



Delivery Pipeline and Central QA

October 17, 2019

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Agenda

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M3 Quality Assurance -
Introduction

04

M3 Continuous
Integration/Continuous
Delivery (CI/CD)
framework

02

M3 Central QA

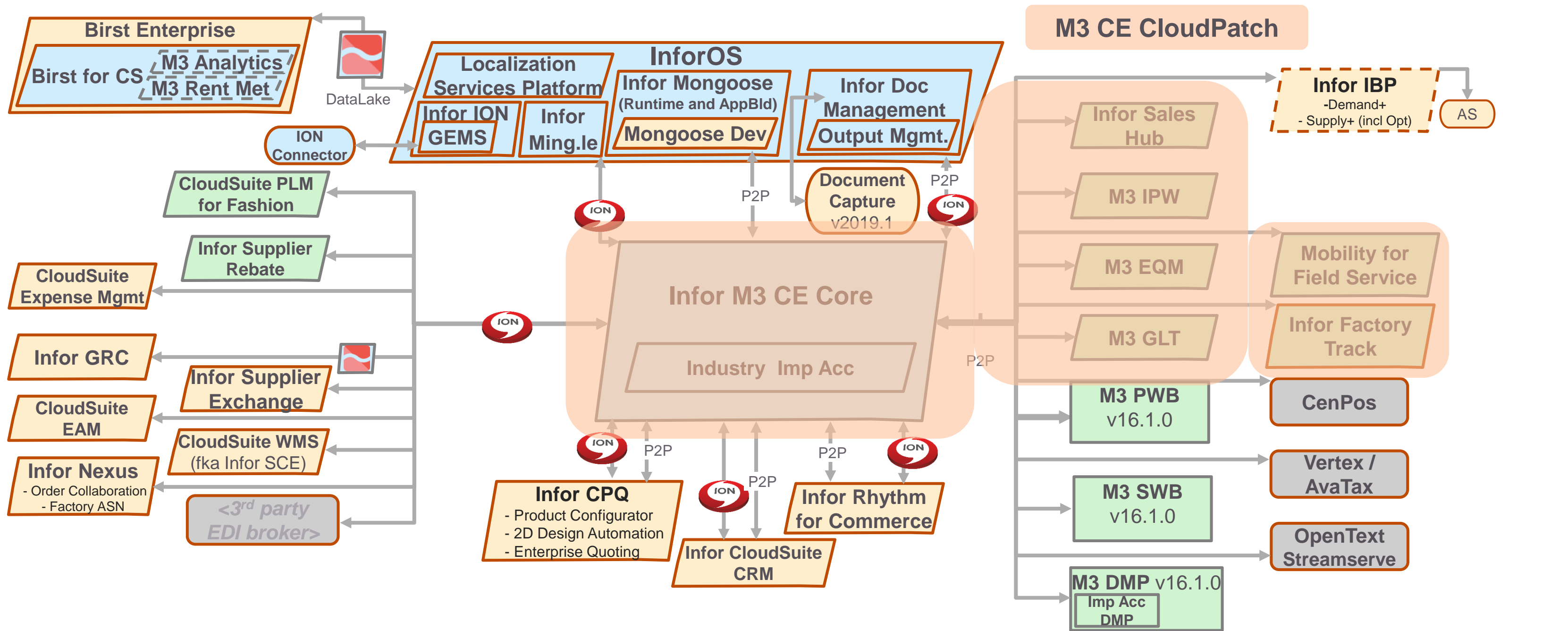
03

M3 Cloud Edition (CE)
Delivery Pipeline

M3 Quality Assurance - Introduction



▲ M3 CloudSuite Superset – Approved for Production



Orange outline = Infor, non-M3: [Dashed outline = Controlled Release]

- *Blue = suite base
- *Yellow = suite add-on
- *Grey = 3rd party license
- *Green = option in one or more industry

↔ Integration tested / certified



Designed for Progress.
Deployment methods

- Cloud (Multi-tenant)
- WEB /3rd party provided
- Cloud (Single-tenant)
- On-Premise Only

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Enterprise Cloud Software, Built for Your Industry

M3 CE CloudSuite Superset – Product Onboarding Overview

| Available | 2019.11 | 2019.12 | 2020.01 | 2020.02 | 2020.03 | 2020.04 |
|--|---------|---|---------|---|---------|---------|
| <ul style="list-style-type: none"> M3 CE Core (incl industry Imp Accs, ProjPortal, RntCount, CustSrvDsk and EPP) Infor OS: ION (incl Data Lake), Ming.le, Homepages, IDM (incl Output Mgmt) Infor Sales Hub Infor Factory Track Mongoose, incl App Builder Infor CPQ Infor CloudSuite EAM Infor Rhythm for Commerce M3 DMP, M3 PWB, M3 SWB M3 GLT - Graphical Lot Tracker Birst M3 Analytics (PM approval required) Infor CloudSuite PLM for Fashion M3 Integration Framework for EDI M3 IPW – Inventory Planning Workbench Infor Supplier Rebate Infor Nexus M3 EQM - Equipment Quotation Management Infor Localization Services Platform Infor CloudSuite Expense Management Infor IBP Infor Document Capture Infor Supplier Exchange Infor CloudSuite WMS (fka Infor SCE) Infor Mobility for Field Services Infor Governance Risk and Compliance M3 Rental Metrics Infor CloudSuite CRM | | <ul style="list-style-type: none"> M3 Customer Lifecycle Manager | | <ul style="list-style-type: none"> M3 Portals Infor d/EPM CloudSuite PLM for Process (Optiva) Infor Global Human Resources <p>Adding new suite: CloudSuite Chemicals</p> | | |



M3 Central QA

OCTOBER – 2019

Central QA overview

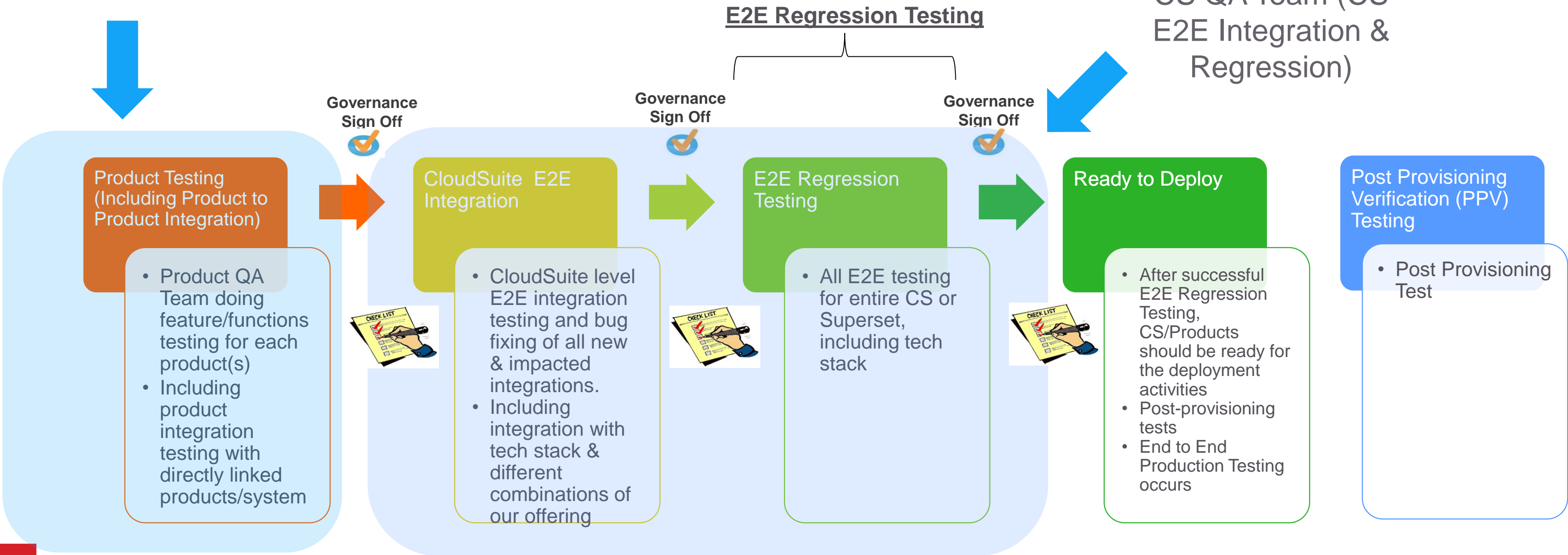
- Infor Central QA organization started 3 years ago
 - Responsible for quality assurance of *all* Infor CloudSuites before release to Production
 - Includes 4 CS teams spread over Manila, India, US and Sweden
 - M3 Central QA team 20+ people based located in Sweden and Manila
 - QA central Governance approves the products that wants to enter the Central QA process and release to Production
- Scope
 - Central QA is responsible for testing and approving each update of all products in a CloudSuite context (including critical updates)
 - Most products release once per month, according to the Infor Central release calendar



QA Central: Multi-Tenant Solution Testing Process

Product QA Team

CS QA Team (CS E2E Integration & Regression)



Planned Infor MT release milestones – monthly updates

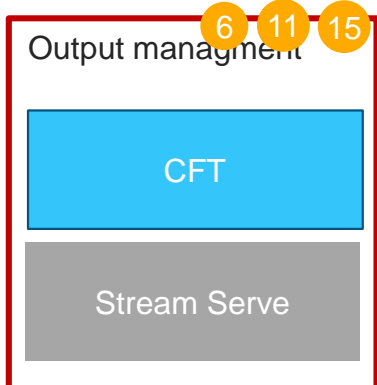
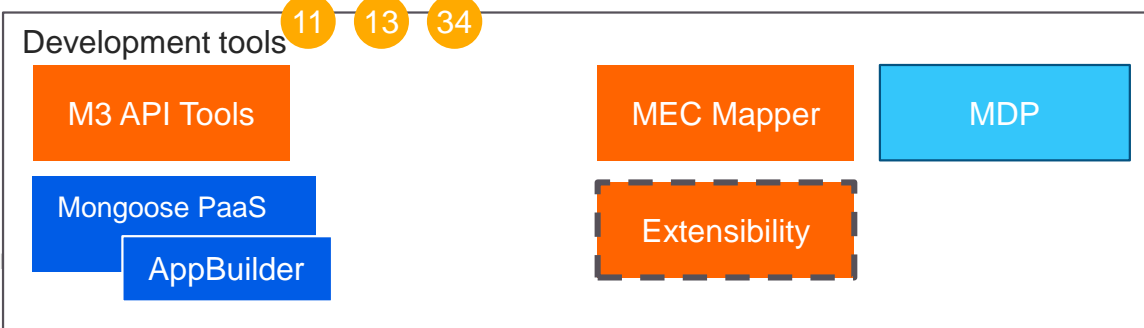
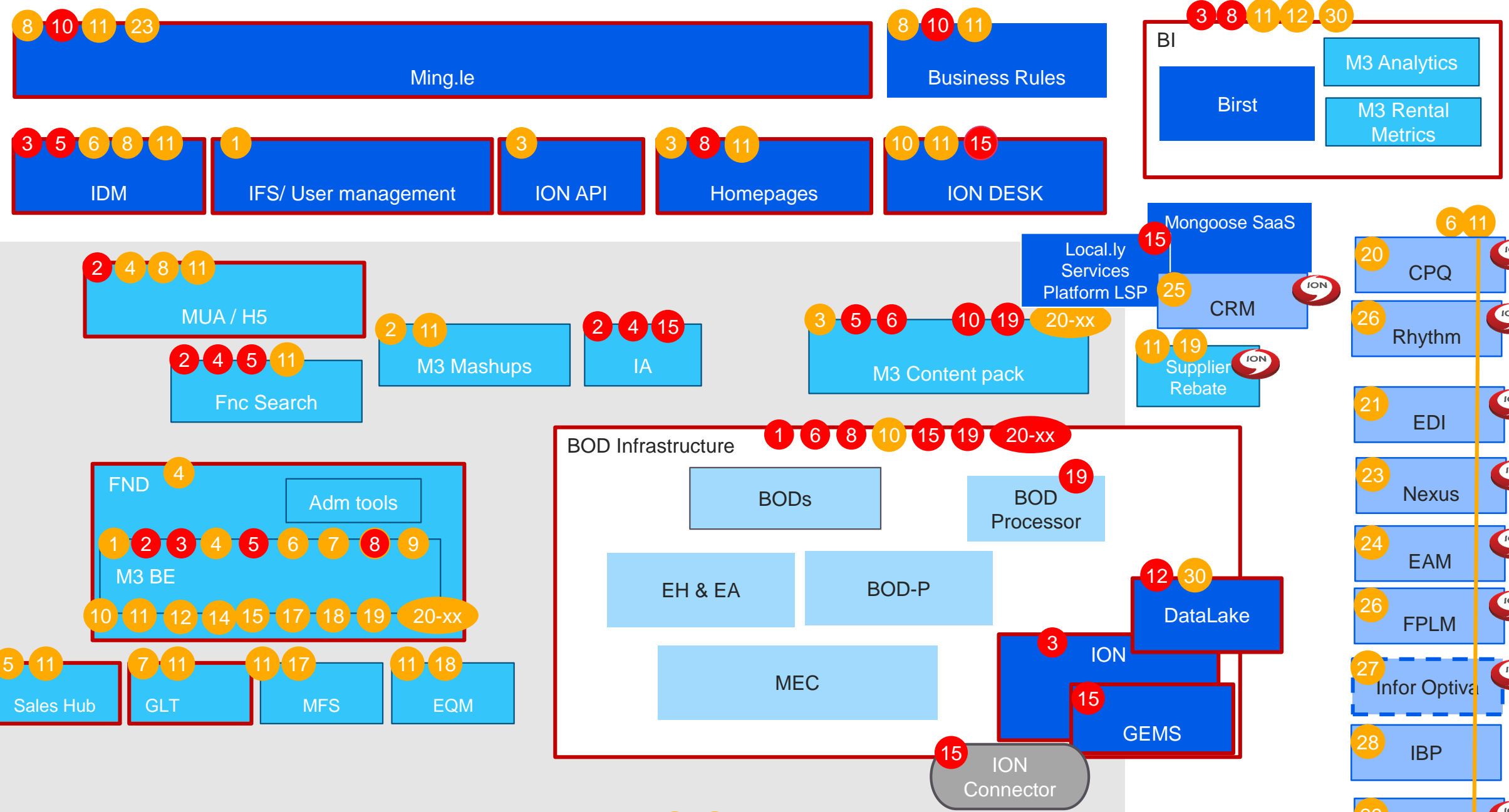
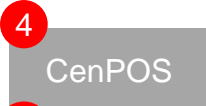
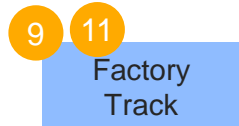
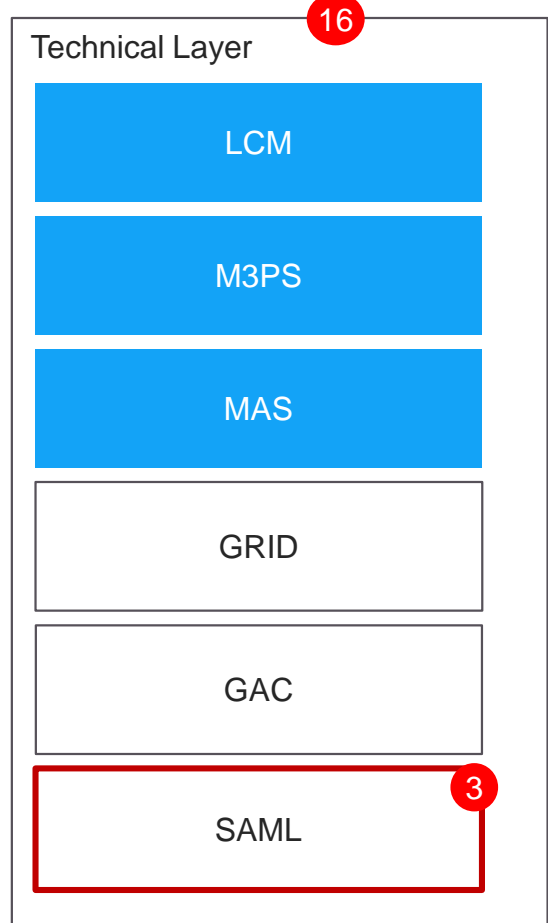
| Infor Update | Final submit to CQA (M3CEPack notation) | What's New Highlights (widget only) | NCRs on KBase | Release Complete - Update Info* published | All Prod and Suite Doco published (Interim RN) | Deployed On Prod <i>Default: Starting 00:00 local time (in the morning)</i> <i>Tokyo, 21:00 local time</i> <i>Frankfurt, 22:00 local time</i> |
|----------------------|--|--|---------------|---|--|--|
| 2019 October | 2019-09-24 (M3CEPack2019.018) | 2019-09-26 | 2019-10-01 | 2019-10-03 | 2019-10-04 | Tue 8-Oct: AP-Southeast-2 (Sydney) and AP-Northeast-1 (Tokyo) Sat 12-Oct: EU-Central-1 (Frankfurt) Sat 19-Oct: US-East-1 (Virginia) |
| 2019 November | 2019-10-29 (M3CEPack2019.019) | 2019-10-31 | 2019-11-05 | 2019-11-07 | 2019-11-08 | Sat 9-Nov: EU-Central-1 (Frankfurt) Tue 12-Nov: AP-Southeast-2 (Sydney) and AP-Northeast-1 (Tokyo) Sat 16-Nov: US-East-1 (Virginia) |
| 2019 December | 2019-11-26 (M3CEPack2019.020) | 2019-11-28 | 2019-12-03 | 2019-12-05 | 2019-12-06 | Sat 7-Dec: EU-Central-1 (Frankfurt) Tue 10-Dec: AP-Southeast-2 (Sydney) and AP-Northeast-1 (Tokyo) Sat 14-Dec: US-East-1 (Virginia) |

*) Update Info = What's New Details, Release Notes and Resolved Issues. Published on Knowledge Base (and What's New widget)



Test automation

- TaaS (aka Krypton)
 - Infor developed test automation tool
 - Used by all Central QA for CloudSuite testing and many Infor products
 - Available for customers (including scripts to use as templates)
- M3 CloudSuites test suite
 - The M3 CloudSuites test suite contains 800+ scripts
 - Being used to test all 4 M3 CloudSuites (Distribution Enterprise, Fashion, Food & Beverage, Equipment)
 - Low maintenance
 - Implementation Accelerators to secure standardization of data
 - Reusability over all M3 suites, interchangeable data in scripts
 - Common components



Legend

- = Test area id, Component addressed with direct tests
- = Test area id, Component addressed with indirect tests (black box)
- = Product is not yet onboarded
- = Product in default/baseline scope in addition to HS & CON that is mandatory for all products



Dependencies – Test Areas

Core products and concepts

| ID | Key | Summary |
|----|---------------------------|--|
| 1 | M3QAR-1 | M3 - User Management |
| 3 | M3QAR-4 | M3 - Homepages (with integrations) |
| 4 | M3QAR-5 | M3 - BE / MUA / FND |
| 6 | M3QAR-7 | M3 - Output & Input management |
| 8 | M3QAR-16 | M3 - Ming.le & Social |
| 10 | M3QAR-10 | M3 - ION/BOD Integrations |
| 11 | M3QAR-8 | M3 - Languages / Internationalization |
| 12 | M3QAR-17 | M3 - Business Intelligence (Analytics) |
| 13 | M3QAR-18 | M3 - Development tools |
| 15 | M3QAR-21 | M3 - Countries |
| 16 | M3QAR-22 | M3 - Technical layer |
| 34 | M3QAR-201 | M3 - Extensibility |

Integrated products

| ID | Key | Summary |
|----|--------------------------|--------------------------------|
| 2 | M3QAR-2 | M3 - Mashups (IA, Eq.) |
| 5 | M3QAR-6 | M3 - Sales Hub |
| 7 | M3QAR-34 | M3 - Graphical Lot Tracker |
| 9 | M3QAR-9 | M3 - Factory Track |
| 14 | M3QAR-20 | M3 - Planning products |
| 17 | M3QAR-27 | M3 - CLM & MFS |
| 18 | M3QAR-31 | M3 - EQM |
| 19 | M3QAR-23 | M3 - Supplier Rebate |
| 20 | M3QAR-26 | M3 - Infor CPQ |
| 21 | M3QAR-28 | M3 - Infor EDI Managed Service |
| 22 | M3QAR-29 | M3 - Infor Rhythm |
| 23 | M3QAR-30 | M3 - GT Nexus |
| 24 | M3QAR-33 | M3 - Infor EAM |
| 25 | M3QAR-32 | M3 - Infor CRM |
| 26 | M3QAR-25 | M3 - Fashion PLM |

| ID | Key | Summary |
|----|---------------------------|------------------------|
| 27 | M3QAR-24 | M3 - Infor Optiva |
| 28 | M3QAR-222 | M3 - Infor IBP |
| 29 | M3QAR-216 | M3 - XM |
| 30 | | M3 - GHR |
| 31 | M3QAR-250 | M3 - Supplier Exchange |
| 32 | M3QAR-419 | M3 – GRC |
| 33 | M3QAR-251 | M3 - WMS (aka SCE) |
| 35 | M3QAR-260 | M3 – Portal |



Test objectives 1 (2)

- Handshake
 - We test that an Application can be opened / is responding and that a user can navigate in the application, open tabs and windows etc. It does not cover any major task. It is a very basic test and should always be followed by the other objectives.
- Basic Integration
 - Testing integration between two components, transaction or data passed. E.g. SalesHub is integrating with BE, MUA and BE are integrating etc. The test cannot stand alone and needs to be executed in company with tests of other objectives.
- Running
 - The test is to verify that an application is running or that and application's major features are running, and available. It does not test that it is working (working is much more complex and covers several test conditions). We test a path and look for the expected result on that path. No bi-ways or exceptions. Example: In Homepage, you can create, update and delete.

Test objectives 2 (2)

- Consistency

- Means that the user's experience is consistent, when it comes to content and configurations. The purpose with the test is to validate that the correct "things" have been deployed and is available for the user. Example: In Homepage, there are 3 ION widgets, 5 BE widgets etc.

- Inspection

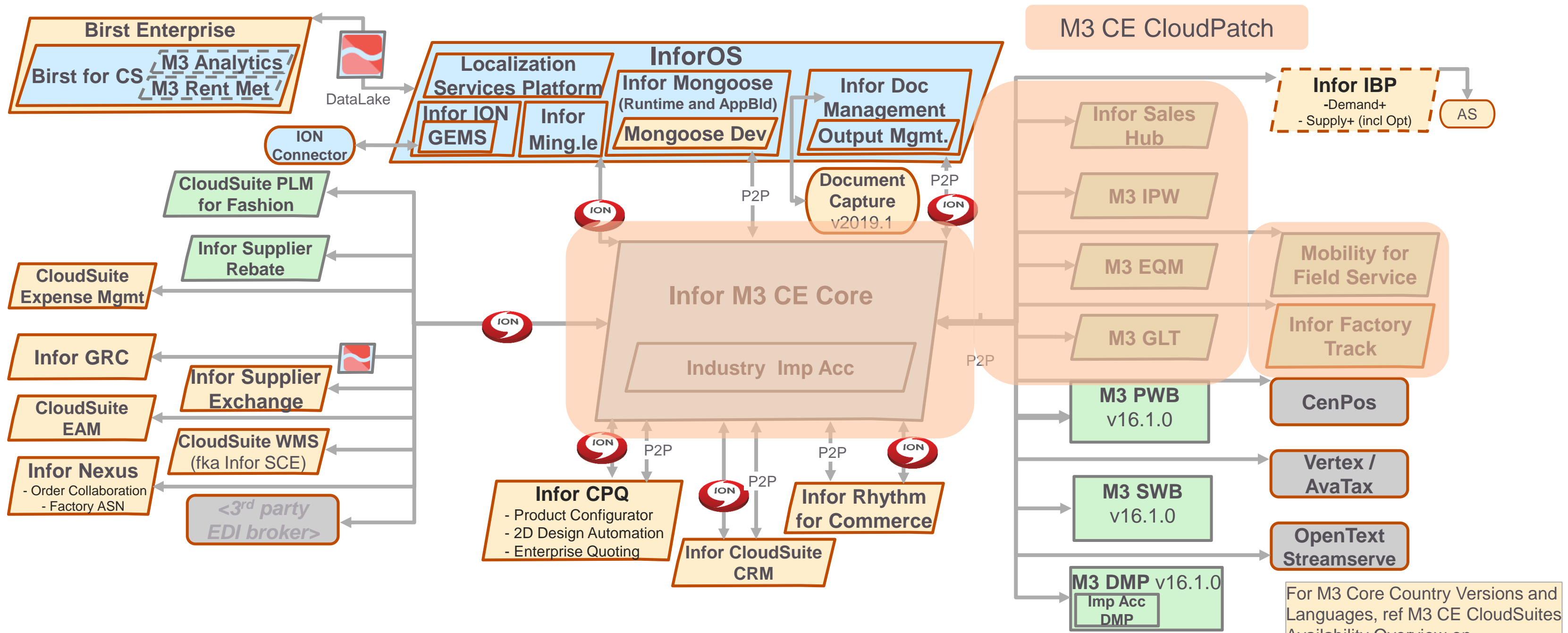
- Is not a test, it is more of checking the state of the system, or the system's applications. Sometimes this is called Health Check or Sanity Check. Example: in the Grid Management page; Checking the status of EH or EA.



M3 CE Delivery Pipeline

OCTOBER – 2019

M3 CloudSuite Superset – Approved for Production



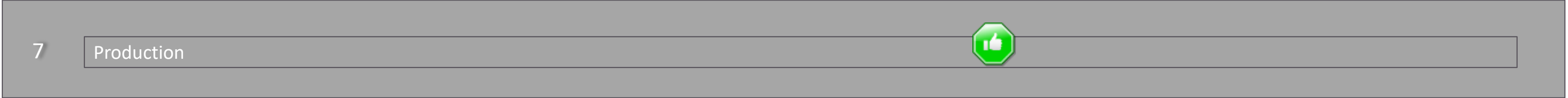
Orange outline = Infor, non-M3: [Dashed outline = Controlled Release]

*Blue = suite base *Yellow = suite add-on *Grey = 3rd party license *Green = option in one or more industry

For M3 Core Country Versions and Languages, ref M3 CE CloudSuites Availability Overview on [KB#1954472](https://kb.infor.com/KB#1954472) and slide 5

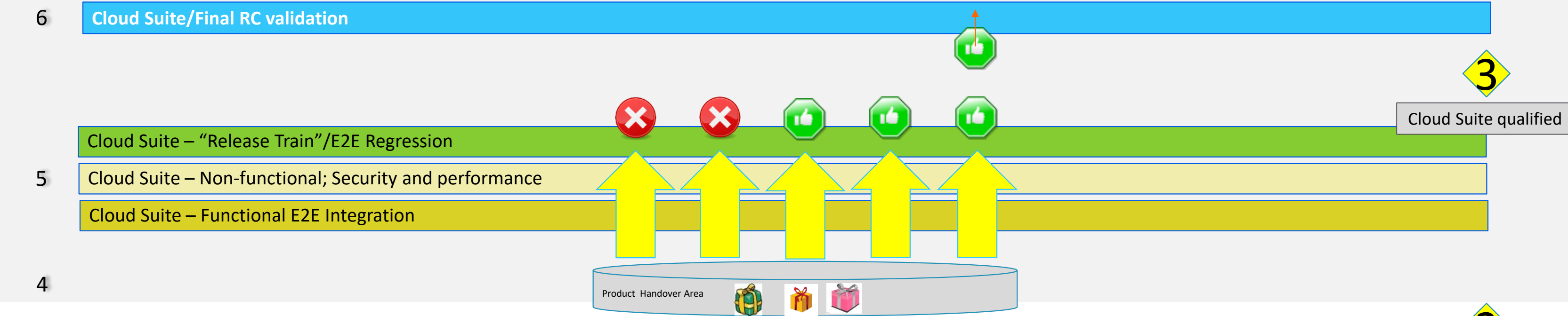
↔ Integration tested / certified

M3 Delivery Process



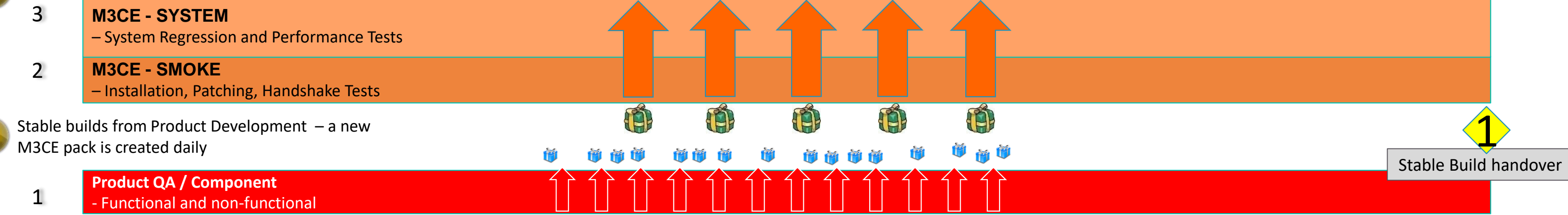
Updates in Production according to schedule for Maintenance Windows

Cloud Suite

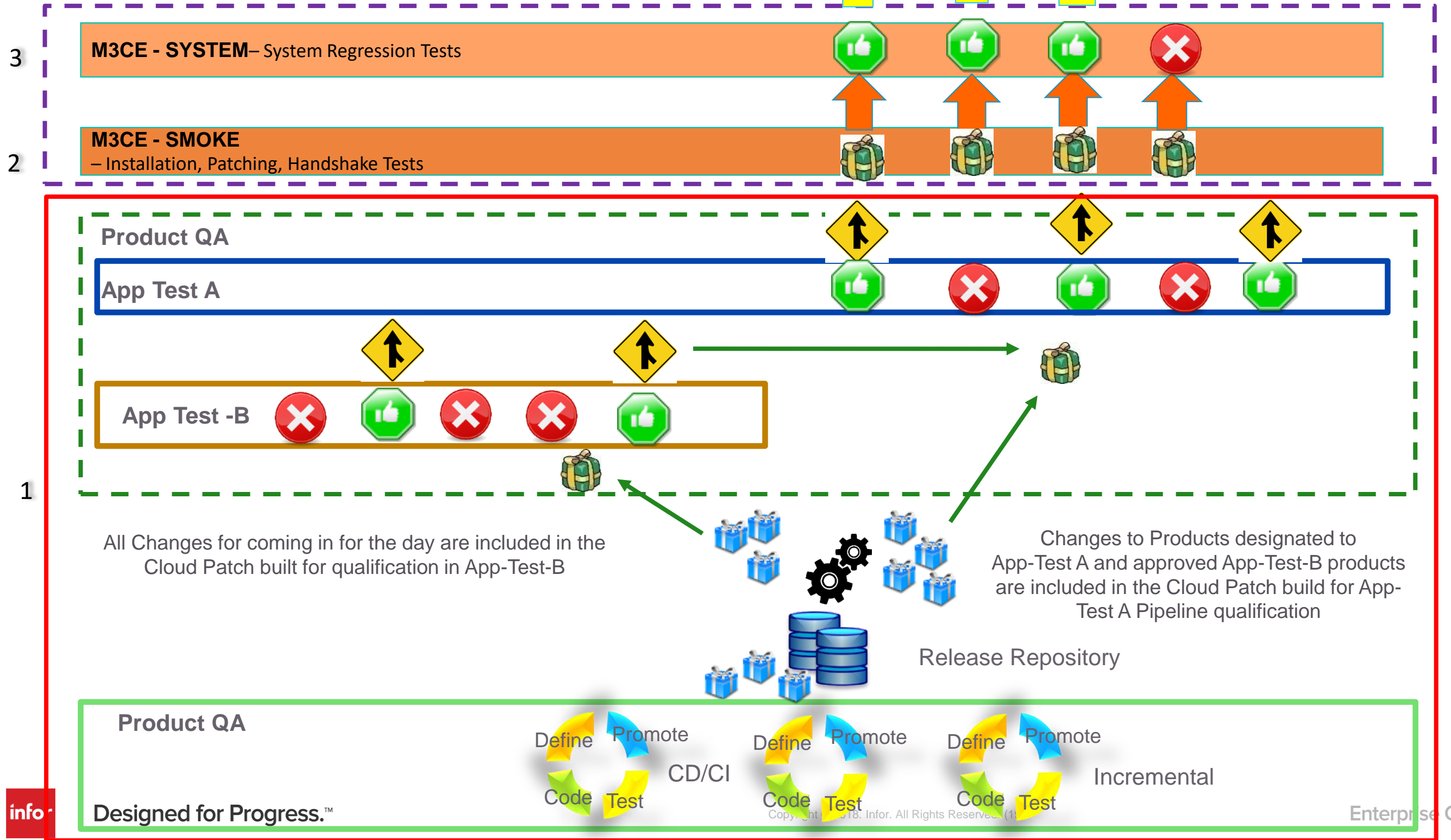


M3CE (M3 Development)

A new M3CE pack is qualified approx. 2-3 times per week



Product Handover Area for M3 Cloud Suite



Level 2/3

DELIVERY PIPELINE

Level 1

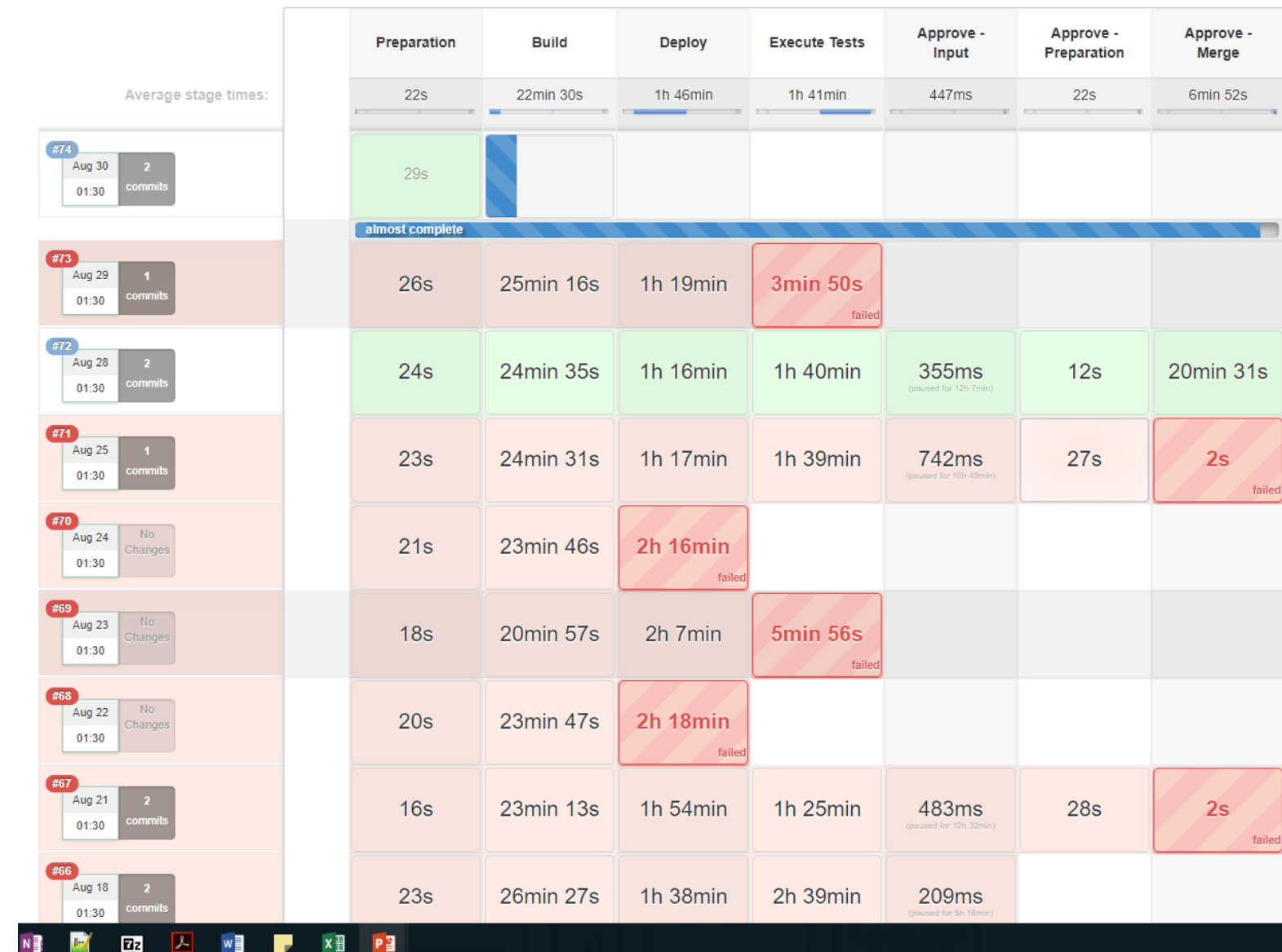
PRE-PIPELINE A

PRE-PIPELINE B

NOT PART OF ANY PIPELINE

Key Principles of the A and B Pipelines

- Continuous Delivery Vehicle of a Product set
- Daily build, deploy, test, decision cycle
- Aim of the Pipeline is to test compatibility between closely dependent products
- Early detection of fault and quick turnaround
- Deliver as often as possible instead of big bangs
- All or None Principle
- Way forward is to fix the issue
- Automation is the key
- Approved Product set is merged into next Pipeline



Purpose with the Pipelines

Delivery Pipeline

- Created to support level 2 and 3 testing to qualify M3CE deliveries
- 600+ test scripts run daily in 4 CloudSuites

Pre-Pipeline A

- Application testing
- Automation for patching
- Automation for running test automation
- Dev teams responsible for testing
- Approved Packages move to Delivery Pipeline

Pre-Pipeline B

Same activities as in Pre-Pipeline A

Used by applications that needs extra time

Approved packages are picked up in to Pre-Pipeline A

Note: All products will be routed via either A or B (no products go directly in to Delivery Pipeline)



CI/CD framework

M3 CI/CD framework

- **Continuous delivery (CD)** is a software engineering approach in which teams produce software in short cycles, ensuring that the software can be reliably released at any time. **Continuous integration (CI)** is a prerequisite to be able to deliver as often as possible.
- M3 Continuous delivery
 - The M3 CE CloudPatch components should be released to the M3 delivery pipeline as often as possible to make sure that the release contains small batches of changes, that are easy to troubleshoot in case of a problem. It's an automatic build process that can release quality assured components as often as possible.
- M3 Continuous integration
 - To get the full benefits from practicing a continuous delivery process M3 is practicing a continuous integration process.
 - The most important part of continuous integration is test automation, meaning every code commit should be validated by running automated tests. There are many types of automated tests that are implemented, the M3 CI/CD framework aims for having automated unit tests, integration tests and system tests in place. In total **14.000** tests run every day/week.
 - **Unit tests** verifies the behaviour of individual methods or classes. These tests should be run each time a build is done to capture issues early, both on the developers local machine and in the build system when a commit is done.
 - **Integration tests** verifies how two or more classes integrate with each other (Internal integration tests), as well as how your component's external APIs integrate with other components (External integration tests).
 - **System tests** verifies how the component works based on its customer and business requirements



M3 CD Framework salient features

Automated Build Framework

- Handles Multiple Product
- Supports Continuous Delivery & Integration for rapid development & release

Internal Pipelines

- Multi-level test steps
- Handles Multiple Repository for intermediate builds

Integration to Jira

- Supports integration to Infor & Lawson Jira
- Commits tagged with Jira
- Automated changelog generation tooling support

Supports Metrics

- Integration to Sonar Qube (Metrics Tooling)

CDv2 Exclusive

- Support both Git & SCM Subversion
- Build in point fix support (interim builds)
- Supports automatic upload of Artifacts to S3 bucket in AWS (optional)





TM

