

Managing Product Quality: A Whole-Lifecycle Approach



PTC Live Global Conference
June 7-10, 2015

Jim Cosco
Vice President
EG Quality Strategy, Systems & Processes
HP Enterprise Group



HP's commitment to quality



Quality Policy

At HP, quality matters and it's everyone's responsibility.

We are committed to continually improving the quality of our products and services.

And we deliver an exceptional customer experience by meeting requirements and embedding quality in everything we do.

Meg Whitman

President and Chief Executive Officer,
Hewlett-Packard Company

Customer experience & quality mission



Customer Experience Excellence

Best customer experience and quality in the industry

- *Differentiated in the marketplace to increase our customers' competitive advantage*



Quality

Most comprehensive quality program as viewed by our customers

- *Data-driven quality delivering a compelling value proposition to our customers*



Innovation

Innovation driving quality and quality driving innovation

- *Breakthrough results targeted and achieved*

Our people and our partners drive quality

Embedded in our relationships, actions, expertise, accountability, and culture

At HP, Quality is a top priority and everyone's responsibility

Quality begins and ends with you – our customers

Quality encompasses the end-to-end quality lifecycle

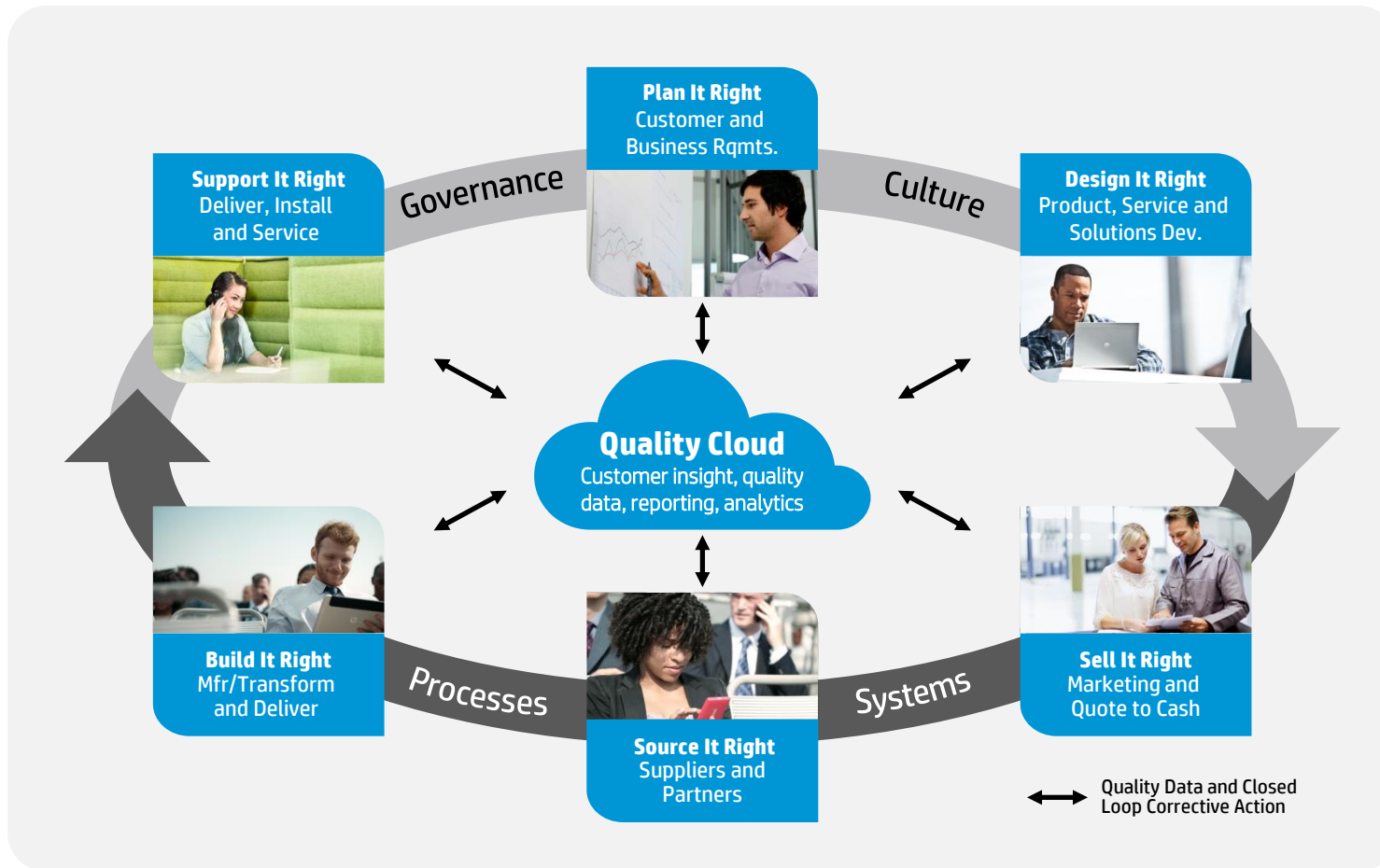
Quality inspires us

Quality drives innovation and continuous improvement

Quality is embedded in our culture

Quality is holistic – People, process, systems, data driven

Our approach to the overall customer experience



Customer Experience drives Quality at each touchpoint

Quality is embedded in each stage of the quality lifecycle to improve the customer experience

Quality metrics for each stage of the lifecycle

Plan It Right
Customer and Business Rqmts.



Plan it Right

- Net Promoter Score
- Account Loyalty Index - % proponent
- Total Partner Experience

Design It Right
Product, Service and Solutions Dev.



Design it Right

- Availability
- Annualized Outage Event Rate
- Duration (hrs)
- Annualized Intervention Rate

Sell It Right
Marketing and Quote to Cash



Sell it Right

- New Product Introduction and Adoption Rate
- Sales Customer Satisfaction Survey

Source It Right
Suppliers and Partners



Source it Right

- Defective Parts per Million
- Supplier Recovery - % of costs committed
- Mean Time Between Failures

Build It Right
Mfr/Transform and Deliver



Build it Right

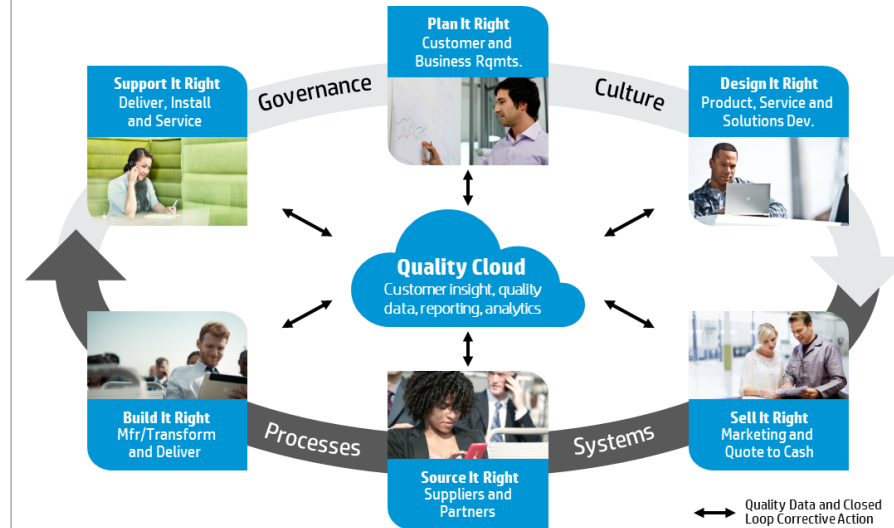
- First Pass Yield
- Out of Box Failure rate

Support It Right
Deliver, Install and Service



Support it Right

- Customer satisfaction / Dissatisfaction
- End to End Resolution Time Missed
- First Time Fix



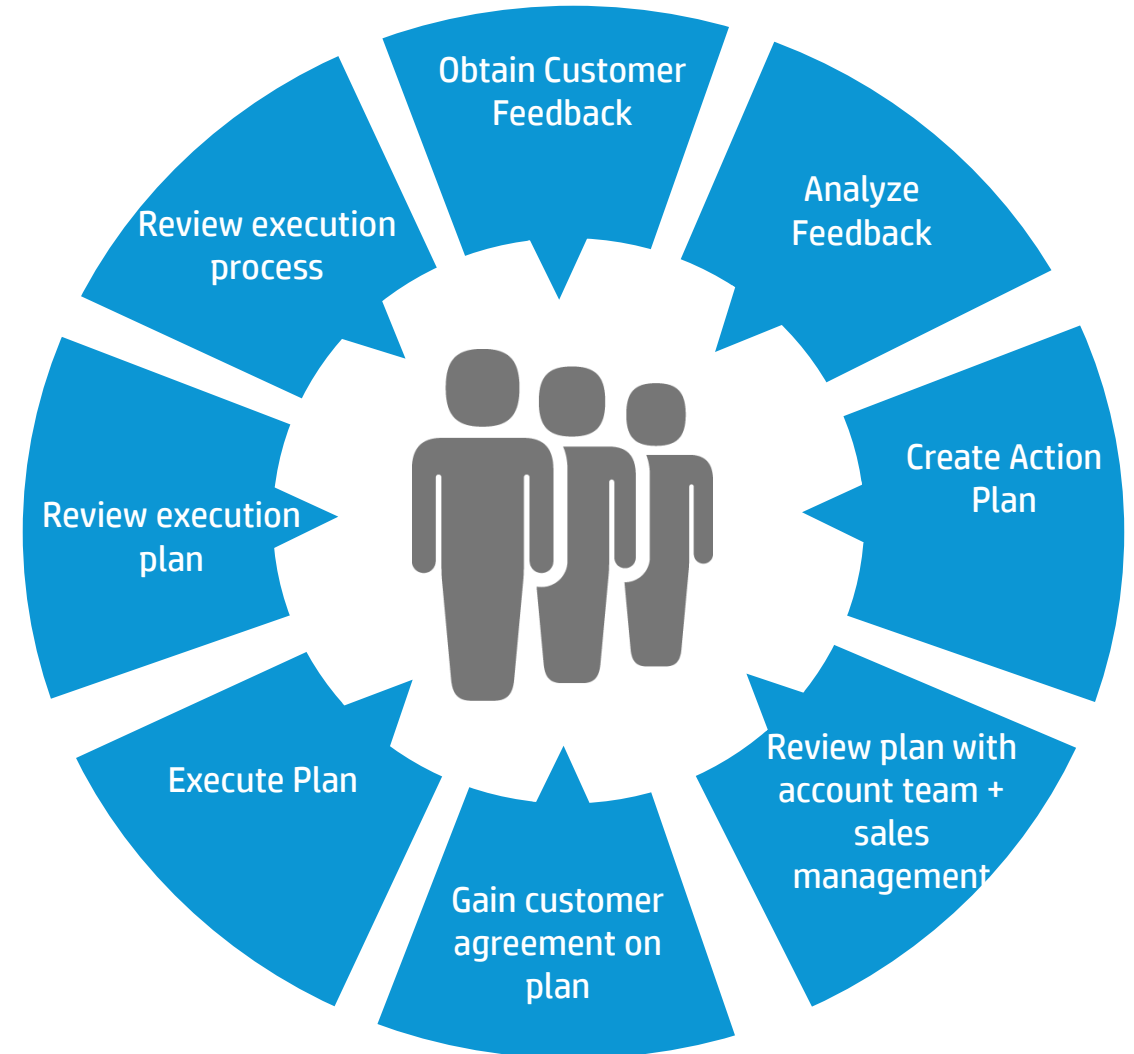


Plan it right

Listening to our customers



- Highlight our strengths and areas for improvement
- Help us understand and support your business initiatives and directions
- Guide action plan development

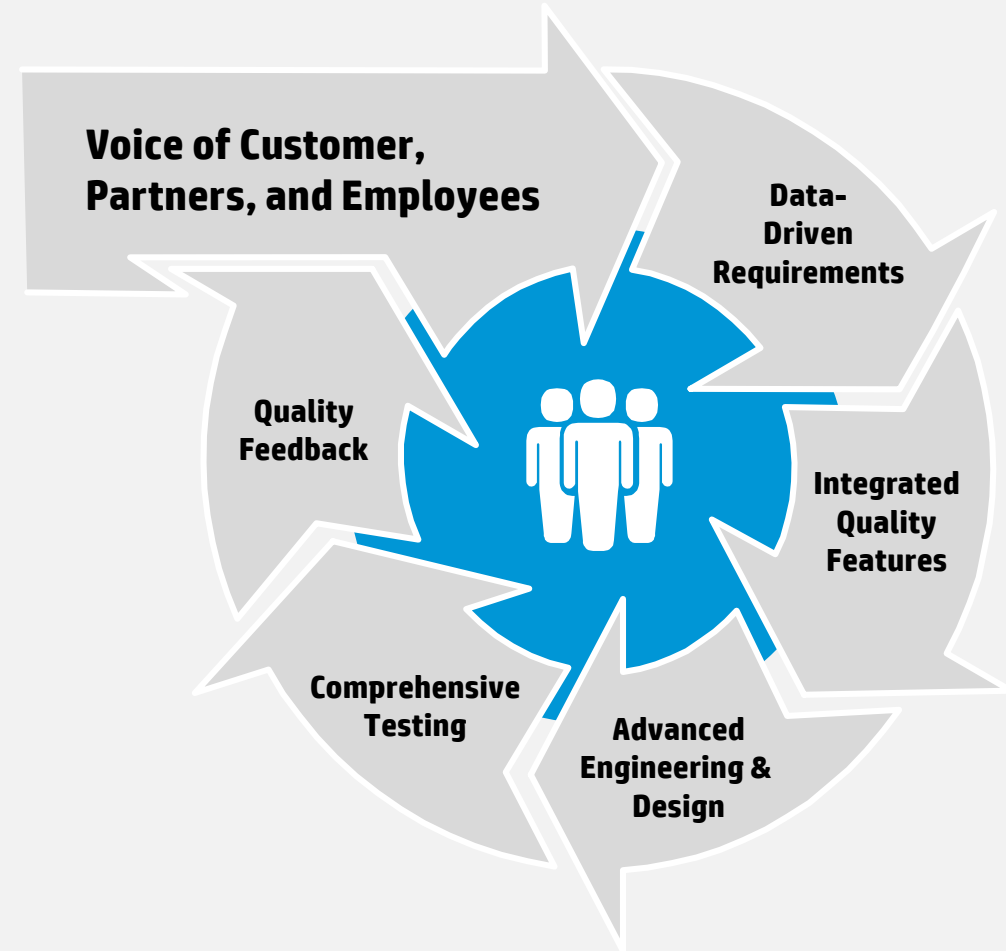




Design it right

Quality designed in

- Design our products, services, and solutions to **maximize customer availability** – key products lead the industry with 6-9s availability
- Ongoing measurable results allow us to **find problems faster and provide quicker resolution**
- Rigorously measure delivered performance to **continuously improve our products, services, solutions, and processes**



Sell it right

Ease of doing business

Exceeding Expectations

- **Product** - sell the right Product, Services and Solutions for each customer environment, enhancing customer enablement
- **Process** - simplify customer sales and purchasing processes
- **Promise** - deliver on-time, first time, every time
- **Service** – ensuring complete customer satisfaction with HP Products, Services, and Solutions



Process Improvements

- **Solution Selling:** Speak more directly to customer's unique business environment
- **Quote Turn-Around Time:** ordering & delivery
- **Partner Capabilities:** Provide uniform sales experience from HP channel partners and resellers

Differentiated Guarantee

- **HP 3PAR Get 6-9s Guarantee**
- **HPN Lifetime Warranty**

Source it right

Sourcing quality components

>> Incoming quality



Rigorous supplier selection

- Component Defective Parts Per Million and Mean Time Between Failures
- New Part/ Supplier Qualification

Supplier management

- Audits and oversight
- Supplier process controls

End to end quality monitoring

- Standardized quality reporting
- On site verification of failed components at integration facilities
- Component testing

Continuous Improvement

- 8D Closed Loop Corrective Action
- Collaborative Kaizen activities

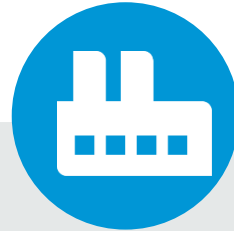
Build it right

Building quality products, solutions and services



Prevention and Detection

- Coordination with Research and Development for design for manufacturing
- Factory monitoring and early warning detection



World-class Factories

- EG production System: Lean deployment and maturity metrics
- Creating Zero Defect Quality Culture
- Relentless focus on First Pass Yield (FPY) in production



Rigorous Tests

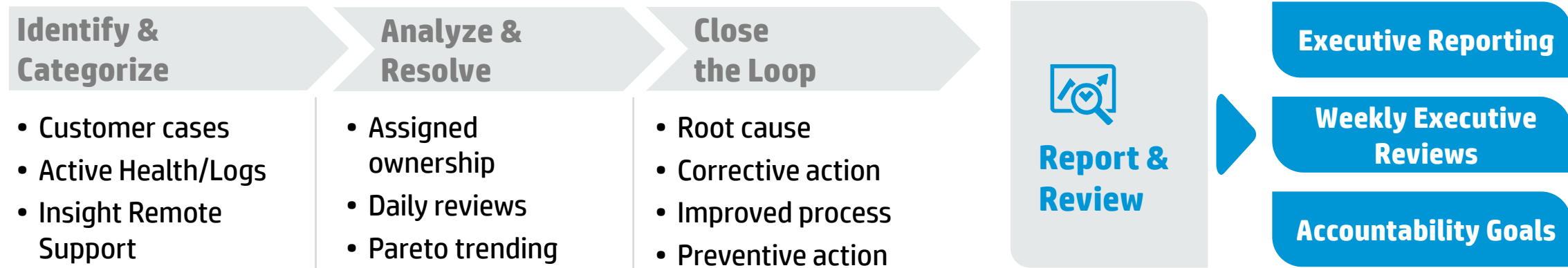
- Extensive run-in testing prior to shipment
- Ongoing reliability testing and test optimization



Support it right

Comprehensive review of every customer issue

Customer Quality Case Process



Proven Results

- Reduced customer downtime over 32M hours
 - Eliminated over 1.5M total outages
 - Annual downtime reduced over 95%
- 



Customer & Quality Benefits



EG Quality improvement results

FY15 YoY Quality Improvements

Fewer outage events

Annualized Outage Event Rate reduced over

15%



Shorter customer downtime

Average Annual Downtime reduced over

20%



Higher reliability

Annualized Intervention Rate reduced over

15%



Higher availability

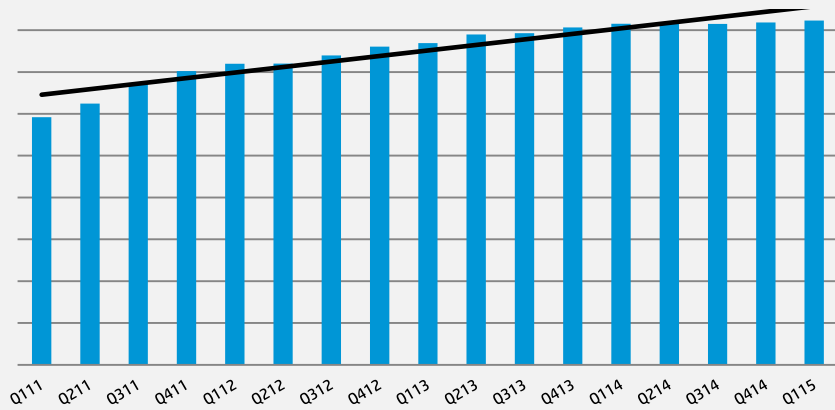
Availability increased over

20%



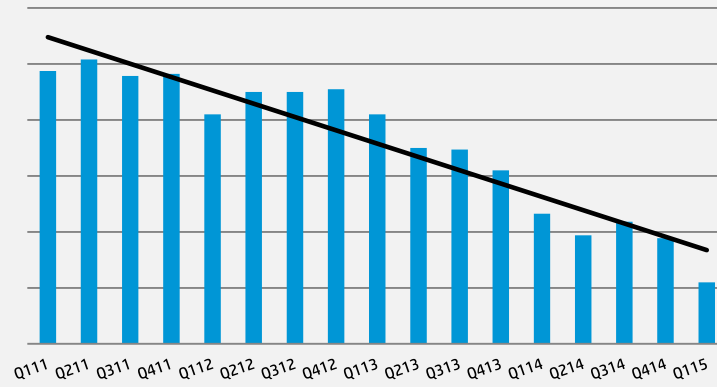
Quality gains

EG Availability



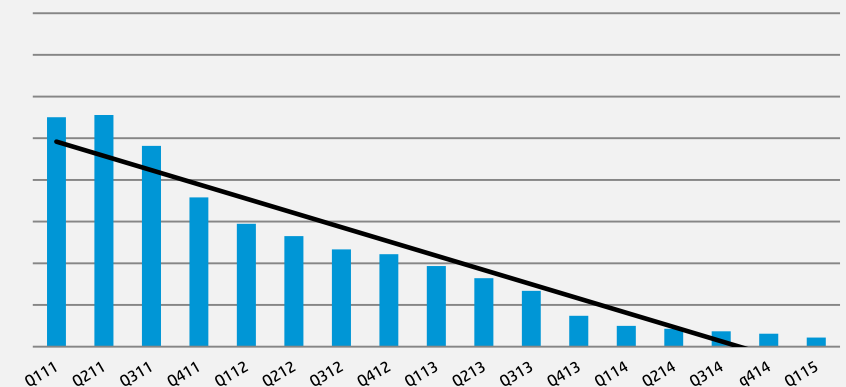
Up is good

ESS Annualized Intervention Rate (AIR)



Down is good

EG Annualized Outage Event Rate (AOER)



Down is good



HP Enterprise Group

External Awards and Accolades

Enterprise Group

Growth Partner of the Year

Tech Data Corporation's US Vendor Summit
December 2014

HP Moonshot

Technology of the Year

InfoWorld 2015

HP Apollo

Top 100 innovations & Innovation of the Year

R&D Magazine's R&D 100 Awards
June & December 2014

HP 3PAR

Best in Quality

Storage Magazine/SearchStorage.com Quality Awards 2014

Best in Class

DCIG Midrange Array Buyer's Guide 2014

#1 Mid-Range Overall Use Case

Gartner Critical Systems Capabilities 2014

Enterprise Group

Top Warranty Expense Reductions

Warranty Week
January 2015



EG Customer and market proof points

Our Improvement is recognized in the marketplace

Advanced

Our development groups are saying that it is the fastest platform that they have ever loaded their systems on—ever. In the entertainment business, we can't deliver anything less than the best. **HP helps us stay ahead of the game.**

Reliable

While production was still running, I switched from one storage system to the other – and not one of our employees noticed... That was when we knew that we could **seamlessly maintain business continuity even in an emergency situation** – without a great deal of effort from us in the IT department.

Unified

HP differentiates itself in how the sales team stays involved at the end of the project, which was very good. Normally, sales people leave and we deal with the delivery team – but at HP, **sales and delivery go hand in hand**, which is better for us.

Proactive

Many times it has happened that a part has been delivered when we haven't even been aware that there was something that was not functioning correctly. Parts were shipped, engineers arrived and the **problem was fixed proactively without any delays.**

In closing

Customer Experience & Quality Mission



Customer Experience Excellence

Best customer experience and quality in the industry

Differentiated in the marketplace to increase our customers' competitive advantage



Quality

Most comprehensive quality program as viewed by our customers

Data-driven quality delivering a compelling value proposition to customers



Innovation

Innovation driving quality and quality driving innovation

Breakthrough results targeted and achieved

The DfX Journey at HP Enterprise Group



FY15 Quality Priorities

EG Quality Strategy, Systems & Processes

Drive Improved Customer Performance through Continuous Innovation



- Support, execute & deliver key EG strategic initiatives
- Deliver on NPS program metrics through improved Quality and communications

Enable Informed Decisions



- Manage and execute the quality cloud IT POA and other IT improvements to provide timely and accurate data
- Develop and build advanced analytic techniques to deliver enhanced data insights
- Develop alerting and predictive capabilities

Deliver Flawless New Products & Solutions



- Instill new processes and critical performance measures in the PDP for NPI health
- Support QLEs and Core Teams to build capabilities and launch highest quality products and solutions
- Improve product & solution portfolio planning and management by developing new capabilities

Transform Processes & Drive Improvement through Actionable Insights



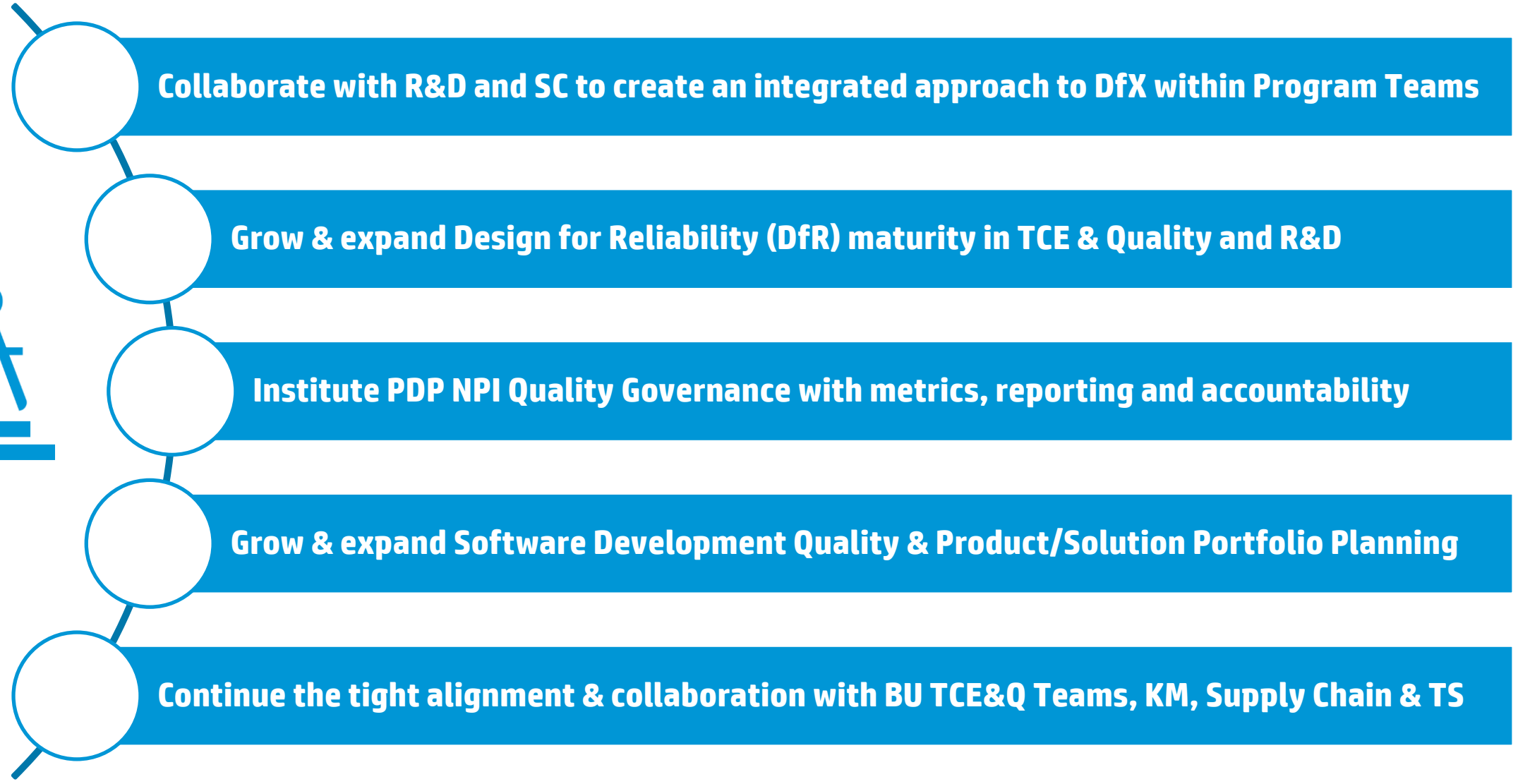
- Coordinate and drive critical improvements throughout the Quality Lifecycle
- Continue to improve QCA process to provide actionable information for all EG cases
- Implement the next phase of the EG Quality Review process, including SFDC transformation
- Support all BU and functional teams to deliver on quality goals (AOER, AOD, AIR, OBF, Availability)

Drive Communications to Improve the Culture of Quality



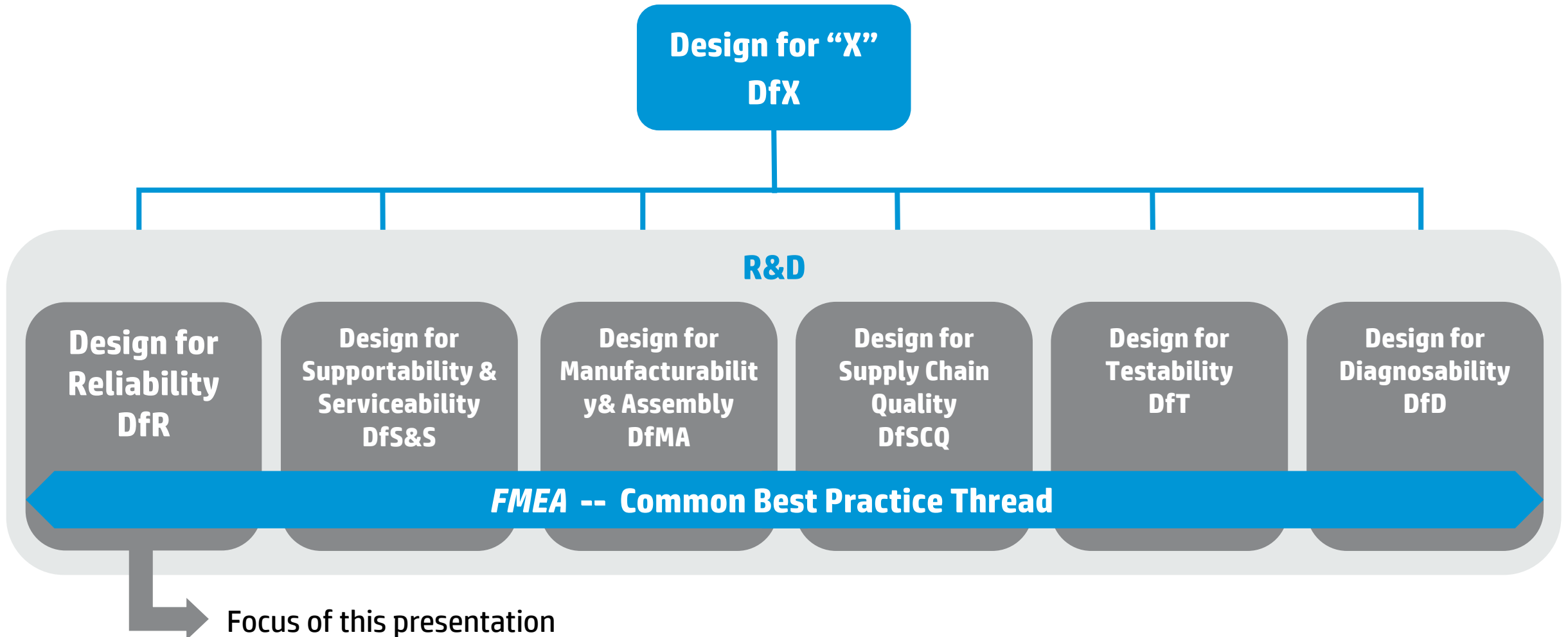
- Build advanced skills & capabilities by delivering training, tools and mentoring
- Promote customer experience & quality through culture programs that inspire and motivate
- Refine and drive programs to recognize & celebrate customer experience & quality excellence
- Deliver the right information to the right audience at the right time to drive the right action

Product Development Quality FY15 Strategy



Design for “X” on Program Teams

DfX is an alignment & collaboration between R&D, TCE & Quality, Supply Chain and TS



xFMEA for NPI Quality Improvements

Fault event & failure modes with root cause & corrective actions are the foundation of DfX



Design for Reliability
DfR

Design for Supportability & Serviceability
DfS/S

Design for Manufacturability & Assembly
DfMA

Design for Testability
DfT

Design for Supply Chain Quality
DfSCQ

Design FMEAs (DFMEA)

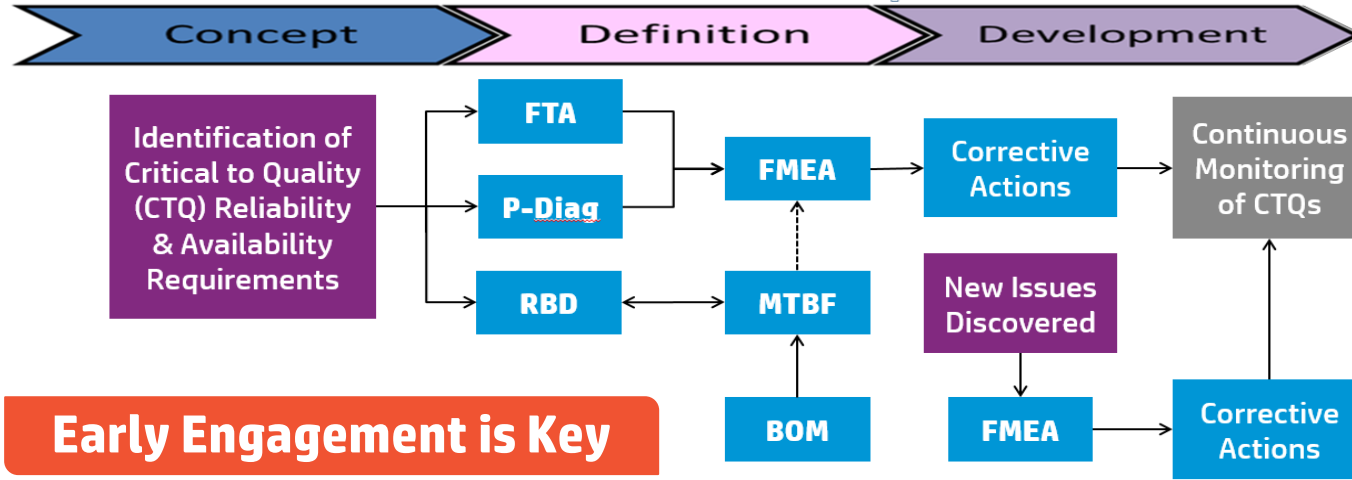
- The primary objective of a Design FMEA is to uncover potential product failures that cause:
 - Reduced product reliability
 - Increased warranty costs
 - Increased system down times
- Ideally, Design FMEAs should be conducted when the design is flexible, but they can be conducted on existing designs as well

Process FMEAs (PFMEA)

- Process FMEAs uncover potential failures that can:
 - Impact product quality
 - Reduce process reliability
 - Cause customer dissatisfaction
 - Create safety or environmental hazards
- Ideally, Process FMEAs should be conducted prior to start-up of a new process, but they can be conducted on existing processes as well

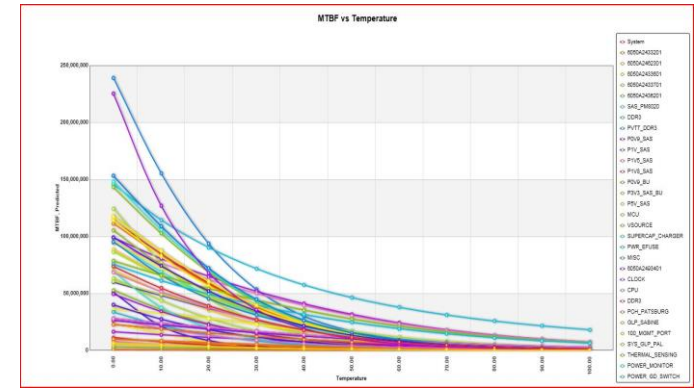
DfR Best Practices

DfR Methods mapped to the R&D Design Phases of the Product Development Process (PDP)

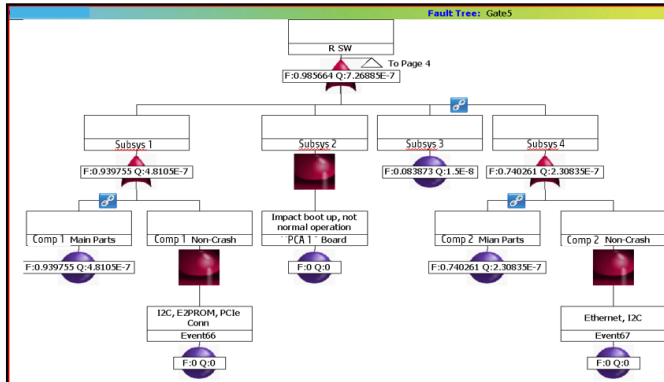


Early Engagement is Key

Mean Time Between Failure (MTBF)



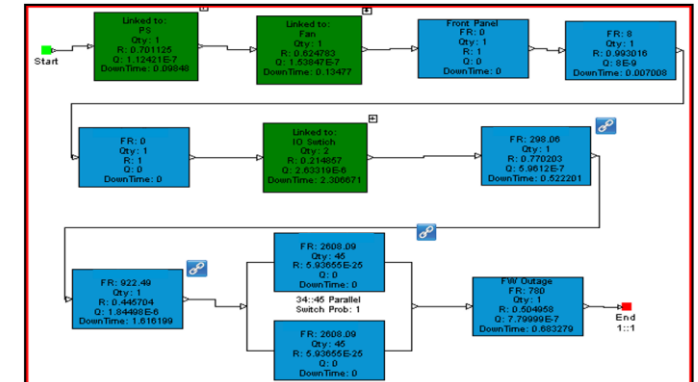
Fault Tree Analysis (FTA)



Failure Mode Effects Analysis (FMEA)

Model ID	Sys Tree Item	Potential Failure Mode	Method of Occurrence	Mode Introduced in Gen	Local Effects	Next Effects	End Effects	SEV	Occur	Detect	EXP	Recommended Actions	Team Lead
Mode 13	OS	not forward compatible with new hardware.	new hardware does not interact with old firmware.		2.x will "red X" the blade; 3.2x will support basic functionality; 3.5x+ required for full functionality	does not give power to blade.	blade does not power on.	4	4	4	64	FRU, ROM should maintain backwards compatibility. Feature detection API is in development between	
Mode 33	Wide port link errors	Multiple hard drives fail causing a failed logical drive and data loss.	In a wide SAS port cabling configuration, the SAS links are used to communicate to multiple hard drives. Anytime one 1 of 4 links indicates a link error, drives fail within 1 hour.		Link error reported.	Over time, multiple drive failures occur.	Multiple hard drives fail resulting in data loss before customer can respond.	5	3	4	60	Controllers should disable the redundant and faulty link in the SAS wide port immediately after detecting a link error.	

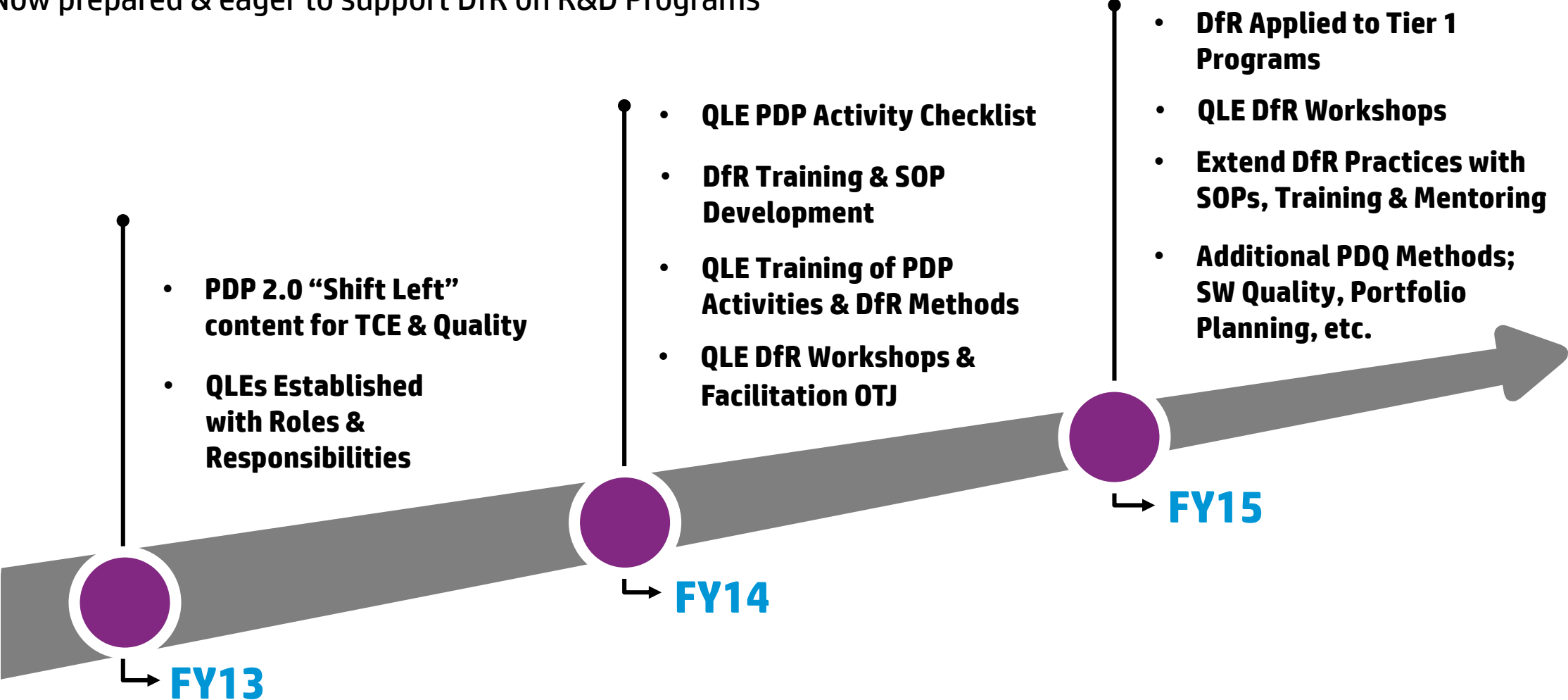
Reliability Block Diagram (RBD)



Quality Lifecycle Engineer (QLE) DfR Capability Growth

QLEs are the Customer Experience & Quality representatives on the Product Program Core Teams

- Now prepared & eager to support DfR on R&D Programs

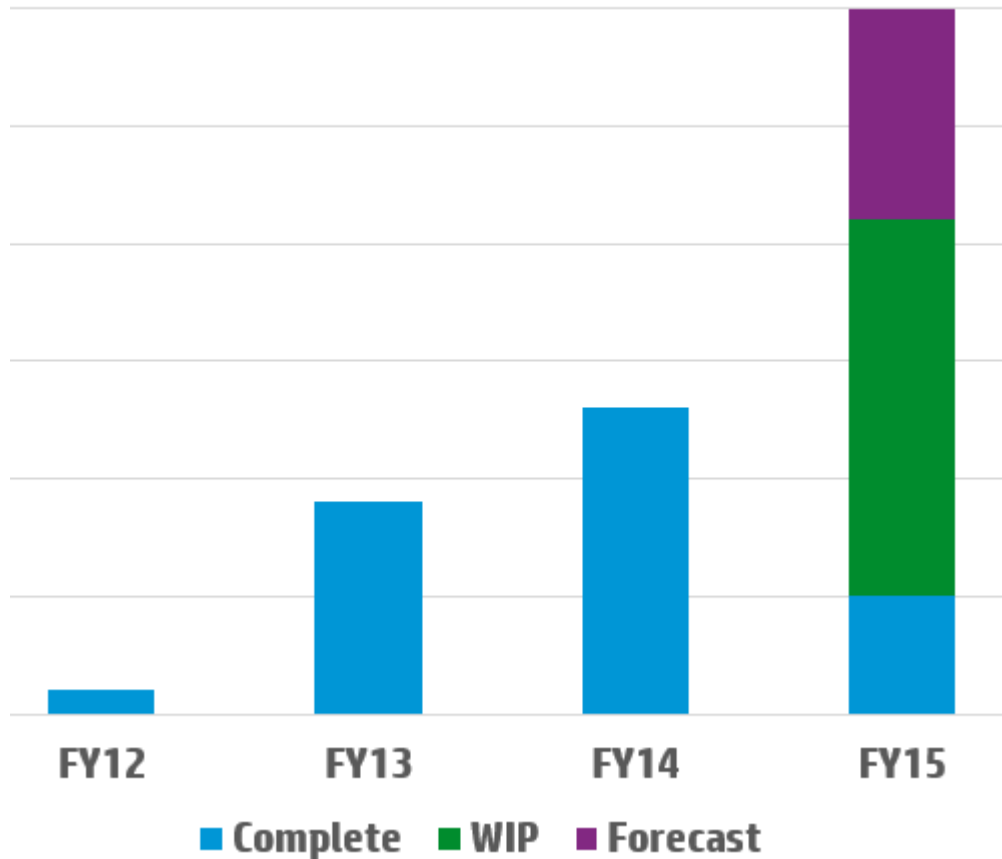


DfR Engagement on R&D Programs

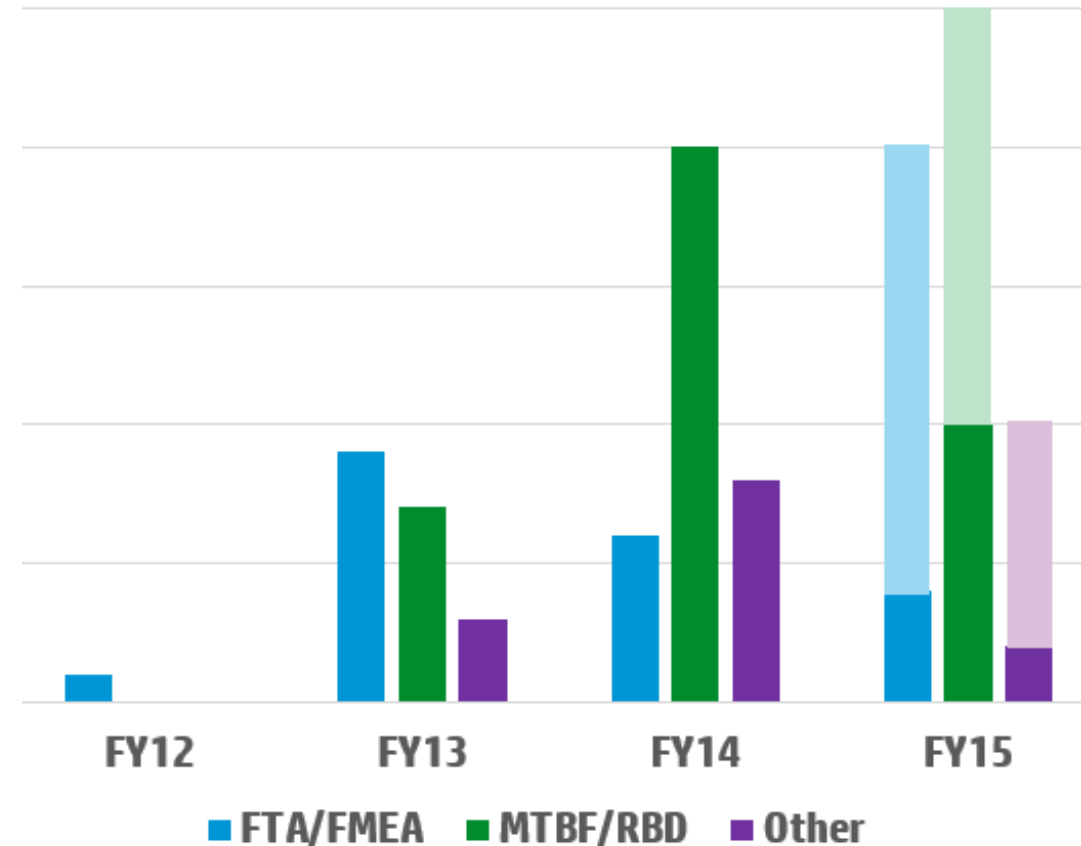
DfR Best Practices Deployment

DfR Methods applied to R&D Programs

DfR Project Engagement on NPI Programs



DfR Methods on NPI Programs



Thank you

