Operational Environment Resiliency

DevOps Adaptability

cnes

gmv INNOVATING SOLUTIONS

CONTENT

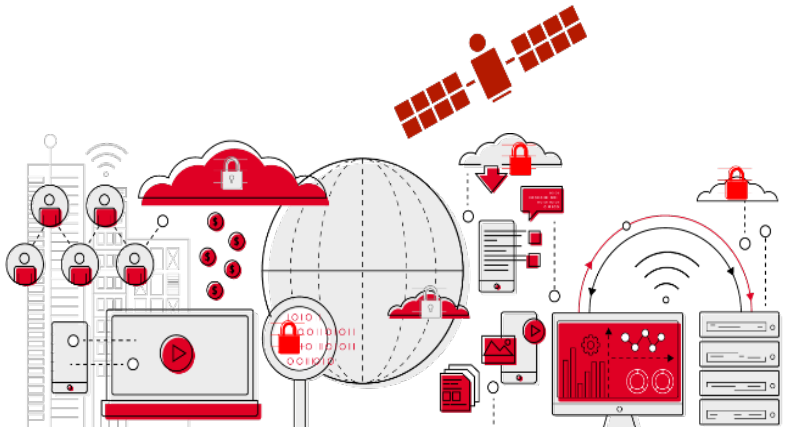
Introduction

Experience at the GMV Control Centers Business Unit

In particular in the Eutelsat section

- Also some relevant experiences from other areas
- Agile approach for implantation

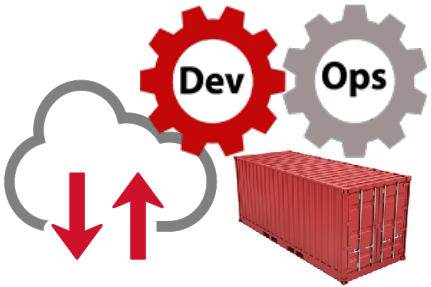
Relying on DevOps practices to handle new situations and challenges



Understanding DevOps

Len Bass, Ingo Weber, and Liming *Zhu—three computer science researchers from the CSIRO* and the Software Engineering Institute—* suggested defining DevOps as:

"a set of practices intended to **reduce the time** between committing **a change** to a system and the change being placed into normal **production**, while ensuring **high quality**"



** Commonwealth Scientific and Industrial Research Organisation (CSIRO) is an independent Australian federal government agency responsible for scientific research*

Main PILARS

- (No) implication of **Team Members**
  - Motivation/Compromise
  - Classical roles/Egos

CULTURE

- (Undesired) **Software Quality**
  - Manual intervention
  - Low level of testing

AUTOMATE

- (Static) **Processes/Procedures**
  - Lack of improvements

MEASURE

- (No) **Feedback** from final users
  - Unknown real expectations

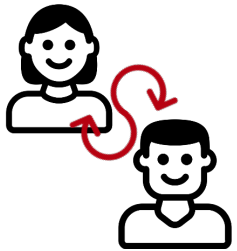
SHARE

ADAPTABILITY

GMV Experience: CULTURE

- Initially we saw a lack of **tools and processes**
- But the we identified a problem a **culture**

- Training, coaching, workshops, …
- Need to believe in the change
- **Motivation** and **Compromise**



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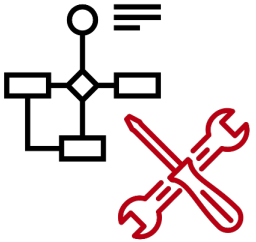
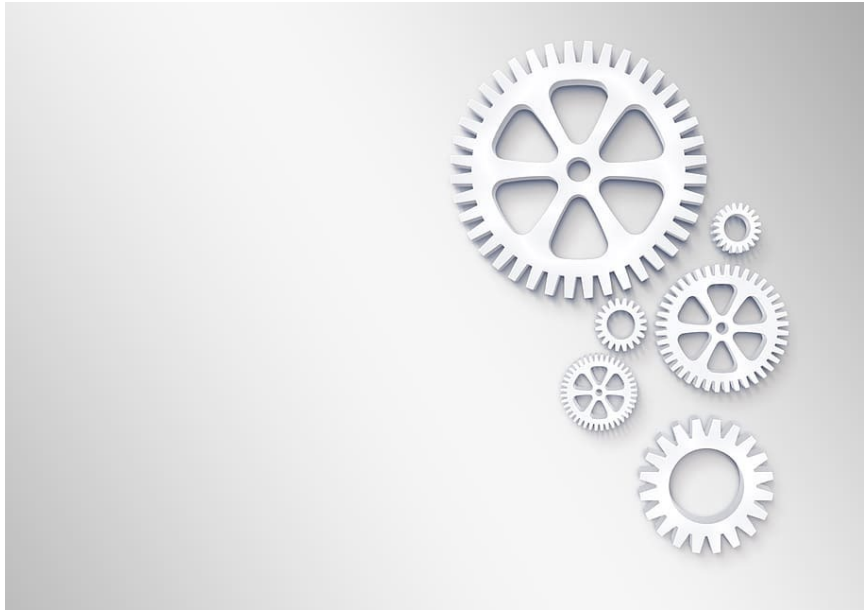


- New **AGILE** approach:
  - New multidisciplinary and self-organized teams
  - New roles: Product Owners (at GMV), Scrum Masters but classical Project Managers
- Usage of **SCRUM** and/or **KANBAN**

GMV Experience: AUTOMATE

- Code Production
- Build/Release Generation
- Validation and Testing
- Deployment

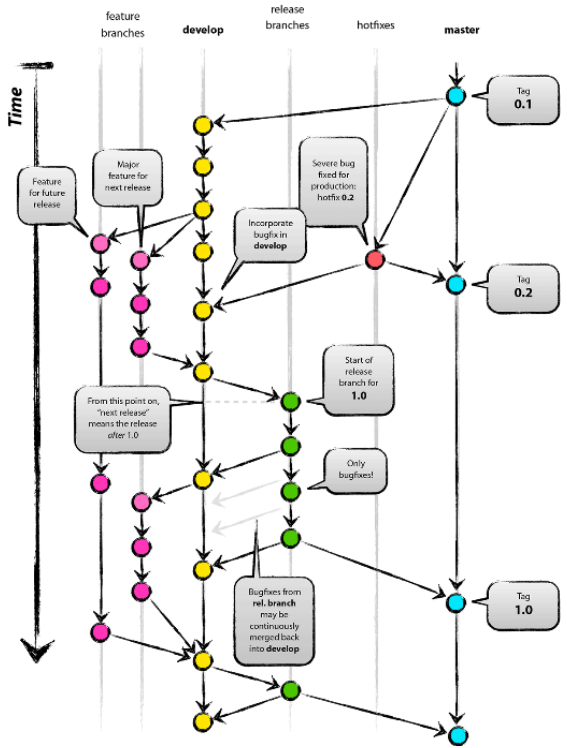


GMV Experience: AUTOMATE

CODE PRODUCTION

- From SVN repository to a **GIT**
  - Repository located at **customer premises**
  - Huge improvement in merges and release generation
  - Usage as **Git Flow** as higher layer

- Development in separate **features (US)**
  - Improved testing and validation
  - Better integration



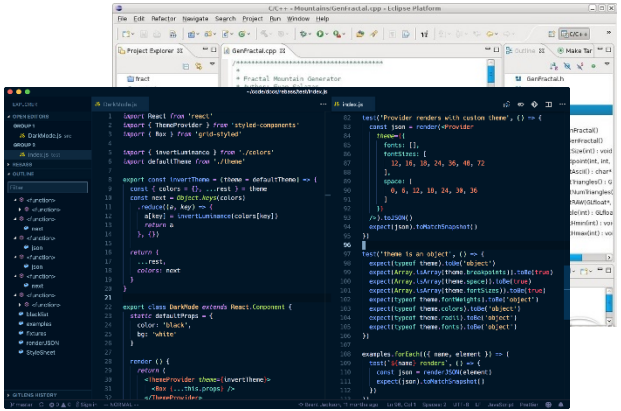
GMV Experience: AUTOMATE

CODE PRODUCTION

- Introduction of **Atlassian Tools**: *JIRA/Confluence/Bitbucket/Bamboo*
  - Excellent integration
  - Focused on Agile

ATLASSIAN
Experts & Solutions Partners

- Other tools to help developers
  - Development IDEs
  - Integration of dependencies, style, metrics

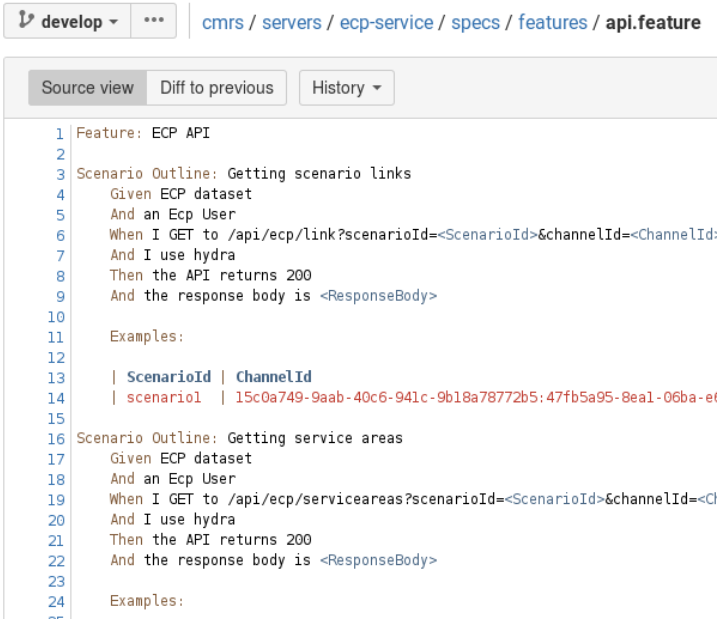


GMV Experience: AUTOMATE

CODE PRODUCTION

- User Stories have a common Definition of Done (**DoD**)
  - Code controlled and reviewed
  - Test cases passed
  - … and other activities project dependent

- But a particular **Acceptance Criteria**
  - Defined and validated by the Product Owner



GMV Experience: AUTOMATE

BUILD GENERATION

- Builds managed by **Bamboo**
  - Incremental, Nightly
  - Automatic after commit
  - Execution of tests
  - Deployment of artifacts
  - Configuration (Ansible)

- Significant effort for **reducing the build generation time**
  - Improvement of our own build systems
  - New compilers (i.e. clang for C++)
  - Parallelization and distribution

GMV Experience: AUTOMATE

VALIDATION AND TESTING

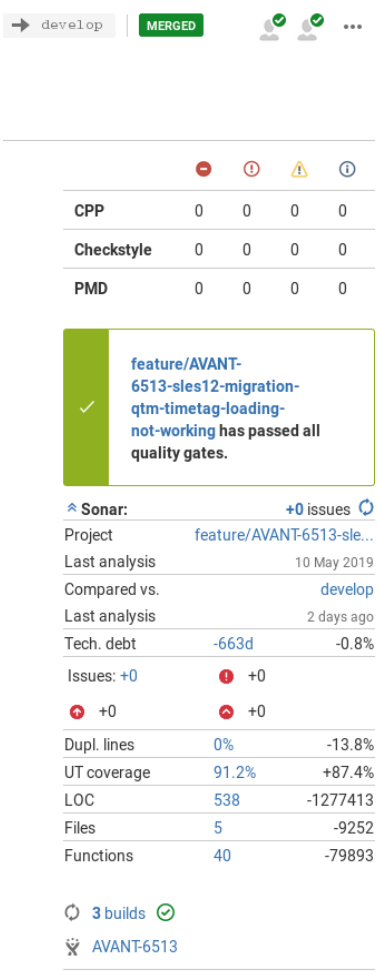
- **Automatic testing** considered a pillar of the process
- Automation in **unit**, **integration** and **system** tests
- In progress
  - **TDD** – Test Driven Development
  - **BDD** – Business Driven Development
  - Huge effort for introducing automatic tests in **legacy code** (refactoring)

- **Validation across the sw. development life cycle:**
  - Before control changes → GIT pre-hook for checking **metrics**
  - After control changes → **Code review** process (pull requests) + **Metrics** (coding & security)
  - Build generation → Execution of test cases (**unit test**)
  - Deployed system → Execution of **integration test** cases + **Cross validation** process
  - Staging environment → Automatic **end-to-end** tests
    → Customer **demo**

GMV Experience: AUTOMATE

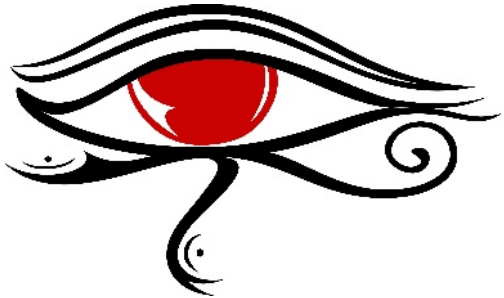
VALIDATION AND TESTING

- Involved tools
  - **Metrics**
    - SonarQube, CppCheck, Cpplint, Checkstyle, Formatter, Gcov, Covertura,
  - **Bitbucket**
    - Code Review
    - Integration of Metrics
  - **Testing framework**
    - Xray: manual and automatic tests
  - **Testing tools**
    - Google Test, Junit, Jest, Mockito, Cucumber, …
    - Robot Framework, procedure automation tool



GMV Experience: SHARE

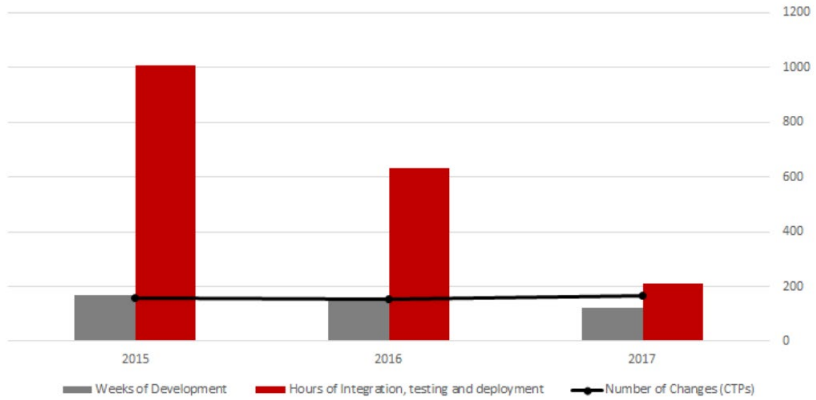
- Feedback from Product Owners → Demo
- Feedback from Customer → Docker containers



- *Continuous deployment* at customer facilities
  - Microservices
  - Refactoring of legacy systems
  - Acceptance/Validation environment
  - Ready for operation deployment

- From staging to **operational** platform managed by Eutelsat
  - Automatic build deployment
  - Manned activation (with seconds of downtime)

GMV Experience: MEASURE



- Deployment effort:
  - from 1000 hours per year to 200 hours
- Defects reported to customer:
  - 25% with respect to before introducing Agile/DevOps
- Others:
  - Code coverage (depends on project nature)
  - Team efficiency (velocity, sprint review, motivation)
  - Improvements (sprint retro and retro of retros)
  - **Customer satisfaction**

DevOps Benefits: COVID-19

- DevOps critical for COVID-19
- Nominal activity at GMV continued with minin
  - **ENVIRONMENTs** adapted:
    - Remote access. Powerful corporative infrastructure
    - Dockers containers for project resources
    - NoMachine for accessing remotely to particular environments
  - **TEAM:**
    - Scrum Ceremonies already integrated in the workflow
    - Team communication and coordination

DevOps Beneficts: COVID-19

- Nominal activity at GMV continued with minimal impact.

  - **SW Efficiency with QUALITY**: automation in place
    - Ms Teams, IDE Clion, JIRA tools and plugins, …
    - Collaboration, Remote Pair programming
    - Mature environments with a high level of automation
    - Development model based on testing

  - Uninterrupted **DELIVERY** and customer **feedback**
    - Remote demos
    - Scheduled meetings and milestones

GMV Experience: CHALLENGES

- How to deal with a flexible development with a **fixed price** and **fixed schedule** project:
  - Agile Contract

- Deal with other non-yet-agile entities
- Keep customer collaboration
- Keep motivated teams
- Keep improving the efficiency from development to delivery

Thank you