

RECENT HIGHLIGHTS FROM COSYLAB

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Abstract

Cosylab was established 13 years ago by a group of regular visitors of the PCaPAC. In the meantime, it has grown to a company of 90 employees that covers the majority of accelerator control projects. In this talk, I will present the most interesting developments that we have done in the past two years on a very different range of projects and I will show how we had to get organized in order to be able to manage them all. The developments were made for labs like KIT, ITER, PSI, EBG-MedAustron, European Spallation Source, Maxlab, SLAC, ORNL, GSI/FAIR but also generally for community software like EPICS, TANGO, Control System Studio, White Rabbit, etc. And they range from electronics development to high level software: electric signal conditioning and interfacing, timing system, machine protection system, fibre-optic communication, Linux driver development, core EPICS development, packaging, high performance networks, medical device integration, database development, all the way up to turnkey systems. Efficient organisation comprises a matrix structure of teams and groups versus projects and accounts, supported by rigorous reporting, measurements and drill-down analyses.

INTRODUCING COSYLAB

In the course of the writing of this paper we received final confirmation of a 2.5 million CHF project for Cosylab on the SwissFEL at PSI, Switzerland. Great news for us and a confirmation of Cosylab's growing involvement in the control system work on cutting edge Big Physics machines around the globe. In this paper we will start by highlighting a few particular projects we are taken on as we speak with a turnkey approach. We will then zoom in on project management aspects that are key to keeping such endeavours on track and delivering on the promise. We will finally look at operational aspects, how Cosylab is internally organized, as the organization is tailored to nature of the projects, their size, as well as our current size.

ELI-NP

The Extreme Light Infrastructure (ELI) [1] currently consists of four projects that will provide a great platform for the study of the fundamental processes that unfold during light-matter interactions. One of them is ELI-NP (Nuclear Physics) in Magurele, Romania.

Once built, the ELI-NP will be the most advanced laser and gamma beam facility in the world. It features Cosylab's first true turnkey control system, designed as such

from the ground up. Coordinated efforts towards turnkey solutions have existed for several years and are being applied by Cosylab to other projects – most prominently for the current projects for ESS and MedAustron.

SOLARIS

Solaris is a project of the Polish Synchrotron Consortium (comprising 35 research institutes and universities). It received financing from the European Structural Funds, and is being constructed as we speak, with first research planned for 2015.

Specific to this project is a strong partnership with the MAX-IV project [2] in Lund, Sweden. The design of the synchrotron ring aims at maximizing reuse of the design of the 1.5 GeV storage ring of MAX-IV. This has repercussions on the design of the control system: it is based on the TANGO control system [3], chosen by MAX-IV.

Cosylab has been selected for the delivery of the control system integration services, including delivery of the timing system hardware. With this choice the Solaris team has opted not to reinvent the wheel on control system integration, just as they chose not to reinvent the storage ring design.

PROJECT MANAGEMENT ASPECTS

Incomplete Requirements

The incomplete requirements, that are so typical of ground breaking and pioneering big physics projects, including the control system part, have a tendency to stall projects before they have even started.

We have a strong philosophy about incomplete requirements, namely to accept them as a fact of life, rather than to fight them (by insisting on and waiting for clearer requirements, hence: stalling). We rather start with designing on a “straw man” design for the control system (with the requirements we have) and develop an early vertical prototype. As such we are pro-active in eliciting the actual requirements, because seeing physical things makes people think much more.

Stalling or over-analysing instead makes little sense, because no complex development ever follows the simple “waterfall” scenario with the phases like requirements, design and implementation following linearly one after the other only once the previous is finished. In reality, some requirements are dropped during the way, new come in, and what's more, development cycles often follow a spiral and pass several times through all the phases.

#80855: ITER: WO29 Drivers
Open · Steal ... Reply · Resolve · Meeting time

LastEntry · Progress · Parent Time · Gantt · ProjectReport

Ticket metadata

The Basics

Id: 80855
Status: new
Priority: 15
Queue: ACC-ITER-WO29_Drivers

People

Owner: @cosylab.com>
Requestors: @cosylab.com>
Cc:
Project Manager: @cosylab.com>

Custom Fields

Ticket Type: (no value)
Feedback: (no value)
Severity: (no value)
ProcessType: (no value)

Dates

Created: 2012-07-19
Starts: 2012-07-16
Started: Not set
Last Contact: 2013-03-27
Due: 2013-01-31
Closed: Not set
Updated: 2013-03-29 by [redacted]

Links

Depends on:
Depended on by:
Hierarchy: [tree icon] [checkbox checked]

80855: ITER Master ticket [new]

- 80856: Management () [resolved]
- 80857: Bugfixing () [resolved]
- 80858: Contract task: cut the project in subprojects () [resolved]
- 80859: Documentation () [resolved]
- 80860: QA () [resolved]

Figure 1: Example of a Master Ticket, representing a project in the RT Tool, Cosylab’s planning, tracking and reporting tool.

Planning, Tracking & Reporting: RT Tool

Cosylab has taken an issue tracking system, called RT, and extended it into a full project management planning and tracking tool. This year, our system celebrated its one hundred thousand and first ticket, to show on what scale and intensity it is used. As software gurus would say, “everything is an object/actor/” At Cosylab EVERY activity or task, is a ticket. And every such ticket = task is typically a part (a child ticket) of a project task and the project task a part of the overall project.

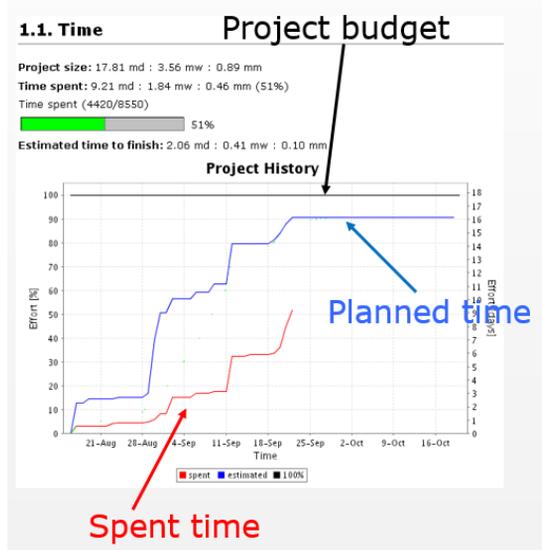


Figure 2: Project Tracking with RT Tool.

Planning is worthless if it is not followed up with meticulous tracking of work items to assess the overall status of the project and in-depth analysis of individual causes of delay. RT has features to assist these essential processes within Cosylab.

Certified Processes: ISO 9001:2008 and Medical ISO 13485:2003

It’s important to do things in the right order: if you design processes to deliver traceable quality, then preparing for ISO certification and renewal becomes a low hurdle, you merely illustrate from the evidence in the IT system, that you are doing what you are saying. The certification is “just” an external confirmation of an internal awareness for quality. Of course, when collaborating on the medical front-end of the machine, such as in MedAustron’s dose delivery system, medical ISO certification becomes a condition sine qua non.

HOW COSYLAB IS ORGANIZED

To explain how Cosylab is structured to optimally take on big projects, it is best to start by describing the different job positions, functions and roles our people will be taking on.

Positions are full time job descriptions, *functions* are additional responsibilities assumed by an employee and *roles* are technical roles in the context of a specific project (e.g. software QA)

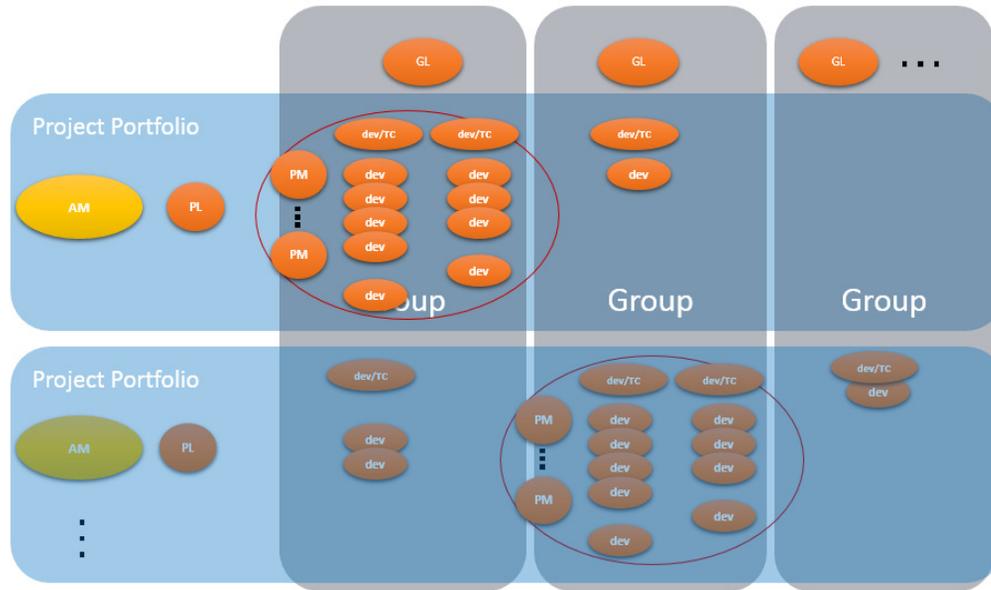


Figure 3: The matrix organization with Human Resources/Teams versus Projects/Accounts axes.

Technical Experts: Rookie, Junior, Senior, Guru Developers

This positions comprise the majority of the Cosylab workforce, they are the experts that bring the control systems to life. Becoming guru in our highly specialized domain takes years, even for the most talented, so there are distinct stages to get there, starting out as Rookie when you freshly join.

Team Coach

This is the function that is the guardian of a particular technical expertise, like FPGA Programming, EPICS Device Integration or Control System Application Development. He/she makes sure his team builds up the necessary expertise and keeps it up-to-date. They are the mentors on the various Cosy Academies. Having a full workload of relevant work for his team is the best training, so he is also a liaison between the group leader and the developers to keep their individual “order book” full and in-sync with the project’s overall work needs.

Group Leaders

The group leader, or GL is the actual “boss” or resource manager of the people in his group. He is also responsible for the strategic direction of his group and appropriate staffing, i.e. he is responsible for hiring people to his group.

PMs, PLs and AMs

These roles form the horizontal, project side of the matrix organization (see further). Project Managers manage sub-projects in one technology. Project Leaders are project portfolio managers, they manage a turnkey project as

a whole. Account Managers take care of the customer facing. In a young fast growing organization of around 100 people, where multi-year projects are all in different stages, the same people combine a position with several functions and/or roles. Nevertheless they, and the rest of the organization are aware of the different “hats” and clearly distinguishes between them, depending on the context. It requires some flexibility, agility from both sides, yet it is highly transparent and efficient.

CONCLUSION

Cosylab has grown quite a lot in the past years and as we have grown, so has our competences and capacities to offer and build a control system at a fixed price. Not a platform but a solution with responsibility for control system up-time. The control of construction cost and quality are a result of Cosylab’s efficient organisation, supported by rigorous reporting, measurements and drill-down analyses. Currently major control system integration work is ongoing around the world at SLAC, GSI/FAIR, ESS, ITER and others. These institutions put their trust in Cosylab to deliver on the promise.

REFERENCES

- [1] <http://www.eli-laser.eu/>
- [2] <https://www.maxlab.lu.se/maxiv>
- [3] <http://www.tango-controls.org/>