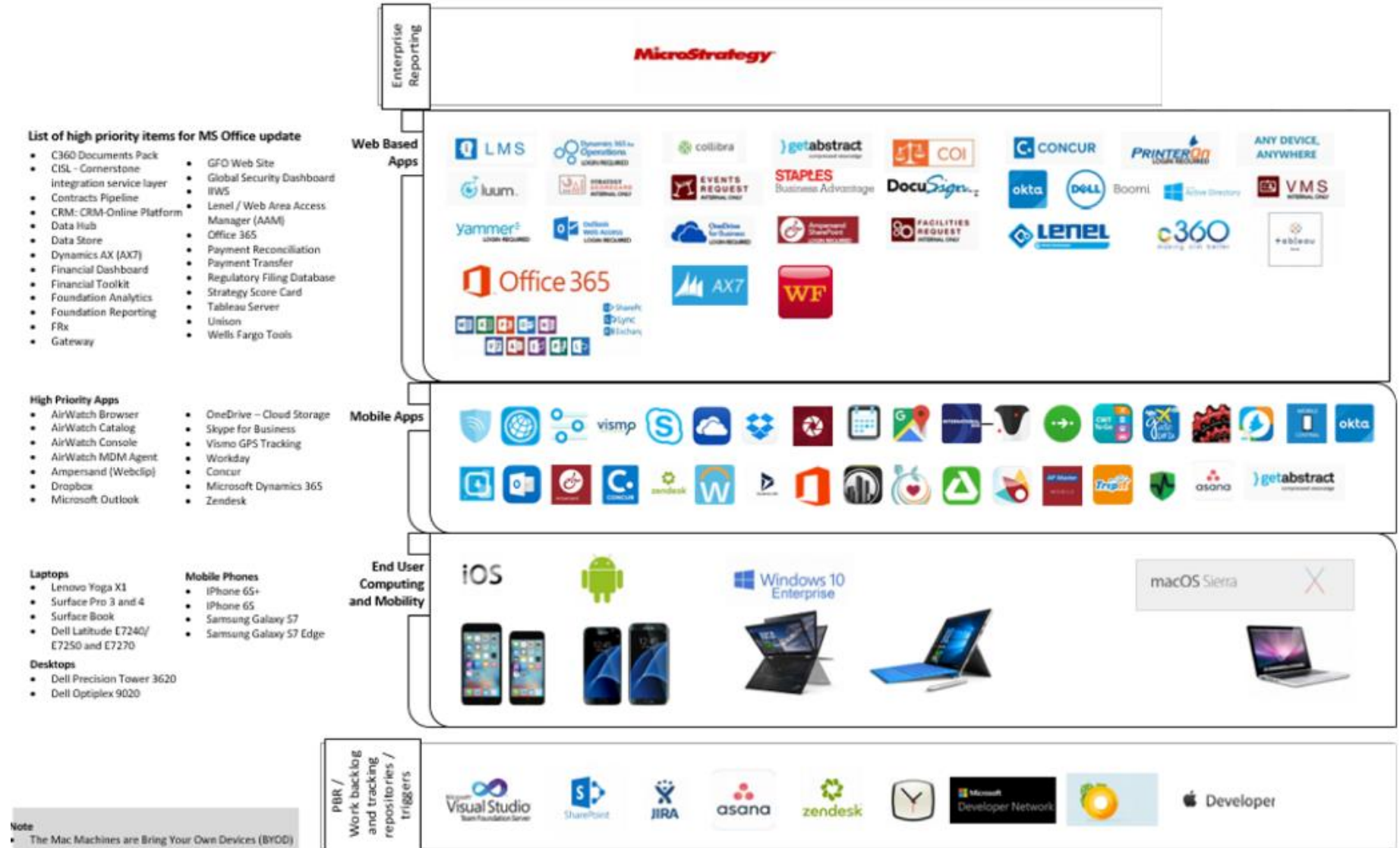
Tools and Tech Diagram
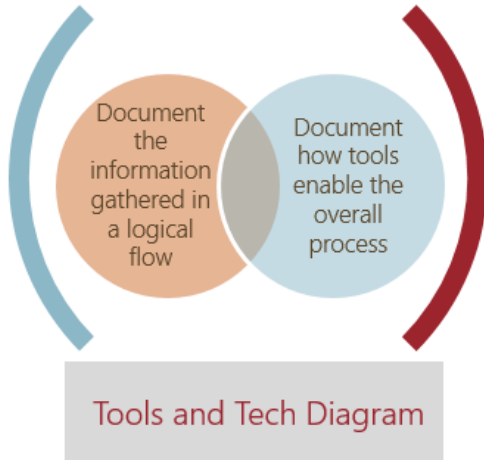
Application stack View

• Visibility into impact of changes by level of control by internal teams

Tools and Tech Diagrams
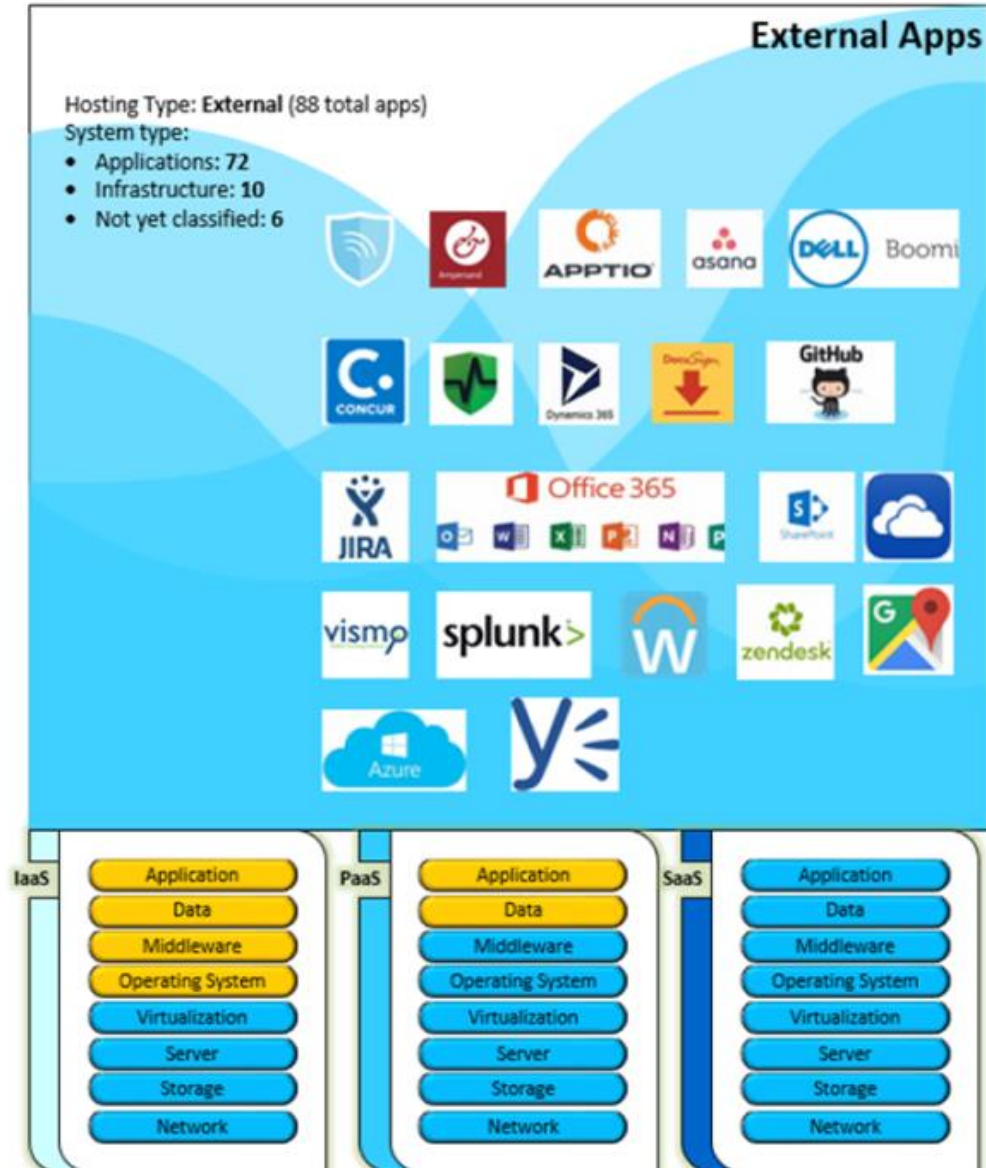
Tools and Tech Diagram
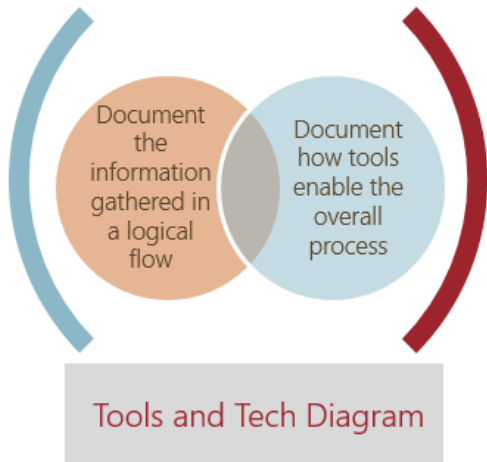
DevOps View

- DevOps enabling tools distributed across the enterprise but not "tool chained"

DOCUMENTS

Document the information gathered in a logical flow

Document how tools enable the overall process

Tools and Tech Diagram

QA Program Assessment feeds into a test strategy document and roadmap
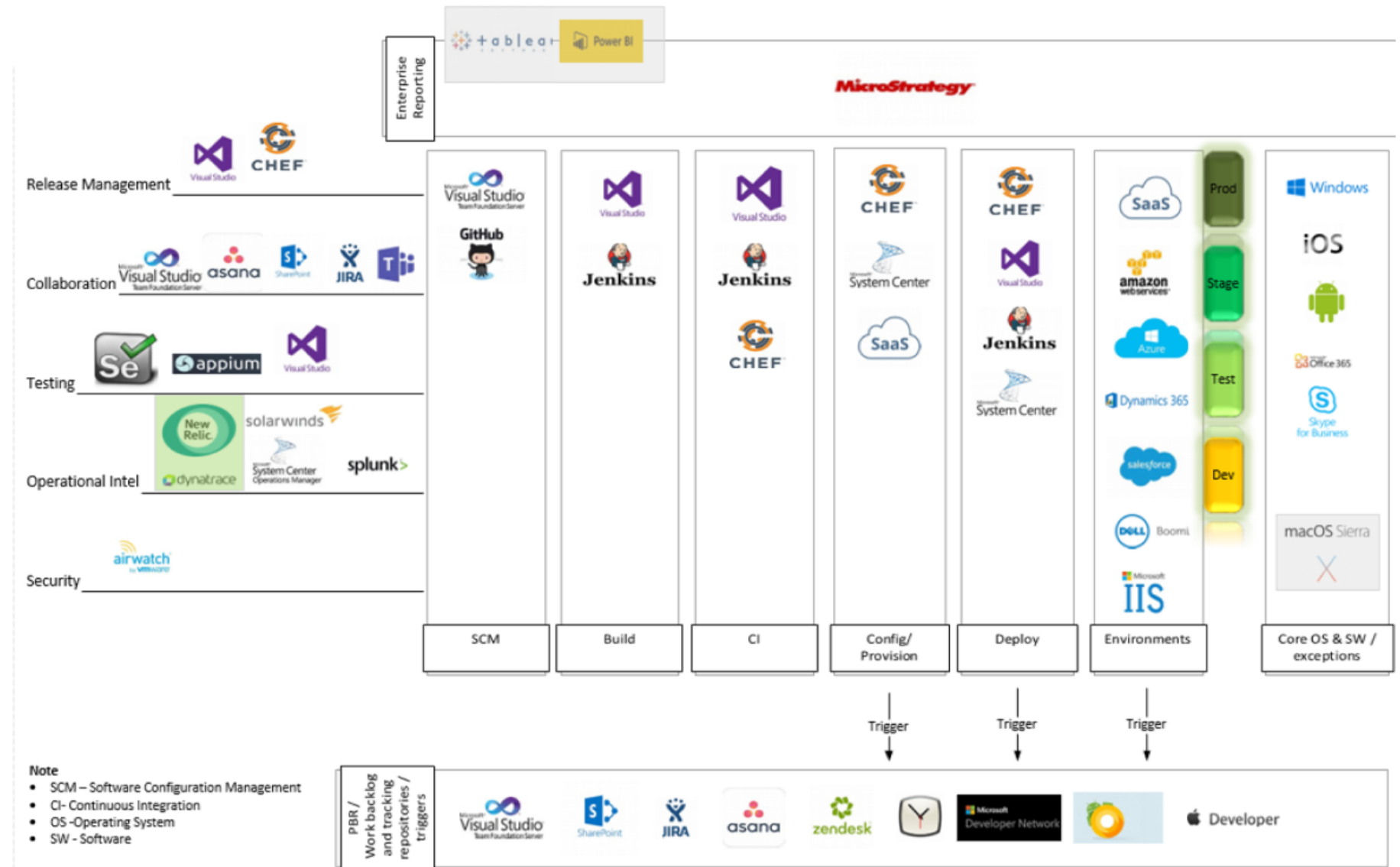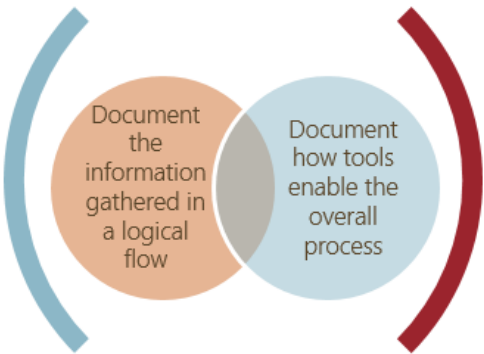
Test Strategy and Roadmap