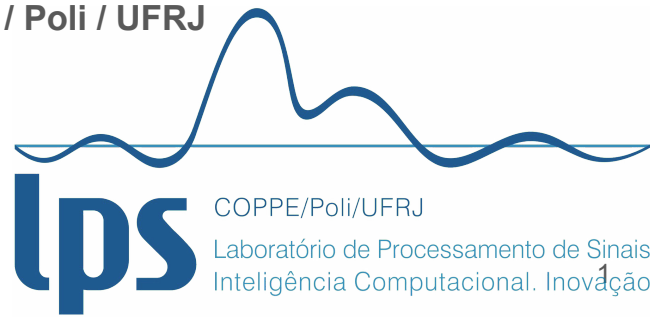


Software Quality at The GLANCE Project

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ATLAS and Its Dynamic Environment

- 182 institutions in 41 countries
- Students, physicists, engineers and technicians:
 - Geographically dispersed
 - Different time zones
 - Different experiences
 - High turnover

The challenge is:

- Information **centralization**
- **Communication** between groups
- **Continuity** of workflows

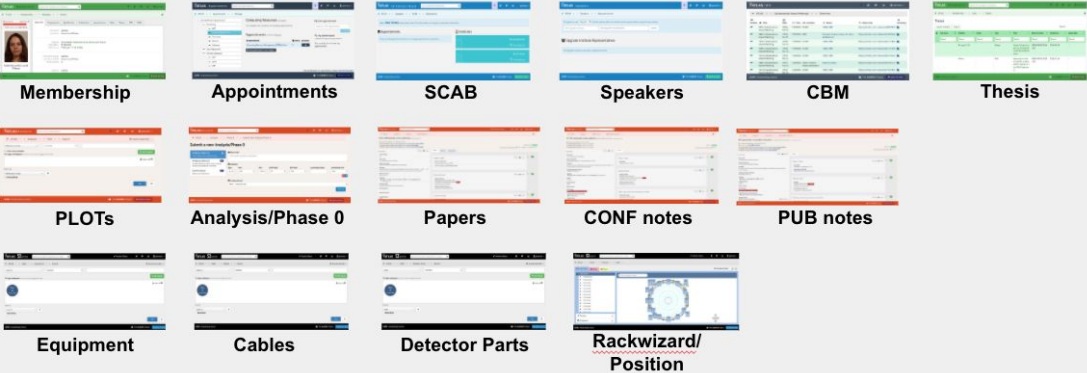
What is Glance?

- Technology agnostic framework to integrate data sources
- Search queries can be posed to this data integrated environment, reducing the latency to get the information needed
- Web user interfaces are easy to be developed on top of Glance, allowing the automation of many ATLAS-related processes
- Migration from "super search" to a set of REST API services further improving its usability


The Glance Project

	ATLAS	LHCb	ALICE
Systems	15	4	3
Users	6k	1.5k	1.3k
Requests per week	10	3	5


ATLAS:



ALICE:



LHCb:



The Glance Project Team & Resources

- 12 current developers (~30 developers over the project history)
 - ATLAS: 7
 - LHCb: 2
 - ALICE: 3
- Geographically scattered
- Mainly undergraduate (part-time) students from POLI / UFRJ
 - Scholarships
 - Internships
 - In loco internships
- 2 startups whose founders are COPPE alumni with ATLAS background
- Budget: 100,000 SFR/years (CERN + UFRJ)
- Contributions from other institutes (mainly UDINE / Italy and LIPE / Portugal)

Analysis

- Supports ATLAS documents' lifecycle
- Automates email notifications
- Keeps track of documents and reviews stored in CERN Document Server

The screenshot shows the ATLAS Analysis web interface. At the top, there is a navigation bar with the ATLAS logo, the word "Analysis", a search bar with the placeholder text "search for publications...", and several utility icons (user profile, home, help, etc.) and the text "atglance". Below the navigation bar, there is a breadcrumb trail: "ATLAS > Analysis". The main content area is titled "Welcome to ATLAS Analysis" and is divided into several sections:

- Phase 0** (represented by a group of people icon):
 - Search
 - Submit New Analysis/Phase 0
 - Request Editorial Board
 - Emails' Editor
 - Clone Analysis/Phase 0
 - Search for Triggers
 - List of Triggers Used
- Papers** (represented by a document icon):
 - Search
 - Submit New Paper
 - Request Editorial Board
 - Emails' Editor
 - Submit a Draft in CDS
- CONF notes** (represented by a microphone icon):
 - Search
 - Submit New CONF note
 - Request Editorial Board
 - Emails' Editor
- PUB notes** (represented by a group of people icon):
 - Search
 - Submit New PUB note
 - Emails' Editor
- Plot** (represented by a bar chart icon):
 - Search
 - Submit New PLOT
 - Emails' Editor
- Documentation** (represented by a document icon):
 - Go to Analysis Documentation

At the bottom of the page, there is a footer with the text "CERN Accelerating science" on the left, "The GLANCE Project" in the center, and a button labeled "report an issue" on the right.

Membership

- System to mainly manage ATLAS's:
 - Personnel
 - Institutes
 - Authorship
- All information from other systems in one place:
 - Contract dates
 - Appointments
 - Analysis papers
 - Given and future talks
 - Operational Task Planning data
 - Thesis
 - Volunteer for talks
- Institutes and Funding Agencies
- Plot generator

The screenshot shows the ATLAS Membership website interface. At the top, there is a green header with the ATLAS logo and the text "ATLAS Membership". A search bar is located to the right of the logo, with the placeholder text "search for members & institutes...". To the right of the search bar, there are several icons: a magnifying glass, a person icon, a document icon, a calendar icon, a list icon, and a user profile icon labeled "ocdasiv". Below the header, there is a breadcrumb navigation bar showing "ATLAS" and "Membership". The main content area is titled "ATLAS Membership" and is divided into several sections, each with an icon and a list of links:

- Members** (person icon):
 - My profile
 - Super search
 - Register new ATLAS member
 - Exception lists
 - Register Inspires and ORCID's
 - Mentors list
- Institutes** (building icon):
 - ATLAS Institute Tree (AIT)
 - Super search
 - Register
 - External Institutes
 - Activities - Projects
- Qualification** (graduation cap icon):
 - My qualification
 - Super search
 - Qualification Tracking
- Authorlists** (document icon):
 - Generate author list
 - Author lists
- Associates** (left arrow icon):
 - Register new non-ATLAS member
 - (STA) Short term associates
 - (MCI) Monte-Carlo authors
 - (ACE) Analysis Consultants and Experts
- Funding Agencies** (building icon):
 - Select Funding Agency
 - Acknowledgement for papers
- Lists** (list icon):
 - Acknowledgement for papers
 - Appointment Memberships
 - Author lists
 - Editorial boards
 - Exception lists
 - External institutes
 - Institutes (Activities - Projects)
 - Mentors
 - Professional status
 - Theses
- Plots** (bar chart icon):
 - Active members

At the bottom of the page, there is a green footer with the text "CERN Accelerating science" on the left, "The GLANCE Project" in the center, and a "report an issue" button on the right.

Glance Main Users

- ATLAS deputy spokesperson
- Physics coordinators
- Publication Committee chairs
- ATLAS Secretariat
- Authorship Committee
- Physics Office
- Resource Coordinator
- Technical Coordination
- TDAQ Upgrade Project Leader

Software Quality in GLANCE

- Centralized requests
- Requirements documentation
- Virtual communication
- Agile method
- Automation

Goals

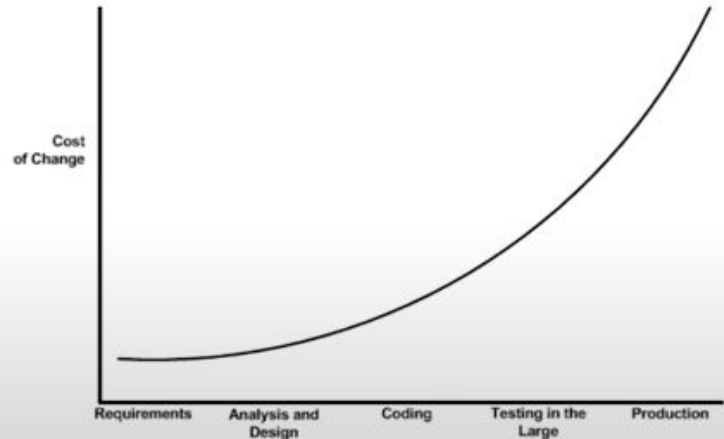


- Ensure your long-life software
- Support business processes grow
- Quick start new developers
- Overcome remote team limitations

How to make it all work?

- Fast iterations
- Testing & Automation
- Concrete and visual artifacts such as mockups, diagrams, and description of scenarios

Anticipate validations as much as possible!

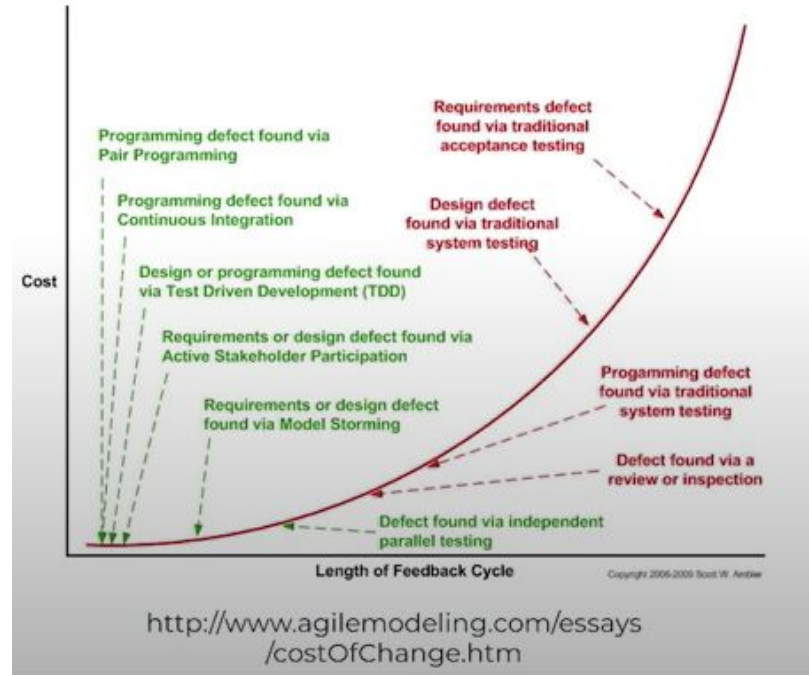


<http://www.agilemodeling.com/essays/costOfChange.htm>

Tooling

Engage the whole team in the development process: programmers, QA team, stakeholders, clients.

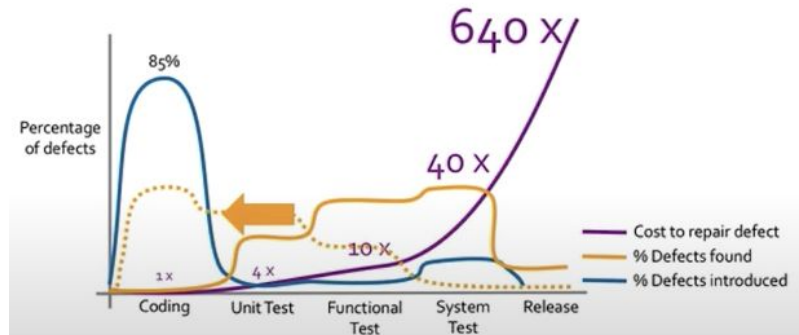
- Pair programming
- Continuous Integration
- Test Driven Development
- Design Guided By Examples
- Ubiquitous Language
- Communicate design and architecture decisions



Testing

- Keep documentation to a minimum using tests as specifications
- Automate your test suites to have a short feedback loop and keep your codebase safe
- Hierarchical testing structure:
 - Unit
 - Functional
 - System

Release smaller working pieces of software to catch missing bugs with the help of users!



Software defect-removal efficiency
Capers Jones et al, 1996

Key Takeaways

- Make sure everyone is following up
 - Define communication channels and reinforce its proper use
 - Make use of visual representations of the domain being modelled (diagrams)
 - Create a single source of truth (Confluence)
- Unburden common bottlenecks
 - Code Review policies
 - Documenting architecture decisions (ADRs)
 - Creating discussions around every new implementation (RFCs)
- Keep technical debt visible and tackle it (JIRA)
 - Consider paying it when negotiating new implementations with stakeholders.
 - Include technical milestones in medium to large sized projects.

Foreseen Challenges and Next Steps

- Measure the development progress and efficiency success
 - Can the team move forward or keep re-implementing old requests?
 - How to measure developers' engagement to the process?
 - How much time a new requirement takes to be released?
- Assess software quality continuously by using machine learning techniques.