TESTING
IN A LARGE SCALE AGILE DEVELOPMENT ENVIRONMENT

CONTENT/AGENDA

1. Introduction
2. Agile on a large scale
3. Testing in a large scale agile environment
4. Conclusion

INTRODUCTION

- Ericsson:
  - The leading vendor for mobile network infrastructure
- Tough competition on the telecommunication market:
  - Number of competitors
  - Merging of traditional Circuit Switched Technology and Packet Switched Technology towards all IP Network
- Motivation:
  - Increase the feedback loops towards design
  - Delivery of high quality products to the customer
  - Being flexible to adapt faster to the market's demand
  - Early and Frequent Delivery

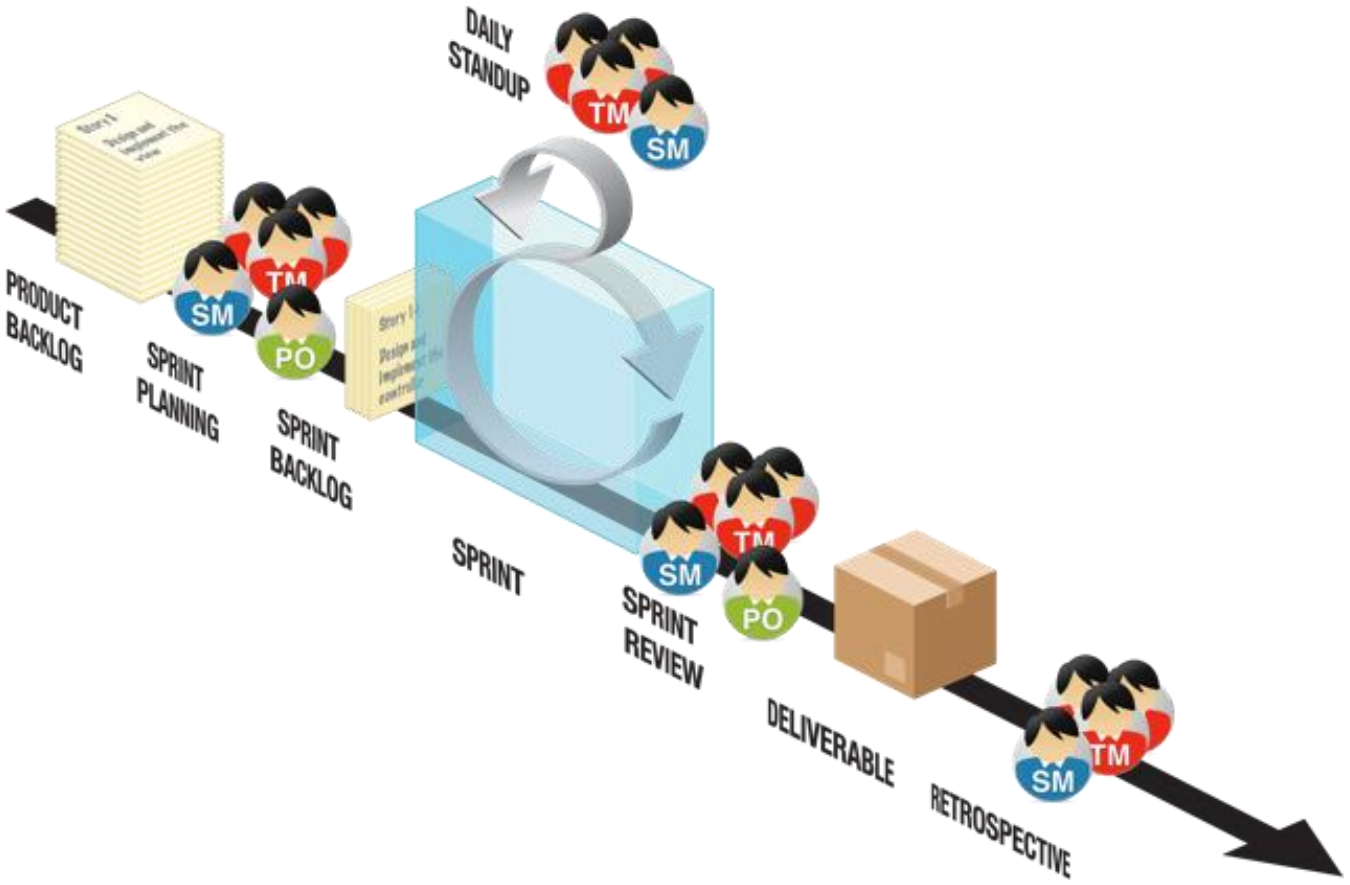
AGILE ON A LARGE SCALE

AGILE

- **Manifesto for Agile Software Development**
- We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:
  - Individuals and interactions over processes and tools
  - Working software over comprehensive documentation
  - Customer collaboration over contract negotiation
  - Responding to change over following a plan
- That is, while there is value in the items on the right, we value the items on the left more.

SCRUM IN A NUTSHELL

› One team collaborating to one feature



LARGE SCALE

- Chief Product Owner: 1
- Number of Product owners: 5
- Number of Scrum teams: 8
- Size of the teams: 6-8
- Number of Scrum Masters: 8
- Number of people: around 70
- Number of locations: 4
- Number of Releases: 2
- Number of manhours: ~100000
- Number of User Stories: ~700

LARGE SCALE

- Our legacy: The Ericsson Mobile Soft Switch

- 8085042 PLEX statements
- 20212606 ASA instructions corresponding to approximately 95000000 Intel instructions
- 2196 SW blocks

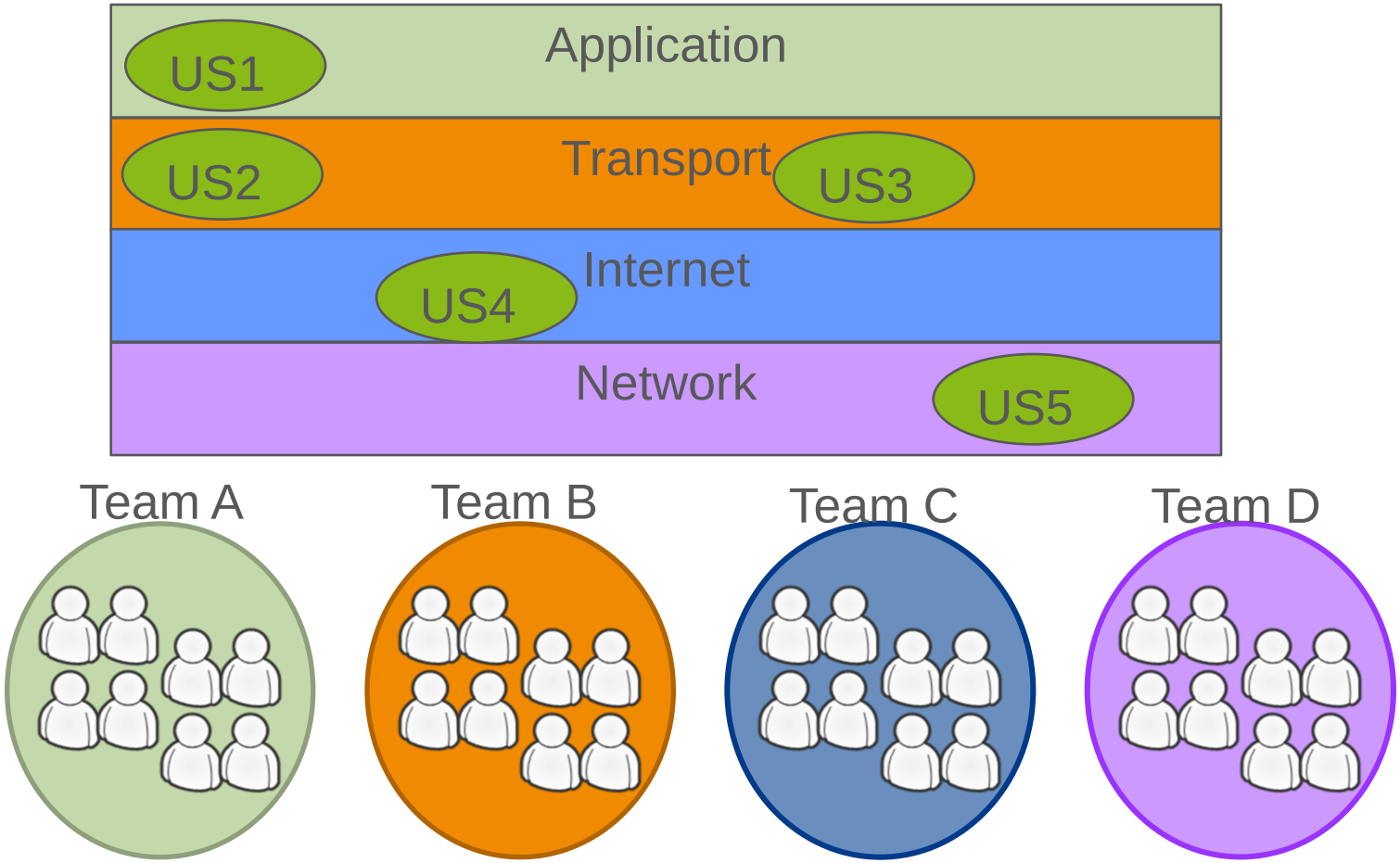
TESTING IN A LARGE SCALE AGILE ENVIRONMENT

WAYS OF WORKING

- Cross functional team of 7 +/- 1 SW developers:
- Virtual teams
- Synchronized sprints inside a feature
- Common Backlog
- Common ceremonies to keep everybody informed

WAYS OF WORKING

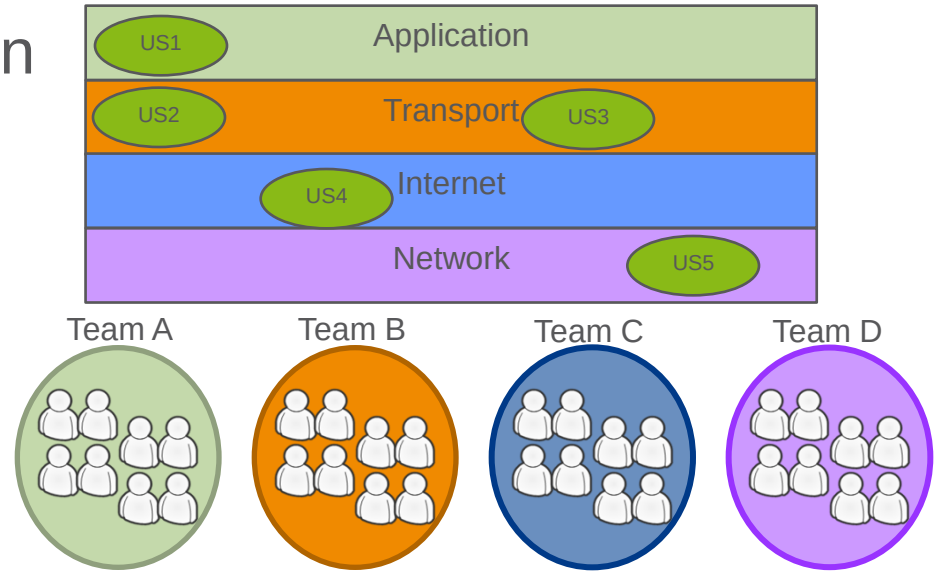
Backlog Setup strictly based on functional areas



WAYS OF WORKING

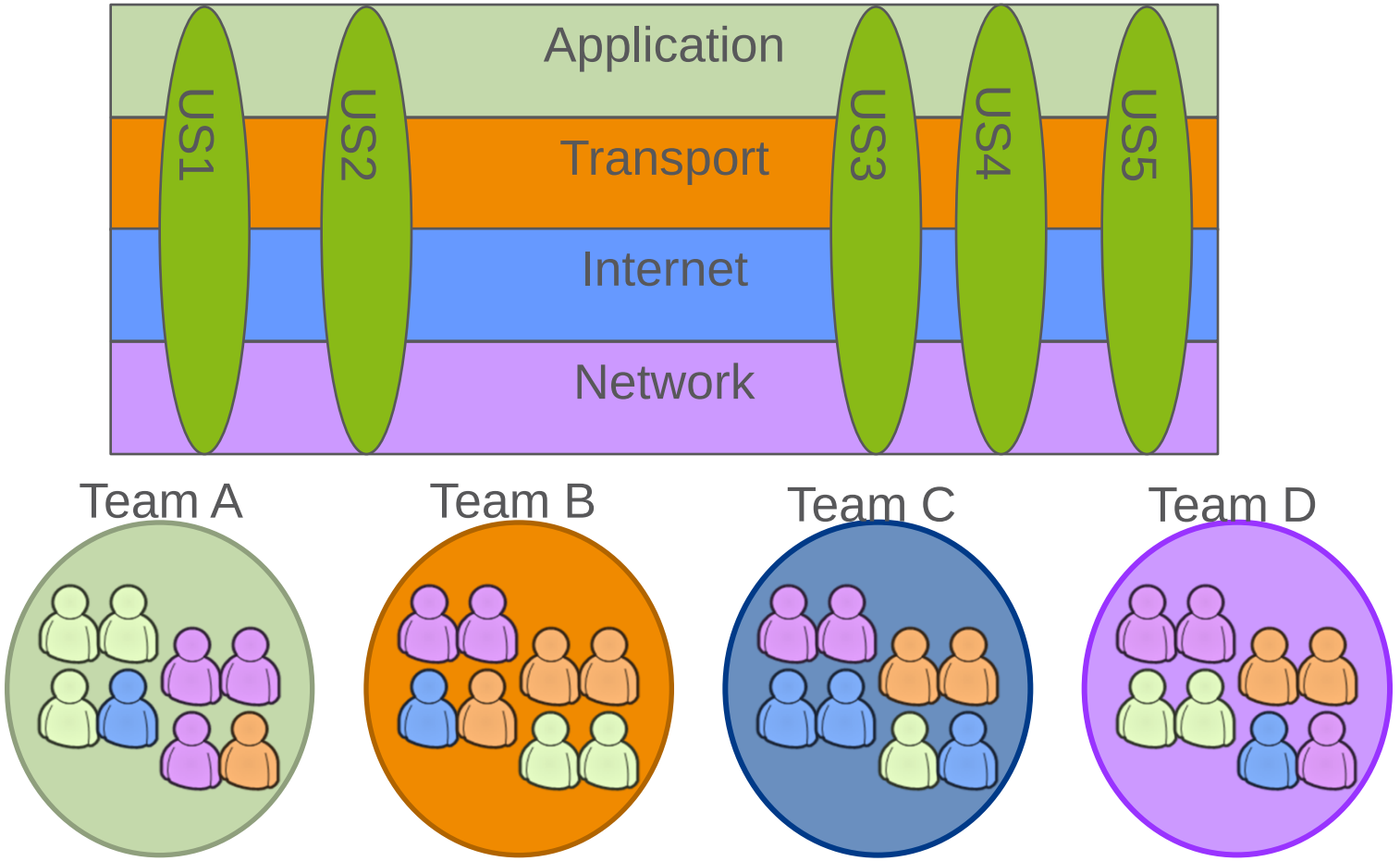
Backlog Setup strictly based on functional areas

- Risk of dependencies between User Stories
- Difficulties to test from an “end to end” perspective
- More planning needed
- Prone to generate delays



WAYS OF WORKING

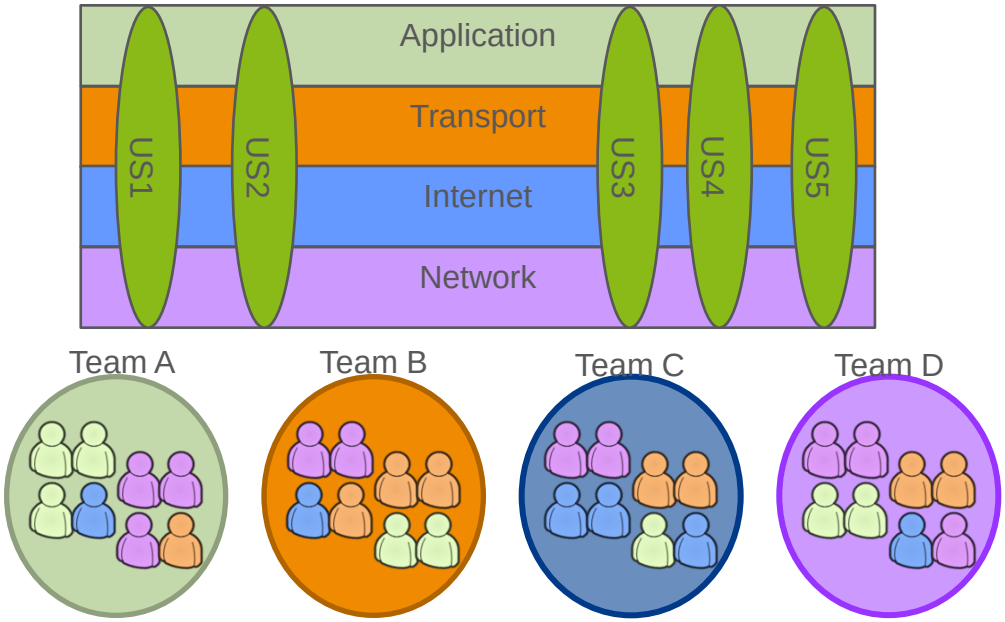
Backlog Setup with end to end focus and functional areas



WAYS OF WORKING

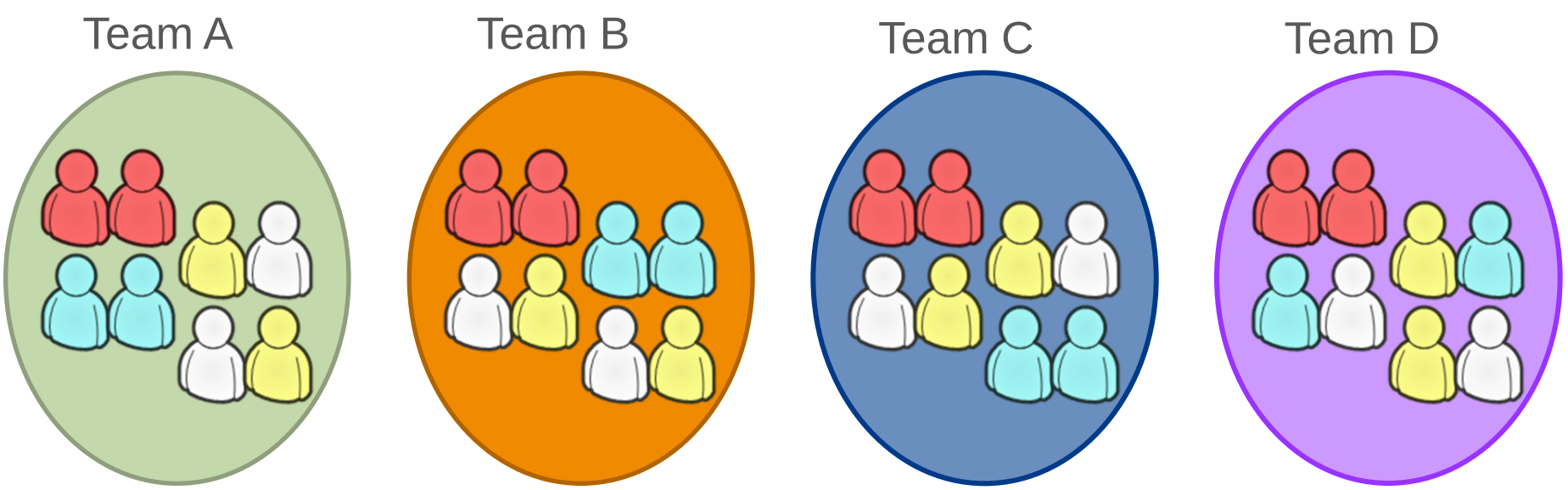
Backlog Setup with end to end focus and functional areas

- Testing possible from “end to end” perspective as the User Story is concluded
- Less planning needed
- Reduce dependencies due to functional areas
- Coordination might increase
- Competence build through training on the job and mix of competences



WAYS OF WORKING

Setup of virtual teams



Virtual Test Team

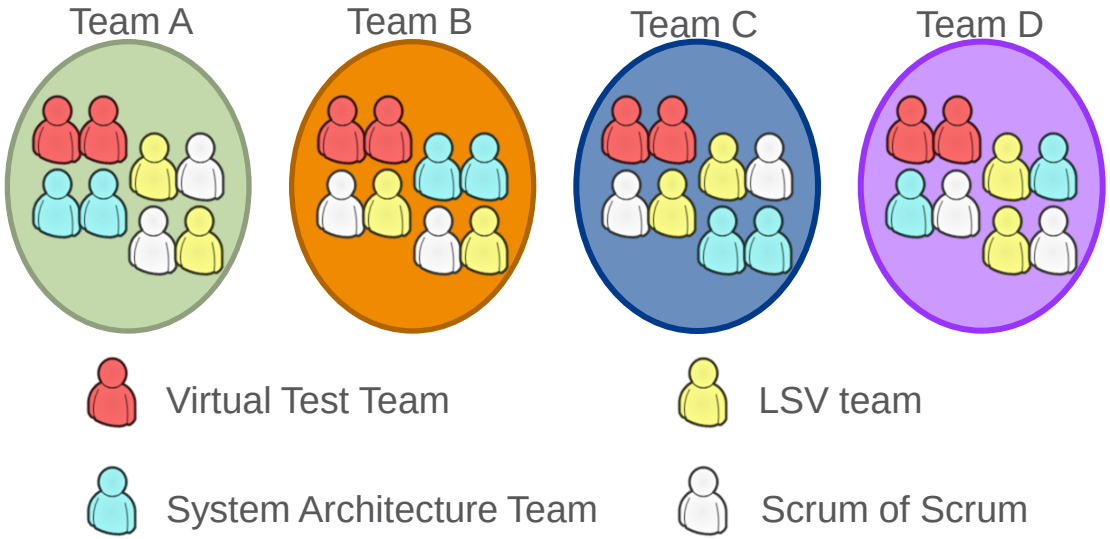
LSV team

System Architecture Team

Scrum of Scrum

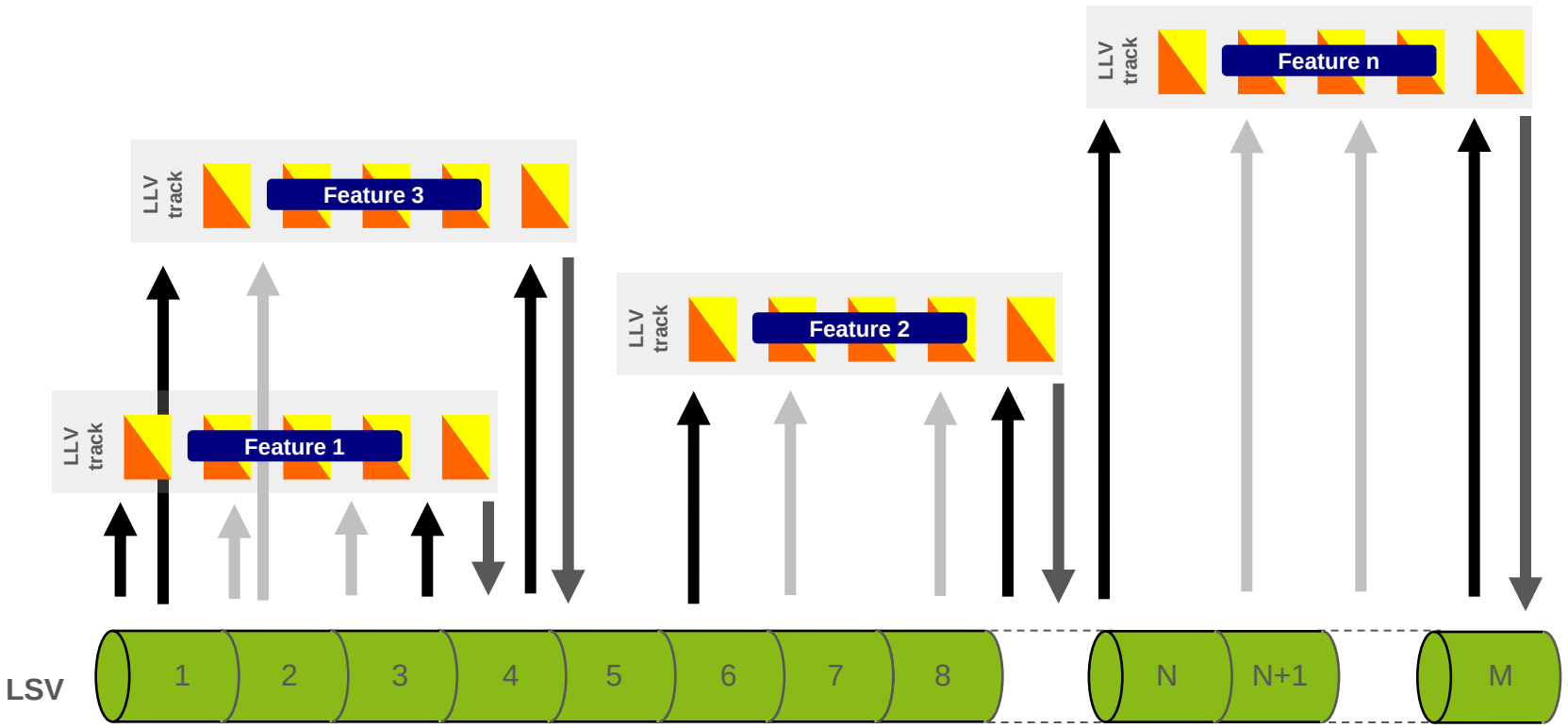
WAYS OF WORKING

Setup of virtual teams



- Overview over the activities with higher priority
  - Testing, Architecture, Software Delivery, Organizational topics

TEST OVERVIEW



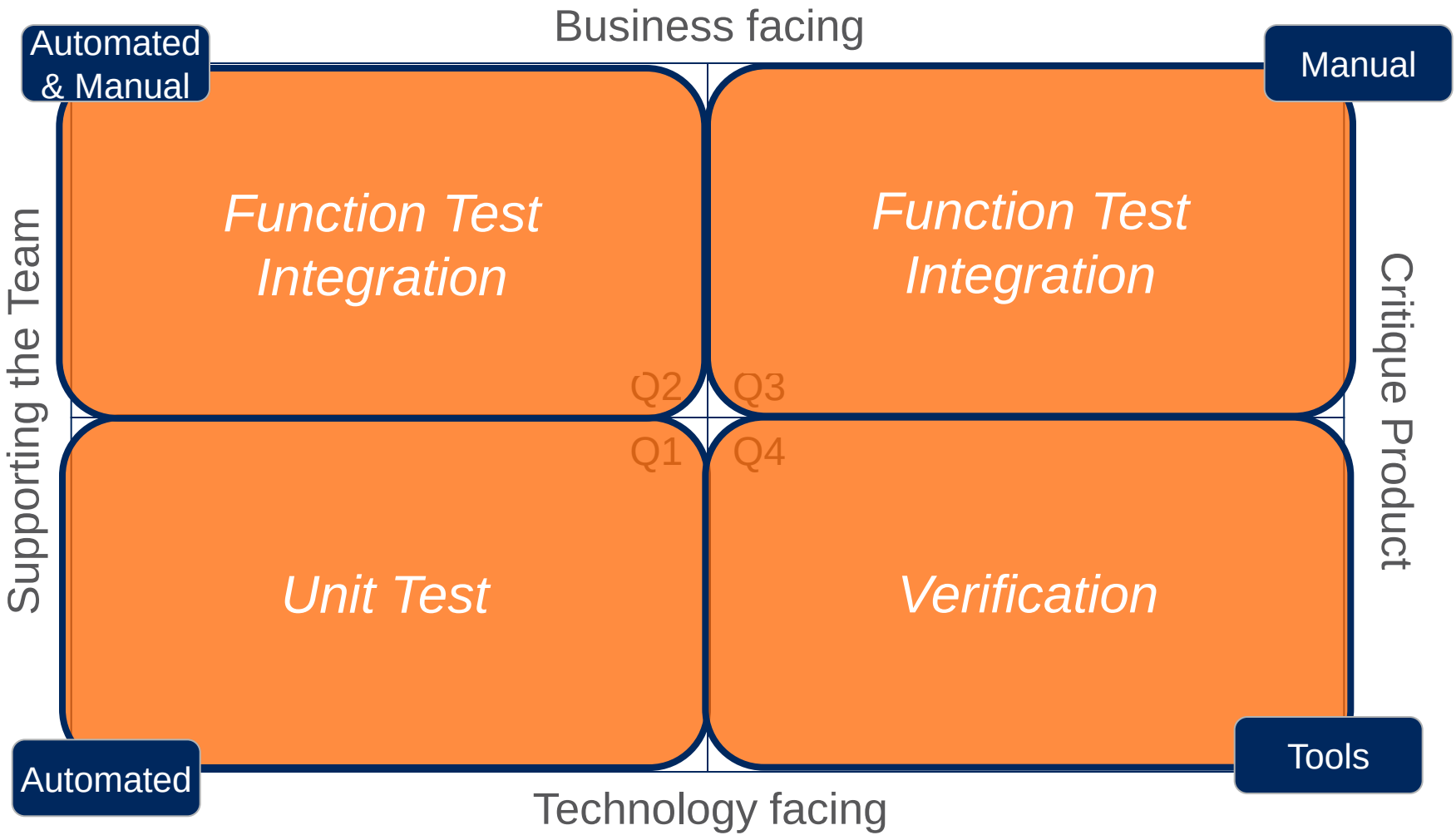
Note: Simplified view, details on following slides

Rebase mandatory

Rebase optional

LSV Delivery

TESTING ACTIVITIES



[1]: taken from Crispin/Gregory: Agile Testing, Addison Wesley, 2009

TESTING ACTIVITIES

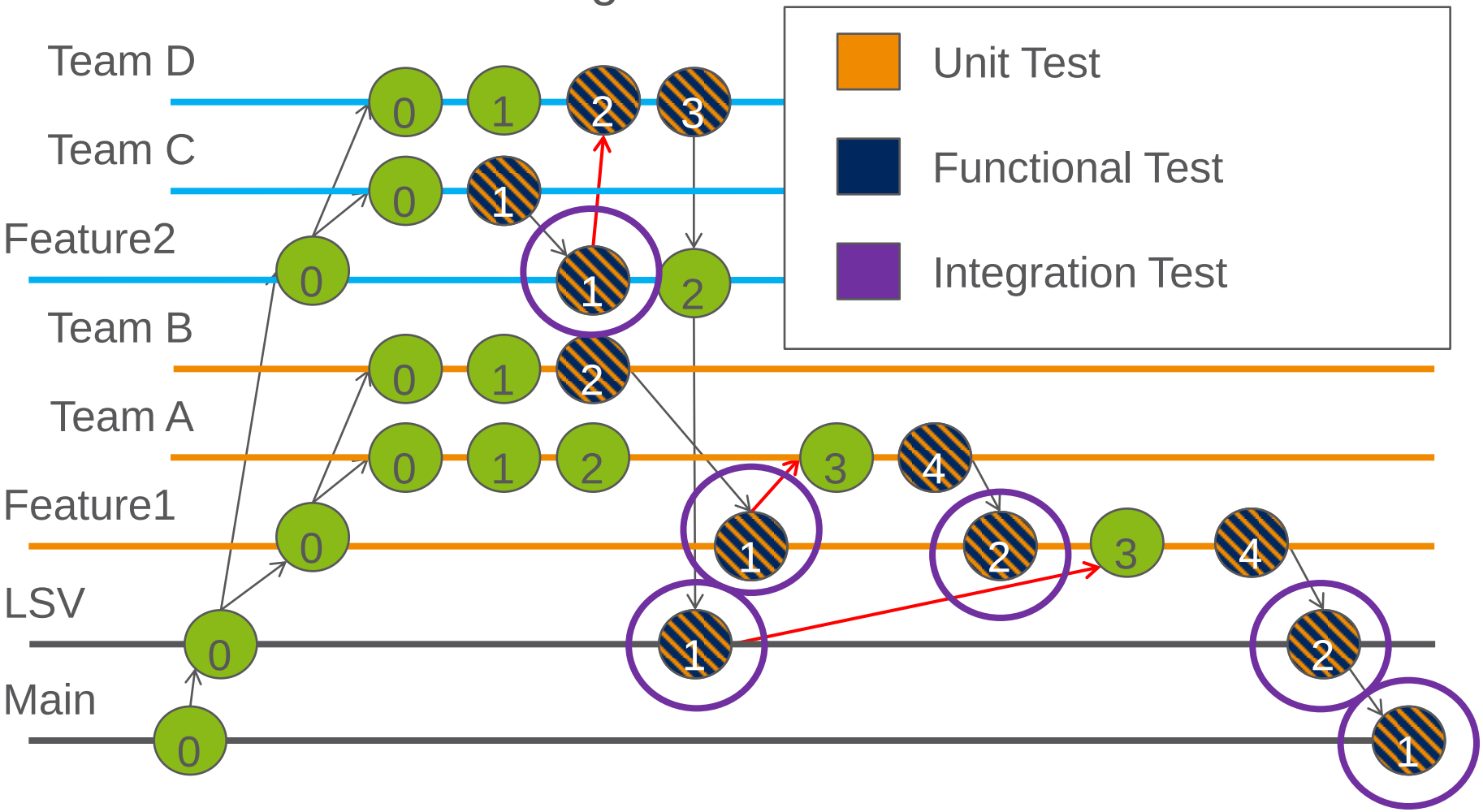
- Q1 Kind of tests are
  - Unit tests – testing small pieces of code
  - System Module Tests – test that units work together correctly
- Q2 Kind of tests are
  - Functional & Integration tests – positive and deterministic negative tests, if possible to automate
  - User Story Acceptance Tests

TESTING ACTIVITIES

- Q3 Kind of tests
  - Exploratory Testing – feedback into stories
  - Feature Test and Regression Test with Background Traffic
  - (early) Characteristics
- Q4 Kind of tests
  - Dimensioned Load on LLV/LSV
  - High Load/Overload on LSV (most likely)
  - Parafunctional tests (Performance, stress)
  - Interoperability, Security

TEST DETAILED VIEW

› Detailed view on Testing Timeframe

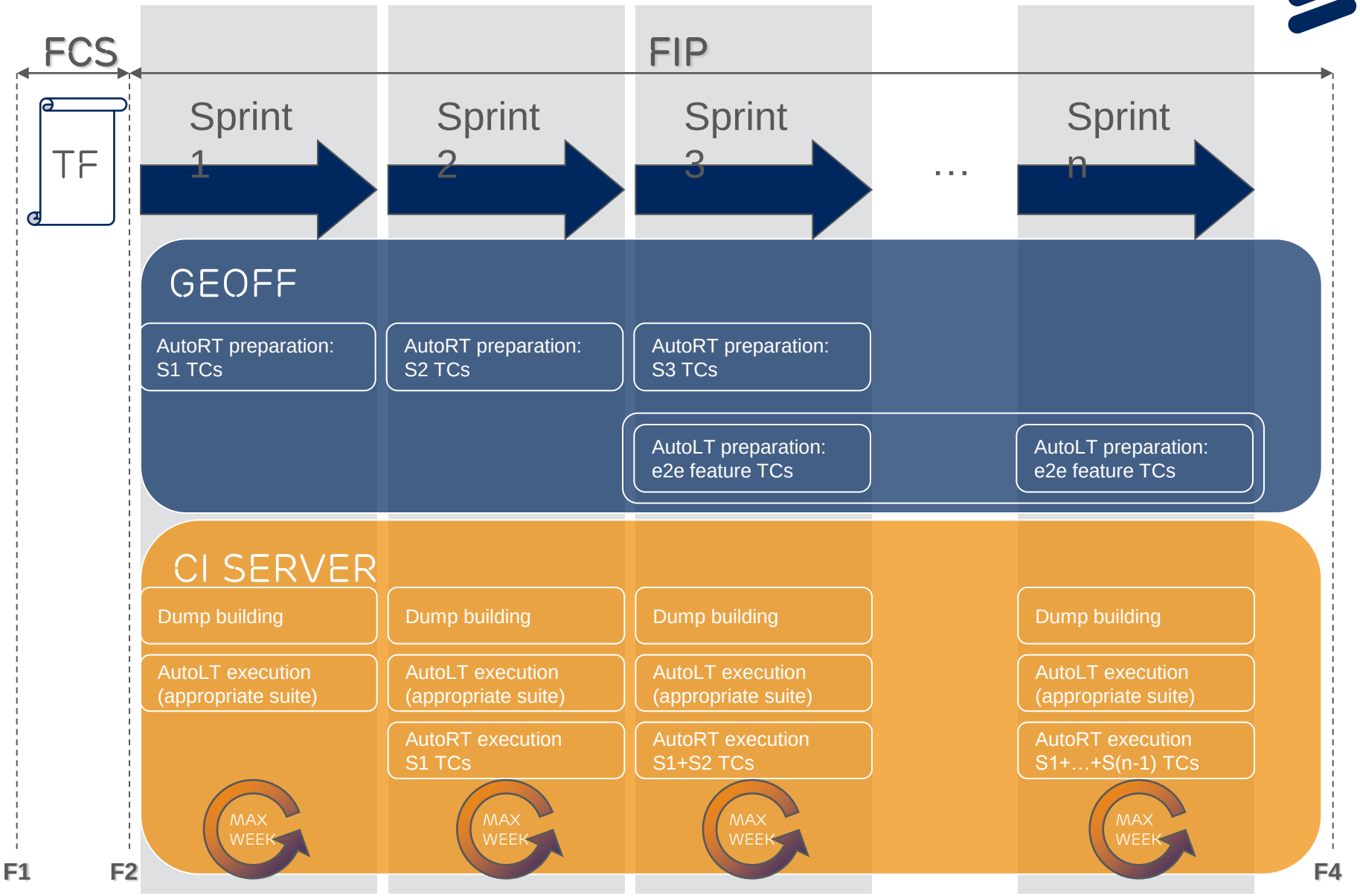


CONTINUOUS INTEGRATION

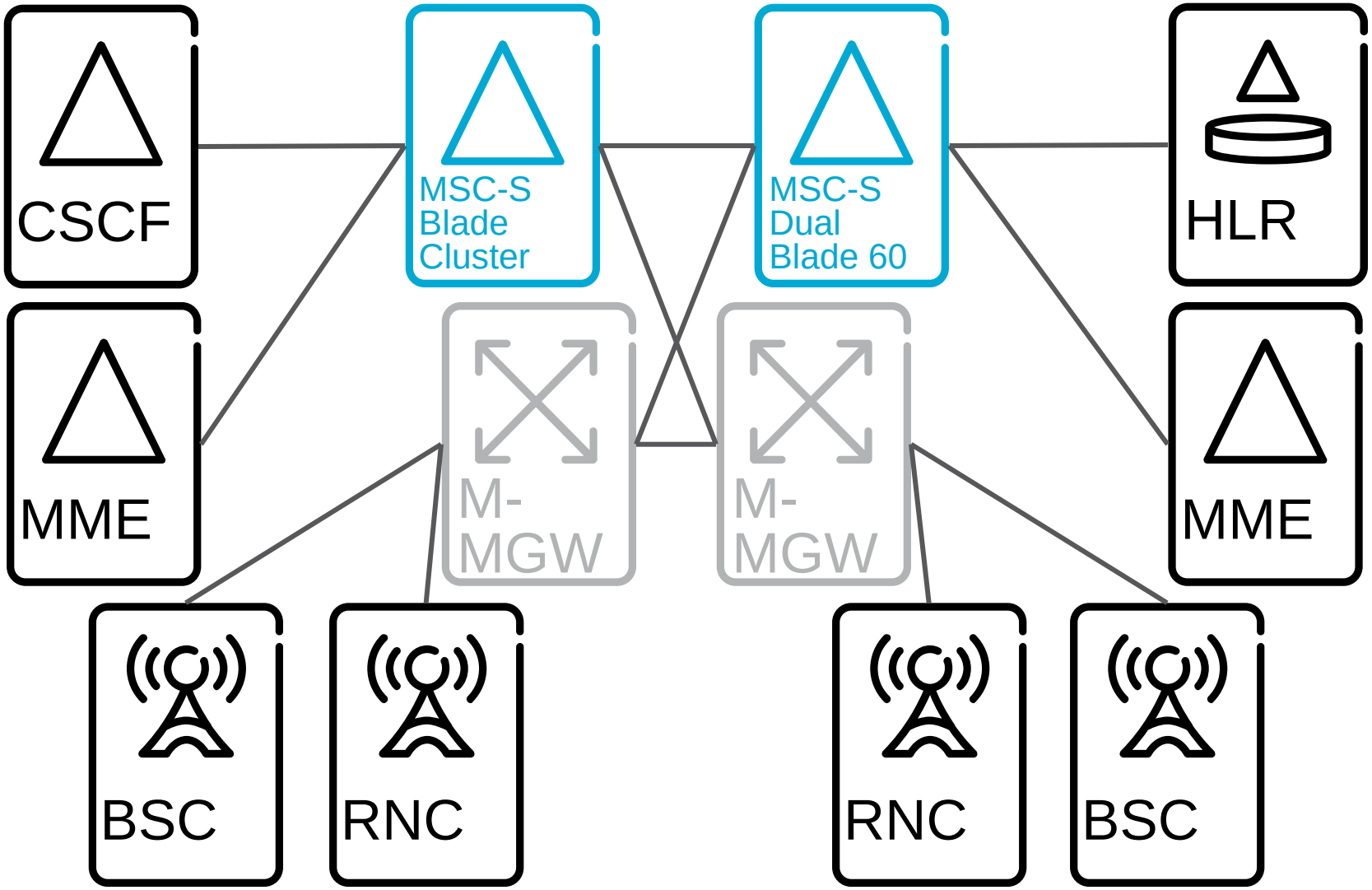
"…a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily – leading to multiple integrations per day. Each integration is verified by an automated build (incl. test) to detect its errors as quickly as possible…"

Martin Fowler

CI WORKFLOW


FCS
FIP
TF
Sprint 1
Sprint 2
Sprint 3
…
Sprint n
GEOFF
AutoRT preparation: S1 TCs
AutoRT preparation: S2 TCs
AutoRT preparation: S3 TCs
AutoLT preparation: e2e feature TCs
AutoLT preparation: e2e feature TCs
CI SERVER
Dump building
Dump building
Dump building
Dump building
AutoLT execution (appropriate suite)
AutoLT execution (appropriate suite)
AutoLT execution (appropriate suite)
AutoLT execution (appropriate suite)
AutoRT execution S1 TCs
AutoRT execution S1+S2 TCs
AutoRT execution S1+…+S(n-1) TCs
MAX WEEK
MAX WEEK
MAX WEEK
MAX WEEK
F1
F2
F4

TEST TOOLS & ENVIRONMENT



TEST TOOLS & ENVIRONMENT

- Unit Test:
  - Ericsson proprietary tool testing the interfaces
- Function Test:
  - Manual: using a simulated environment simulating all nodes but with the possibility to load the real MSC software
  - Automated: using a proprietary tool with an open source framework based on TTCN-3
- Regression Test:
  - Based on the automated test cases from the Function Test
  - Running on a Continuous Integration Server (Jenkins)
- Feature load (moderate/high/overload):
  - Proprietary tool based on TTCN-3 generating load on the real environment

CONCLUSION/WRAP-UP

Challenges

- Coordination
- Maintenance of a high reliability
- Working high quality Legacy
- Documentation
- Test tool & environment

CONCLUSION

Benefits

- Eliminate waste
- Early indication of Software Quality
- Early corrective actions possible
- Reduce test time enabling earlier release of product
- Enabling of Continuous Integration as first step towards a possible Continuous Delivery
- Early customer involvement

CONCLUSION

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ERICSSON