Project Management in Research Institutes

What is project management?

- Entering random numbers into Microsoft project and printing long rolls of paper
- Filling pointless reports nobody looks at
- Something that makes management happy

To sum up: Something I don't need or like

Project Management in Research Institutes

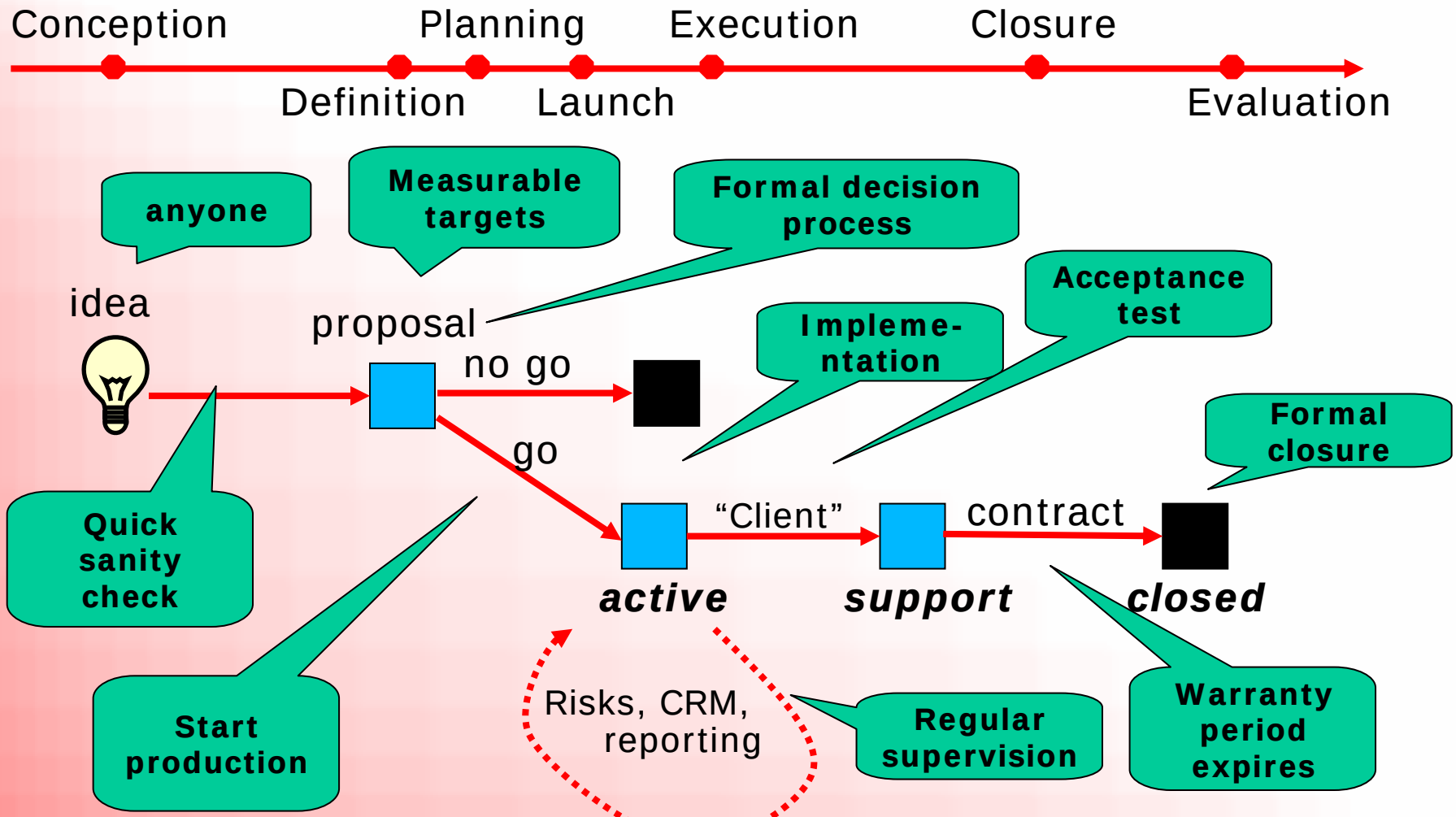
… but, people have problems:

- What should I focus on today? Everything is urgent, so it doesn't really matter
- I am not sure what I will be doing in two months, this means I have all the time available, right?
- How far are we on this project, anyway? I just know that the deadline is in two weeks
- It seemed like a good idea to start this, but now I am not really sure why
- I feel like I am the only one who cares about this project. What are the others doing?

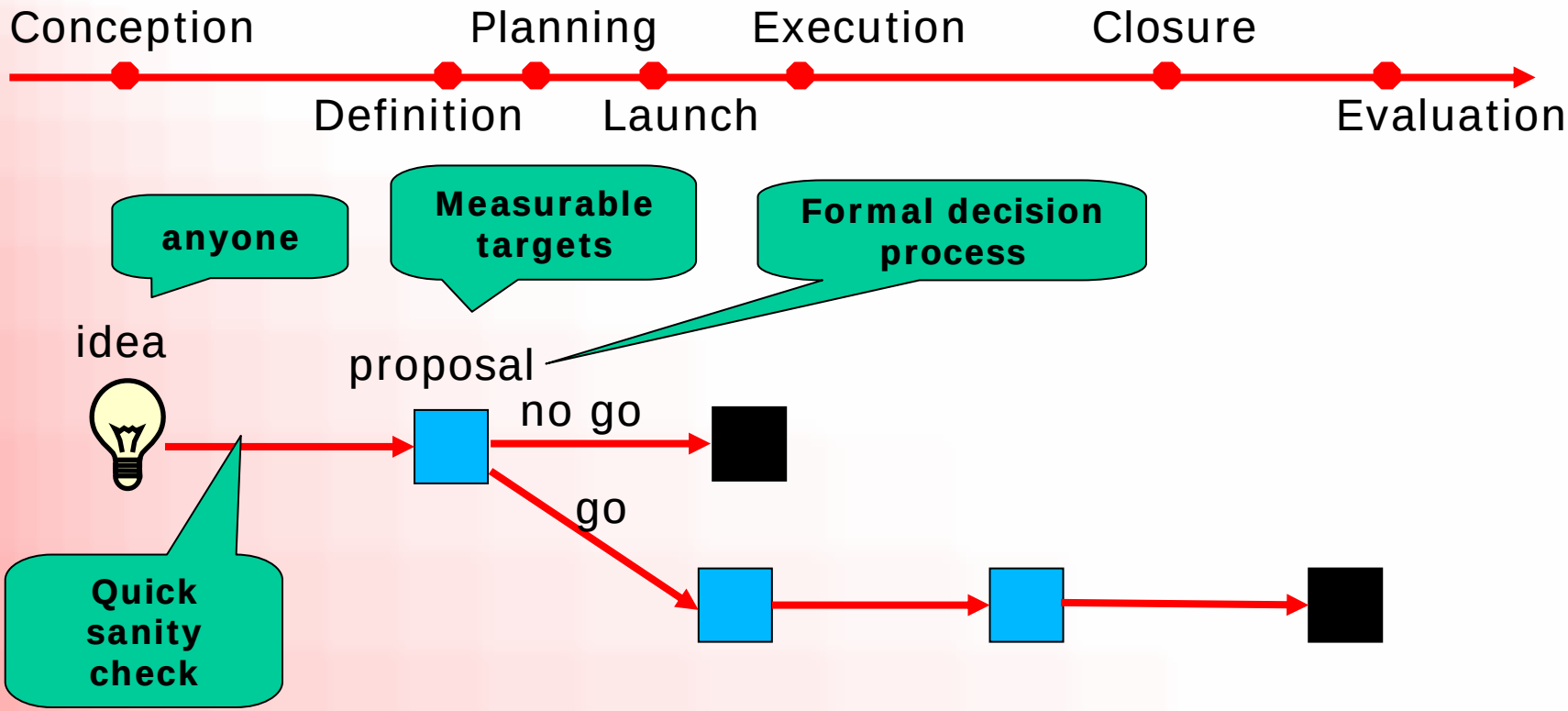
Roadmap

- Lifecycle of a Project
  - Phases
  - Addressing common pitfalls
  - Step by step checklists
- Second order theory
  - Reporting – why, what and how
  - Resource management
  - Analysis

Project Flow



Project Flow – the Idea



From Idea to Proposal and to Project Launch

- Pitfalls:
  - Projects are started too easily (without basic thinking about purpose and scope)
  - Too many projects in parallel: focus of work is lost
- What to do about it:
  - Quick sanity check: why start something? Think about the big picture as well
  - Prepare a well rounded proposal
  - Use formal decision process to start a project

Checklist: Project Start up

- **The startup process**
  - Who your sponsor is
  - Who the customer and possible secondary customers are
  - Who will use the results
  - The initial project core team - or likely candidates
  - Other people who can influence the project - the stakeholders
- **Customer needs and expectations**
  - Understand the customer - explore priority and relative importance to other activities
  - Understand the customer's environment in which they must operate
  - Use political skills - not all customers are equal and some needs cannot be addressed
  - Demonstrate your technical competence and awareness of their technical needs
  - Convert ill-defined needs into practical solutions
  - Keep an open mind and a creative approach
  - Analyse the mixed signals you receive through personal influence on needs
  - Attempt to expose the hidden expectations

Checklist: Project Start up

- **Questions to ask the customer when starting the business case for the project**
  - What changes are identified?
    - process changes?
    - behaviour changes?
  - Are these just a 'quick fix' or a quantum leap?
  - What does the customer believe is needed?
  - Do all customers agree?
  - Have the fundamental needs been separated from wishes?
  - Are pre-determined solutions being proposed already?
  - Has the end users perception of needs been identified?
  - Have the needs been listed as primary, secondary and hopes?
  - Has this lists been priorities and agreed with the customer?
  - Can you turn the information into clear 'statements of need?
  - Can you use the needs analysis to derive a 'statement of requirements'?
  - Will the customer agree with your statement of requirements?

Checklist: Project Brief and Stakeholder List

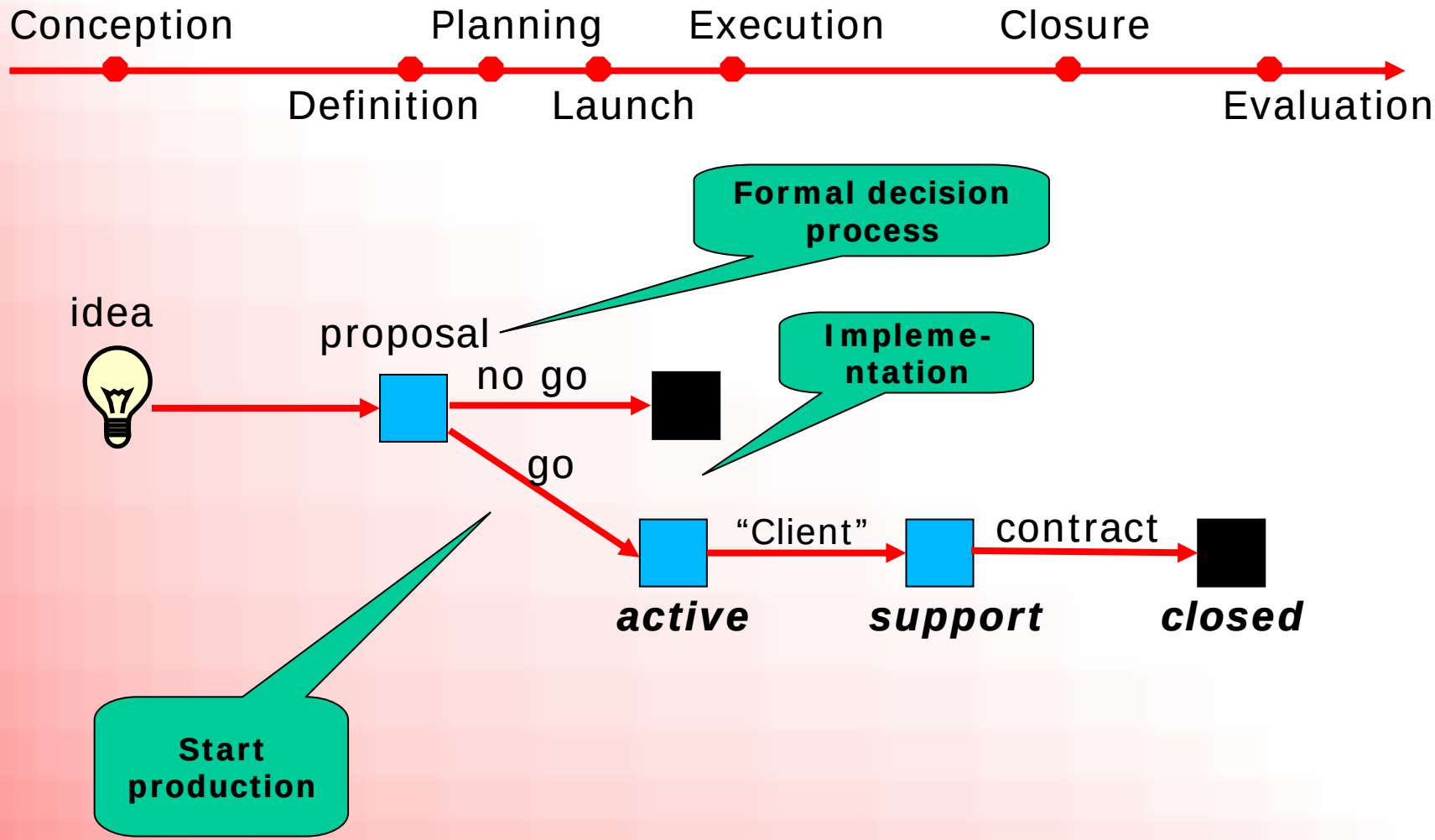
- **Project brief**
  - The project origins - a need or opportunity statement.
  - The project rationale - why is it necessary now.
  - The benefits of the project - to the customer and your organisation.
  - The project budget if known at this stage.
  - The current timescale and expected deadlines - subject always to detailed planning later.

- **A stakeholder list**
  - Name of stakeholder and job title/position.
  - Location and contact data (telephone/fax/e-mail).
  - Whether internal/external to your organisation.
  - Ranking of importance to the project (high, medium, low).
  - Current degree of support for the project (positive, negative).

Checklist: Statement of Requirements and Objectives

- **Statement of requirements**
  - Needs and expectations identified and to whom attributed?
  - How these needs can be met in practice?
  - Which needs cannot be satisfied yet and why?
  - What assumptions have been made at this stage?
  - What the project is about and what is not included?
- **Project objectives statement**
  - A statement of background
  - The project purpose - why are we doing this now?
  - The overall project objective - in 25-30 words
  - The primary deliverables of the project with expected delivery dates
  - The primary benefits to be gained - quantified in the business case
  - The cost of the project
  - What skills are required - particularly those not currently available?
  - Any identified interfaces with other active projects

Project Flow - Planning



Planning

- Pitfalls:
  - Not done at all: no reference to track progress
  - People get over allocated and ineffective
  - No “satisfaction of a job well done”

- What to do about it:
  - Prepare at least the initial project plan
  - Make a risk plan
  - Communicate the plan and get commitment

Checklist: Planning

- **Planning is about asking questions:**
  - What actions need to be done?
  - When are these actions to be done?
  - Who is going to do them?
  - What equipment and tools are required?
  - What is not going to be done?

- **Project planning is carried out to:**
  - Identify everything that needs to be done.
  - Reduce risk and uncertainty to minimum.
  - Establish standards of performance.
  - Provide a structured basis for executing the work.
  - Establish procedures for effective control of the work.
  - Obtain the required outcomes in the minimum time.

Checklist: Allocation of Responsibility, The Critical Path

- **Allocation of responsibility**
  - The work to be done is identified at the detailed task level.
  - The dependencies are clearly identified.
  - The estimates of durations are accurate and subject to constant scrutiny.
  - The work gets done on time to the quality needed.
  - The work conforms to quality assurance procedures and requirements.
  - Regular monitoring is maintained.

- **The critical path**
  - The critical path - confirmation of your initial inspection.
  - The start and finish times for all the key stages.
  - The amount of 'spare time' available in the non-critical key stages.

Checklist: Analyse Resource Requirements

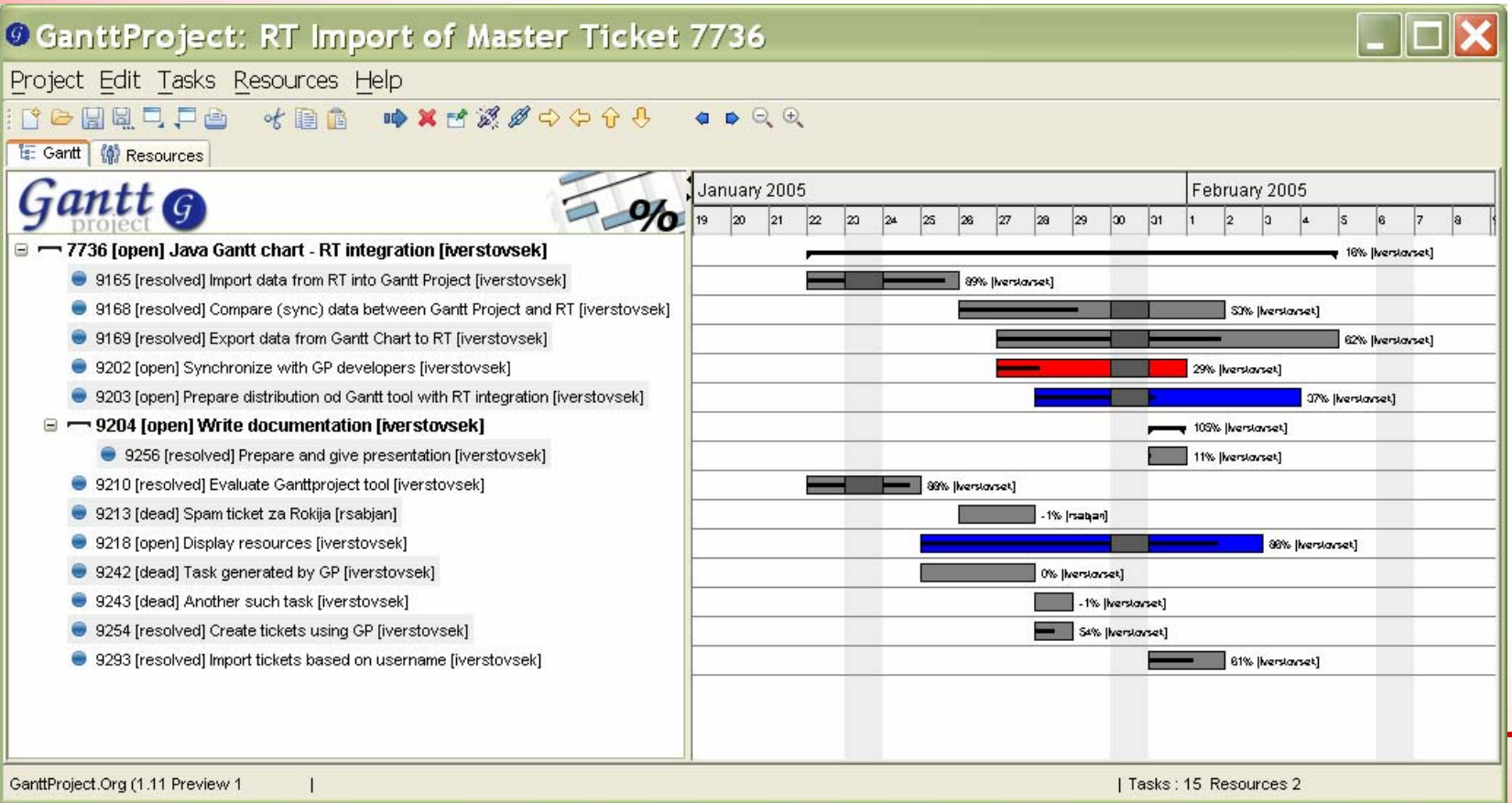
- **Analyse resource requirements**
  - Review the initial task list.
  - Add to the tasks where necessary.
  - Analyse for the 'often forgotten tasks':
    - documentation,
    - approval times,
    - testing planning and development,
    - project reviews and gathering the data,
    - project meetings and user group meetings,
    - negotiations with suppliers,
    - expediting and administrations.
- **Suggest each key stage owner**
  - Derives a complete list of tasks in their key stage.
  - Produces a responsibility chart for each key stage.
  - Estimates the durations of all the tasks in the key stage.
  - Identifies the actual people who will carry out the work.
  - Confirms their commitment availability.

Checklist: Milestones

- **Define milestones**
  - Completion of a key task, for example, providing output to third parties.
  - Completion of one of the project deliverables.
  - Stage generation of benefits.
  - Completion of a third party significant event, for example, acceptance tests.
  - Completion of third party activity, for example delivery of equipment or data.
  - A financial audit point.
  - A project audit point.
  - A quality audit.
  - Completion of a significant stage of work (possibly a critical element).
  - A significant decision point, for example, abort the project.
  - Completion of a project stage to release further funding.

Use Gantt for the Initial Project Plan

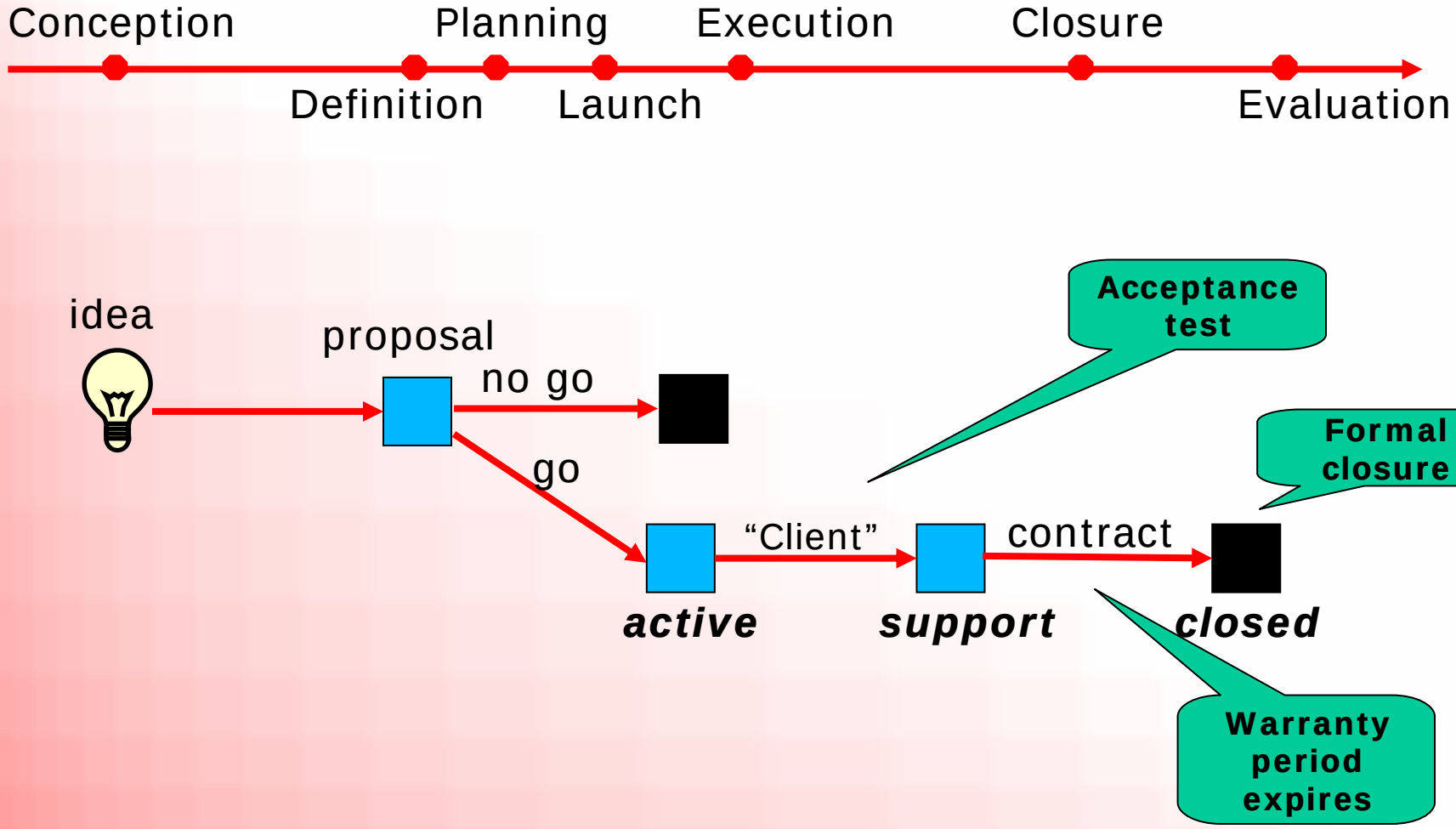
- A "helicopter view" of the project
- Easy identification of the critical path



Checklist: Risks

- **Risks**
  - A short description of the risk.
  - When it is expected to occur.
  - The probability assessed.
  - What consequences are expected.
  - What actions you will take if it happens.
  - Who will take the actions.
  - Who is responsible for monitoring the risk.

Project Flow – Closure and Evaluation



Closure and Evaluation

- Pitfalls:
  - Never ending work on certain projects
  - Nothing learned from past experience
- What to do about it:
  - Acceptance process (even for internal projects)
  - Close project, plan resources for support (for a limited period of time !)

Checklist: Acceptance Process

- **Acceptance process**
  - Unfinished non-critical work.
  - The project tasks done.
  - The deliverables achieved.
  - Quality standards attained.
  - Supply of equipment.
  - Installation of equipment.
  - Testing and validation of equipment.
  - Testing and validation of operating processes.
  - Documentation manuals.
  - New standard operating procedures.
  - New standard operating procedures.
  - Design of training programmes.
  - Training of operating staff and management.
  - Training of maintenance staff.
  - Setting up a help desk.
  - Establishing maintenance function.
  - Outstanding issues awaiting resolution.
  - Identifying any follow-on projects.
  - Limits of acceptability.
  - Who monitors post project performance.
  - Budget over-runs.

Checklist: Acceptance Process

- **In addition confirm:**
  - Who is responsible for each step of the acceptance process and the work involved.
  - What post-project support is required and who is responsible.
  - What post-project support can be available.
  - For how long such support must be given.

Checklist: Wrap Up Presentation

- Provide the background of the project - you can recycle slides from the kick-start meeting presentation. Why was the project important? Justify that the project in-line with the company's strategy.
- Provide an insider's summary of the project. Tell anectodes. Discuss mistakes, do not blame people for them, present what the team has learned through them.
- Is the outcome different from what was planned in the kick-start meeting? Why?
- What have we gained / lost with the project? Payment of the bill is not everything. Which new friends / partners have we made? How can or are we already use this as an opportunity for new business. What have we learned about the market?
- Suggest areas for future improvements for developers, management and the process itself.

Second Order Effects

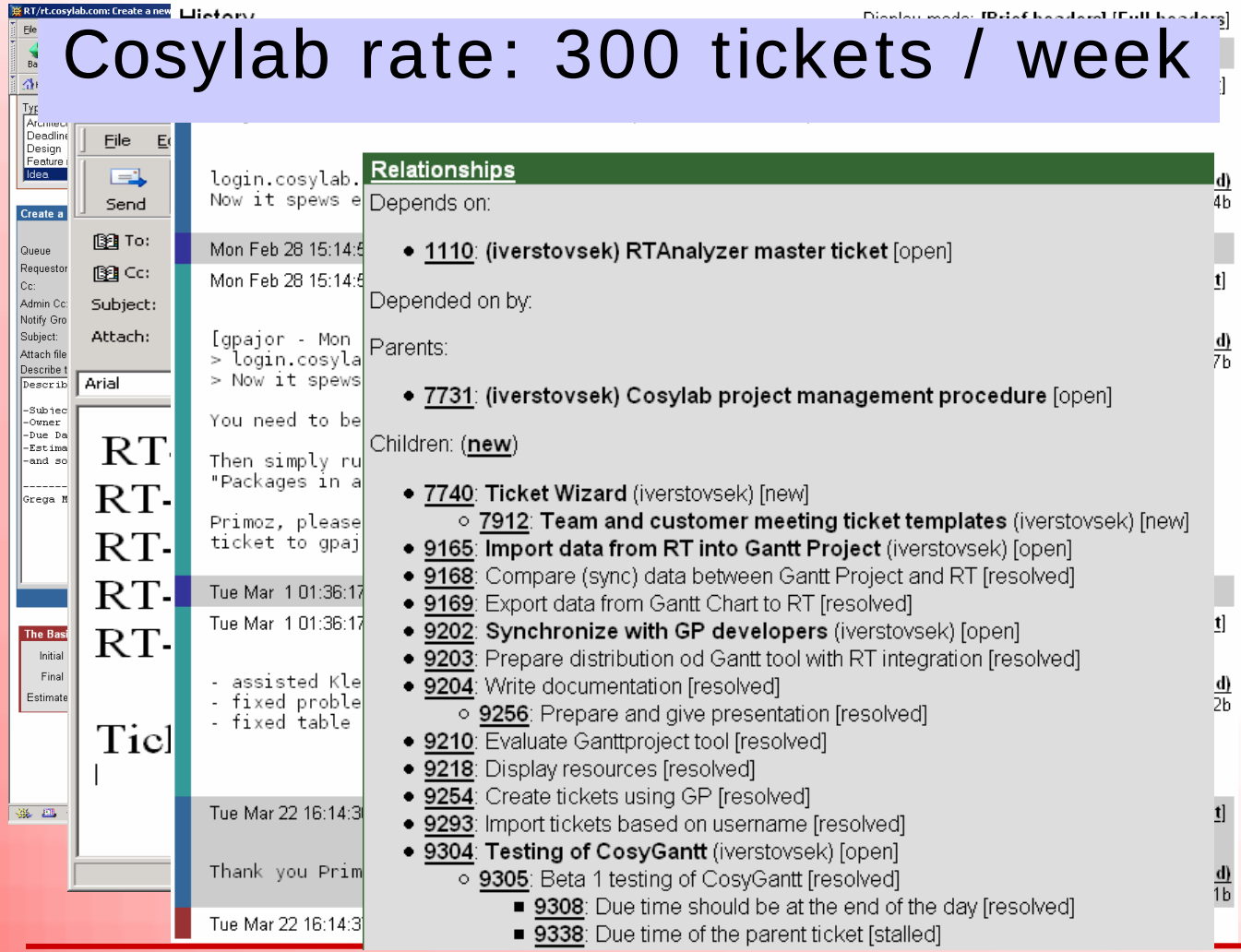
- Tracking work progress and time spent
- Reporting project status
- Risk management

Tracking Work in Progress

- The cultural aspect of reporting work done
  - Big Brother effect
  - DESY: relative units are tracked (not man-hours)
- Any reporting and management system must
  - introduce **minimal** overhead
  - show its benefits, fast!
- Introduce the system gradually
  - Lectures
  - Coaching and support for users

Tracking Progress and Time Spent

Cosylab rate: 300 tickets / week



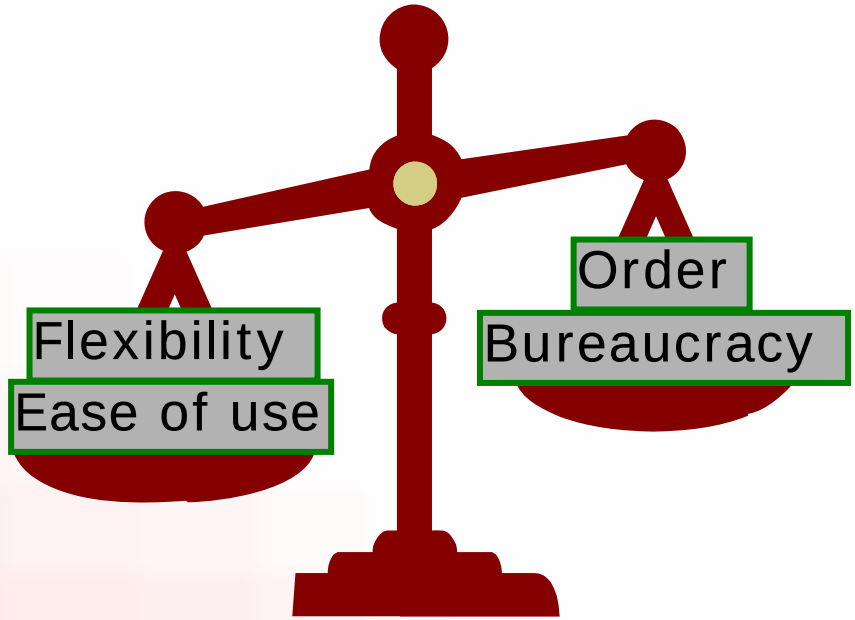
The Ticket

- People
  - owner, CCs
- Subject
- Status
  - open,
  - resolved
- Queue
- Body
  - text
  - attachments
- Due Date
- Estimated Time
- Time spent
- Relationships
  - parent-child
  - refers to
  - depends on
- Keywords

Cosy Project Manager

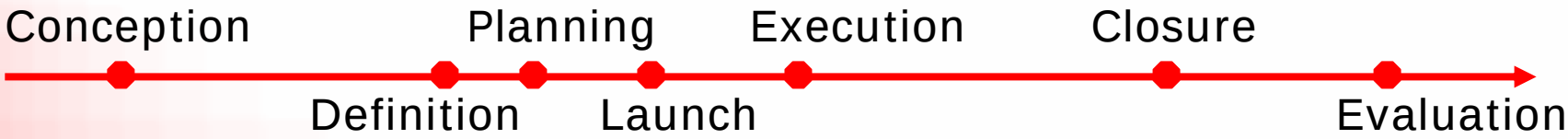
- Planning, reporting and analysis of multiple projects in a dynamic organization
- Built on top of open source tools, e.g. RT
- flexible, little overhead
- Nevertheless boasts some very powerful features

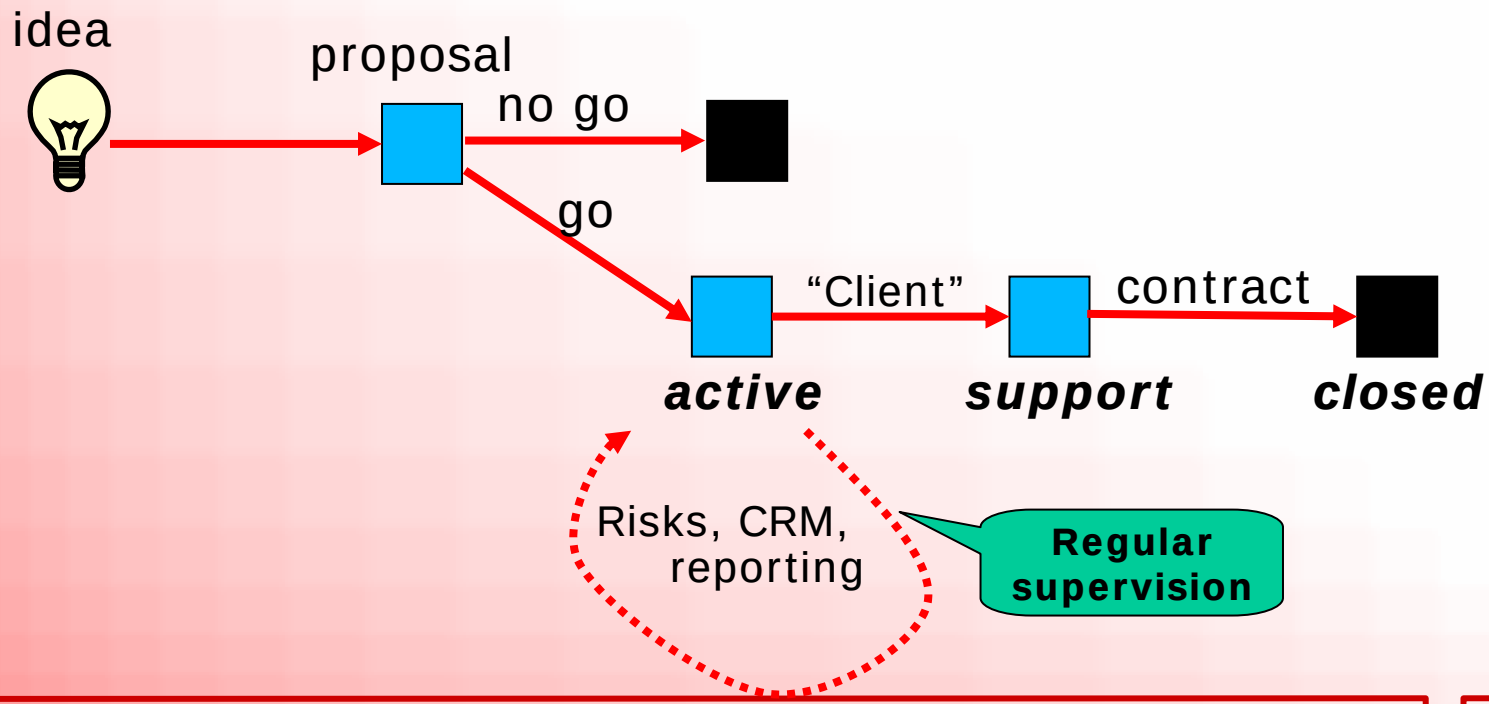
Any system is a trade off between



Ideal solution for research institutes!

Project Flow - Supervision





Monthly Reports Help Project Managers

- End-of-month
  - Short and concise reports
  - Only the necessary information
- 3th next month: “Supervisor” and PM agree on report
  - Have a meeting, if necessary
- Supervisor can be another project manager (peer review)

Monthly Report
Project Management Report

I. **Tidy up project report**: Eliminate errors, warnings
II. Update PM documentation, accessible from the report

Specific questions on:
1. Budget
2. Schedule
3. Overall progress
4. Clients
5. Planned activities - enumerate major or important ones
6. Planned resources
7. Risks
   Risk 1, Risk 2, ...
8. Specific questions for this project
9. Feedback - Requested actions for the COO (how can I help you)

Extraordinary Supervision
"Presentation to Bill Gates"

- Presentation of project progress on a meeting
  - Prepared by project manager
- Initiated by QA, project manager, the management or somebody else
- Same procedure as for Monthly Reports
  + additional "tricky" questions

Early Detection of (Potential) Problems

- Which tickets are past due? Is estimated time set? Is there too much work being done? Is the project organized well?

2.1. Errors

Ticket	Owner	Status	Subject	Description	Quick fix
13993	Aljaz Podborsek	resolved	prepare test microIOC for ASP storage ring	Ticket has estimated time set to 60 min, however it was resolved without any efford entered. Either set estimated time to zero or enter missing time.	Set estimated time to zero.
14753	Jansa Gasper	resolved	Write documentation	Ticket has estimated time set to 180 min, however it was resolved without any efford entered. Either set estimated time to zero or enter missing time.	Set estimated time to zero.
13686	Jansa Gasper	open	**MPS for SR of ASP for DF**	Sum of contract tasks for child tickets (4640 min) does not equal master ticket contract time (8550 min).	

2.2. Warnings

Ticket	Owner	Status	Subject	Description	Quick fix
13685	Jansa Gasper	dead	test	Ticket in project queue has no parent	
14283	Jansa Gasper	resolved	add new features for storage ring MPS	Ticket has estimated time set to 960 min, however it was resolved in only 380 min.	
13722	Jansa Gasper	new	**microIOC development software**	Contract ticket has zero contract time.	
13738	Borut Likar	resolved	Modfiy DF-ASPBooster's maven build	Ticket is moderately over time: worked: 845, estimated: 480.	
14242	Borut Likar	resolved	This is for debian package creating stuff	Ticket has estimated time set to 1440 min, however it was resolved in only 330 min.	

Planned vs. Spent Work in Real Time

People

Project name: MPS for SR of ASP for DF

Project manager: Jansa Gasper

Developers:

- Rok Sabjan
- Gasper Pajor
- Damjan Golob
- Matjaz Kobal
- Jansa Gasper
- Borut Likar

Start date: 2005-08-16

End date: 2005-10-20, 26 days till estimated finish.

Master ticket: 13686

Project budget

1.1. Time

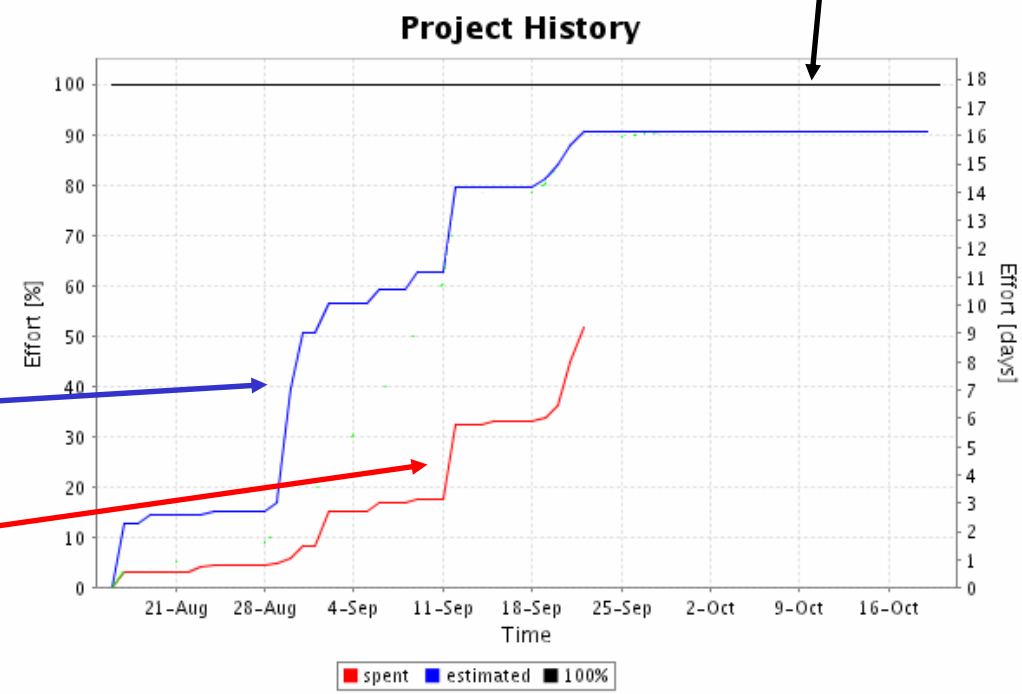
Project size: 17.81 md : 3.56 mw : 0.89 mm

Time spent: 9.21 md : 1.84 mw : 0.46 mm (51%)

Time spent (4420/8550)

51%

Estimated time to finish: 2.06 md : 0.41 mw : 0.10 mm



Estimated time

Time worked

Status of High Level Tasks

- Overview of time spent on contract tasks
  - Contract time = budget in man-hours
  - Total estimated = from created tickets
  - Spent time = time reported into the system

1.4. Contract tasks

Ticket	Task name	Spent / total estimated / contract task time (days)	weeks	spent / contract	total estimated / contract	spent / total estimated	Responsible	Status	Activity
13688	Quality Assurance Ticket	0.00 / 0.00 / 1.10	0.00 / 0.00 / 0.22	0%	0%	0%	Jansa Gasper	new	View
14438	Customization work for EPICS	1.61 / 3.12 / 5.00	0.32 / 0.62 / 1.00	32%	62%	51%	Jansa Gasper	new	View
13689	EPICS MPS device driver modifications	1.39 / 2.75 / 2.00	0.28 / 0.55 / 0.40	69%	137%	50%	Jansa Gasper	new	View
13722	microIOC development software	4.46 / 7.09 / 0.00	0.89 / 1.42 / 0.00	Inf%	Inf%	62%	Jansa Gasper	new	View
13687	Project Management	1.76 / 3.17 / 1.56	0.35 / 0.63 / 0.31	112%	202%	55%	Jansa Gasper	new	View

Completed 0 out of 5 items.

Create a new task.

Interaction: Team and Customer Meetings

- Mailing lists
  - Internal: All project members
  - External: Internal + clients
- Team meetings
  - one per week (tough projects) or one per two weeks
- Customer meetings
  - One per every two weeks (phone conference)

Resource Planning

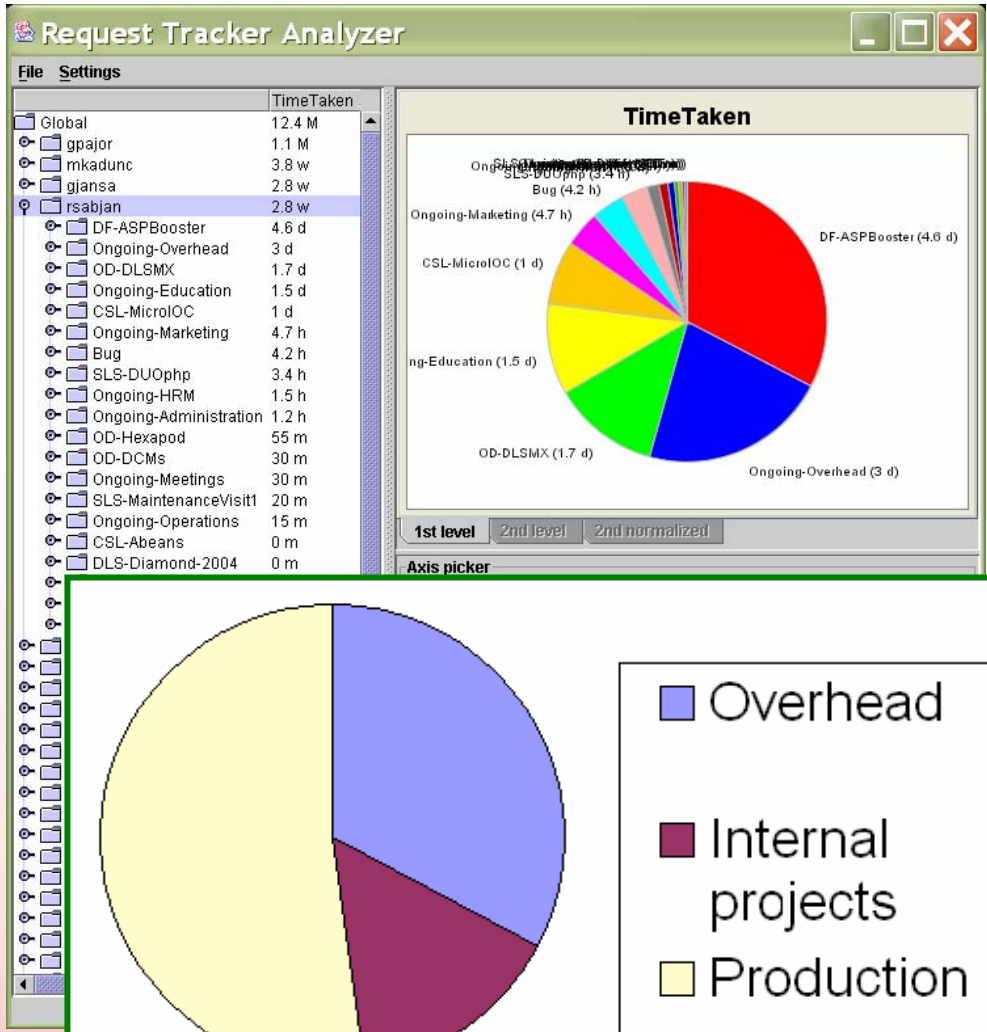
Today:		34	35	36	37	38	39	40
Plan starts with	Effective	21/Aug	28/Aug	04/Sep	11/Sep	18/Sep	25/Sep	02/Oct
31/ July 2006	hours	27/Aug	03/Sep	10/Sep	17/Sep	24/Sep	01/Oct	08/Oct
Important Deadlines								
Franetic Damir	20	OD-ASPPX ??	OD-ASPPX ??	Faks – Sluzba	Faks – Sluzba	Faks – Sluzba	Faks – Sluzba	Faks – Sluzba
Gajsek Rok	30	OD ASPPX Bench test	OD-ASPPX ??	OD-ASPPX ?? / SPEC	OD ASPPX Integration	OD-ASPPX ??	OD-ASPPX ??	OD ASPPX Integration
Golez Denis	15	Asyn study	Asyn study	New motor recod	New motor recod	New motor recod		10 ur na teden? ->
Golob Janez	20	Kamera USB	Kamera USB	Kamera USB				
Ilievski Enej	10	Faks – Diploma	Faks – Diploma	EPICS Academy	EPICS Academy			10 ur na teden ->
Jansa Gasper	25	Faks – Diploma	Faks – Diploma	PLC	PLC	SLS-Scienta	Faks – Diploma	Faks – Diploma
Kobal Matjaz	30	OD ASPPX Bench test	OD-ASPPX ??	OD-ASPPX ??	OD ASPPX Integration	OD-ASPPX ??		
Kolaric Primoz	15	Non-EPICS	Non-EPICS	Non-EPICS	Non-EPICS	Non-EPICS	Non-EPICS	Non-EPICS
Kosmrlj Andrej	15	ZDA	ZDA	ZDA	ZDA	ZDA	ZDA	ZDA
Krapec Iztok	30	Faks – Diploma	Faks – Diploma	Faks – Diploma	Faks – Diploma	Faks – Diploma	Faks – Diploma	
Medvescek Peter	30	DF-ASPApple2 PMAC	DF-ASPApple2 PMAC	DF-ASPApple2 PMAC	DLS On-site support	DF-ASPApple2 PMAC	DF-ASPApple2 PMAC	DF-ASPApple2 PMAC
Pajor Gasper	30	DF-ASPApple2 PM	DF-ASPApple2 PM	DF-ASPApple2 PM	DF-ASPApple2 PM	DF-ASPApple2 PM	DF-ASPApple2 PM	Dopust
Pelko Miha	30	Dopust	Dopust	Dopust	Dopust	Delta Tau zastopstvo	Delta Tau zastopstvo	
Sabjan Rok	20	EPICS Course Preparations	EPICS Course Preparations	Taiwan EPICS Course	Taiwan EPICS Course	OD-ASP PX2/SAXS funcspecs		Business visit SLS
Stefanic Rok	15	DF-ASPApple2 EPICS	DF-ASPApple2 EPICS	DF-ASPApple2 EPICS	DF-ASPApple2 EPICS	DF-ASPApple2 EPICS	EMBL student work	EMBL student work
Strnisa Klemen	15	Vrzjak Sezana	Picoscope	Picoscope	Mbox health	PMAC upload	Dopust ?	10 ur na teden ->
Verstovsek Igor	20	EPICS COO, CSL reorganizacija	Dopust	Dopust	Dopust			
Vrabic Rok	20	M-Box mcomm addons	Dopust	Dopust				
Vrtic Bojan	20	Faks – Diploma	socket2serial	socket2serial		Ike: ALBA		

- People vs. weeks
- Very High level

  Only one major activity of the week

Analysis of Projects

- On-line Analytical Processing (OLAP)
  - "cross sections" of data on any level
- Work spent per developer
- Distribution of activity in the organization



You Should Take at Least the Following from This Tutorial

- Take extra time for conception, planning and closing stages of projects
- Manage risks thought the project
- Use some sort of project management / reporting system
- Monitor project progress (close the loop)
- Ease “cultural issues” by
  - Demonstrating benefits of p.m. to people
  - Constant coaching

Thank You!

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Hypothetical Questions of Hypothetical People

- **Developer**
  - *"What are my tasks for today? Which is the most urgent?"*
  - *"Where can I see how my colleagues did things?"*
- **Project manager**
  - *"How far is my project - in terms of time AND progress?"*
  - *"What are the biggest problems of the project?"*
  - *"Can I satisfy the management / clients (a.k.a. The Big Boss™) without having too much overhead writing reports?"*
- **The Big Boss™**
  - *"Is the project on track?"*

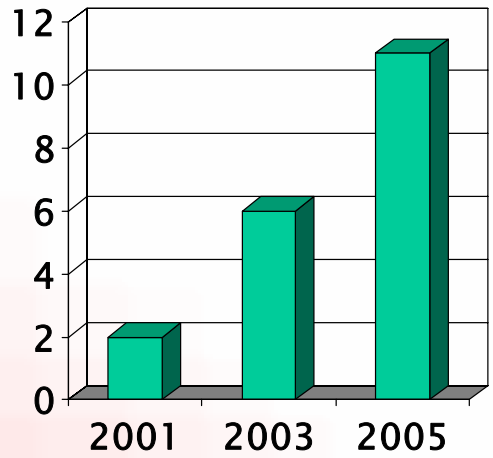
What to Expect from a Management System?

- Offer its users help to
  - supervise work in progress
  - learn from mistakes
  - optimize for the future
- The system: *How* formal and *when* to introduce it?
- Our approach - *evolution*
  - Take open source tools and adapt them
  - Let the tools evolve along with your needs

The Stage - R & D Company

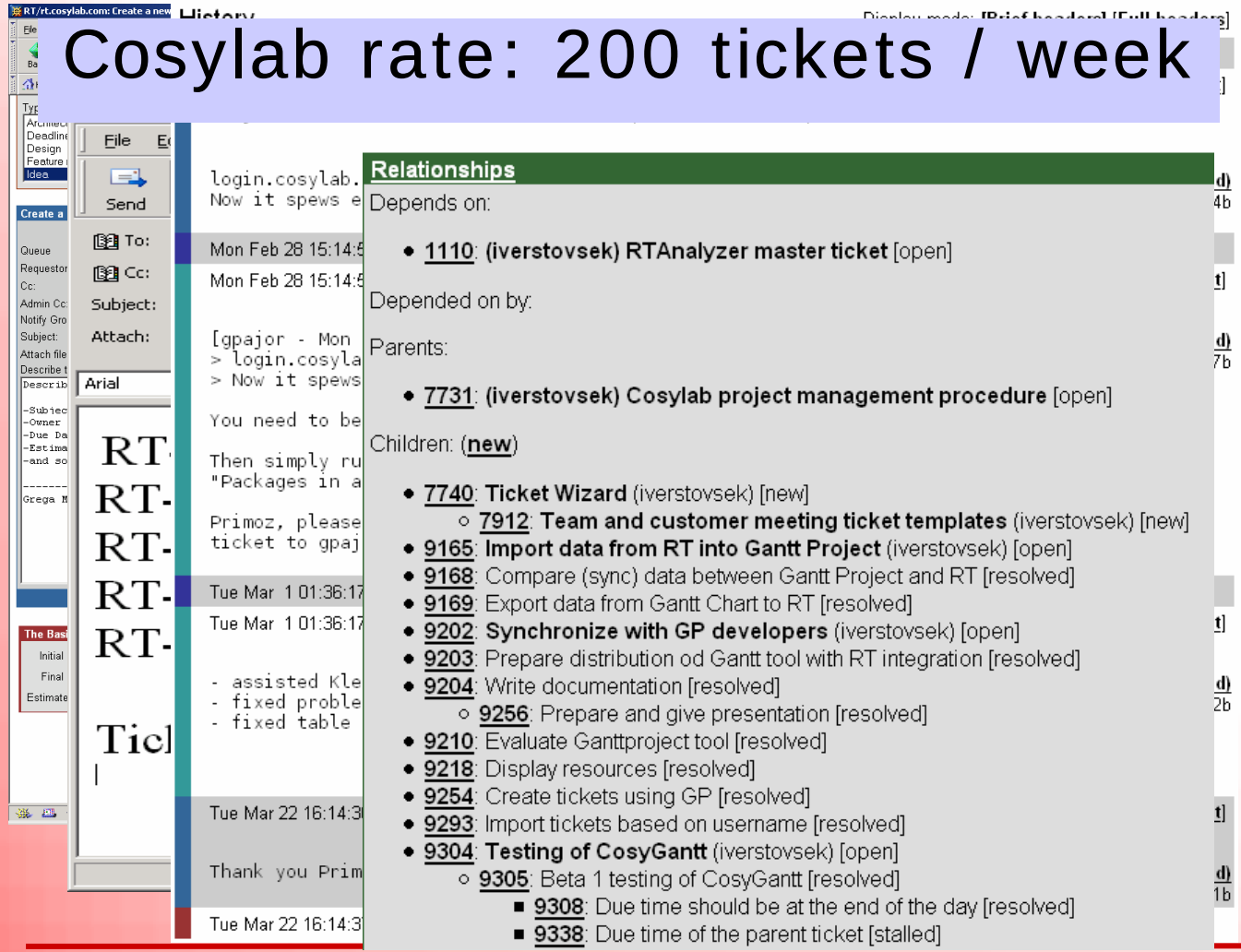
- Cosylab: spin-off of Jozef Stefan Institute
  - project oriented work, research
  - => very similar to research institutes

Cosylab team	2001	2003	2005
Full-time persons	2	6	11
Half-time persons	6	6	15
Projects	4	15	30
Customers	4	12	25



Request Tracker (RT)

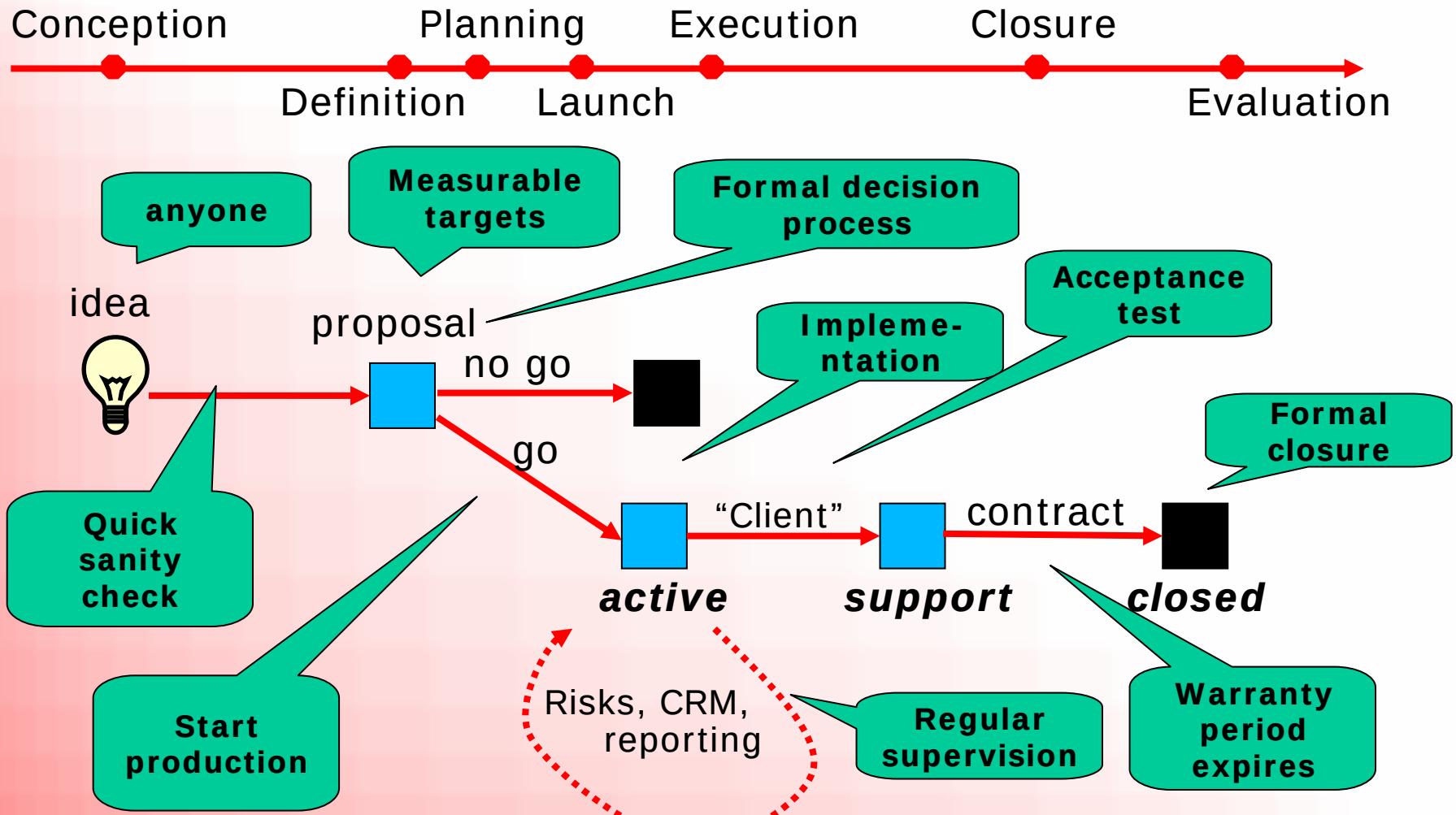
Cosylab rate: 200 tickets / week



The Ticket

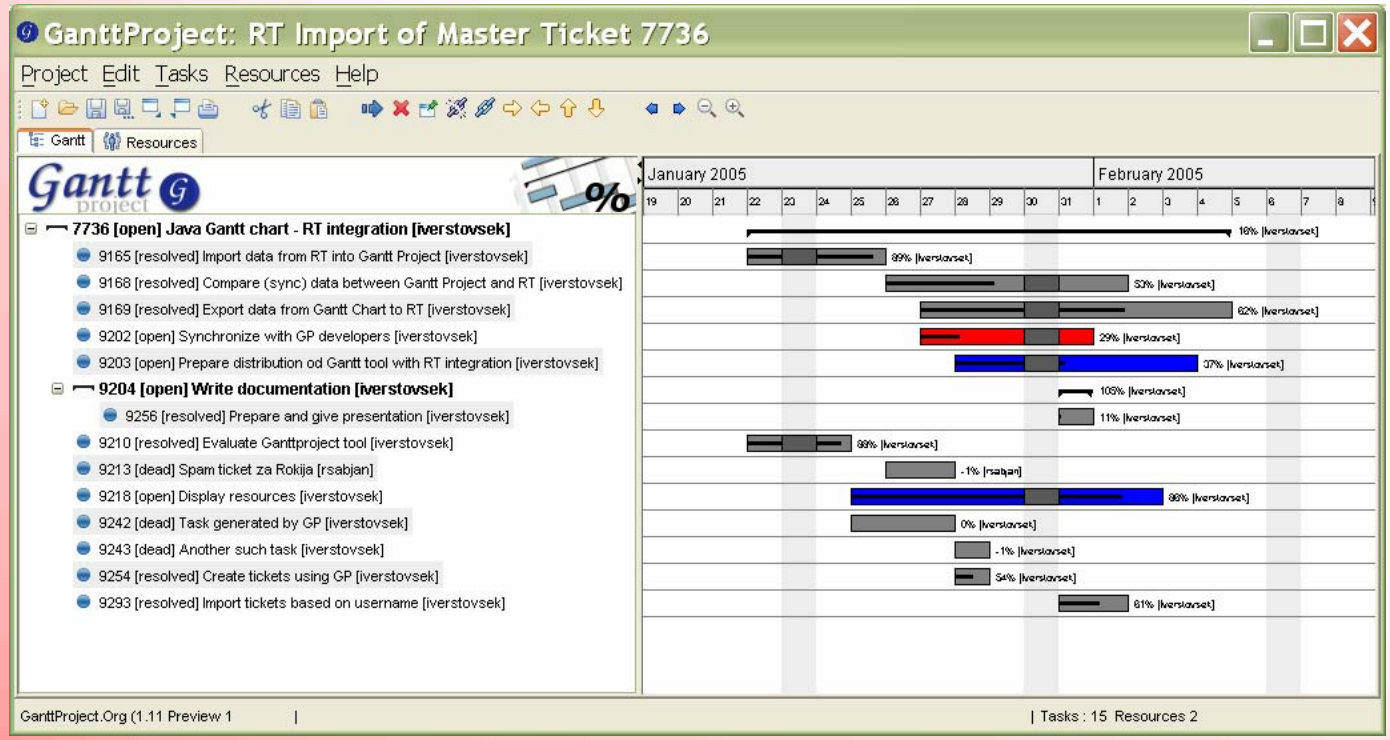
- People
  - owner, CCs
- Subject
- Status
  - open,
  - resolved
- Queue
- Body
  - text
  - attachments
- Due Date
- Estimated Time
- Time spent
- Relationships
  - parent-child
  - refers to
  - depends on
- Keywords

Project Flow



Gantt Project (GP)

- GP provides a "helicopter view" of tasks
- Our adaptation: two way integration with RT



- Colour coded status
- Actual progress of the task

From Tickets to Project

- **A project is more than a set of tickets!**
- Project is defined / consists of
  - Project group (members, leader)
  - Budget (available money and work)
  - Deadlines and milestones
  - Communication
  - Deliverables (SW and HW releases,...)
  - Quality assurance
  - Project management
- This information is added into RT database

Organizing Your Project

- **Master ticket** (level 0)
  - **Contract task** 1 (level 1)
    - » ticket 1 (level 2)
      - o) ticket 1.1 (level 3)
        - - ticket 1.1.1 (level 4)
    - » ticket 2 (level 2)
  - **Contract task** 2 (level 1)

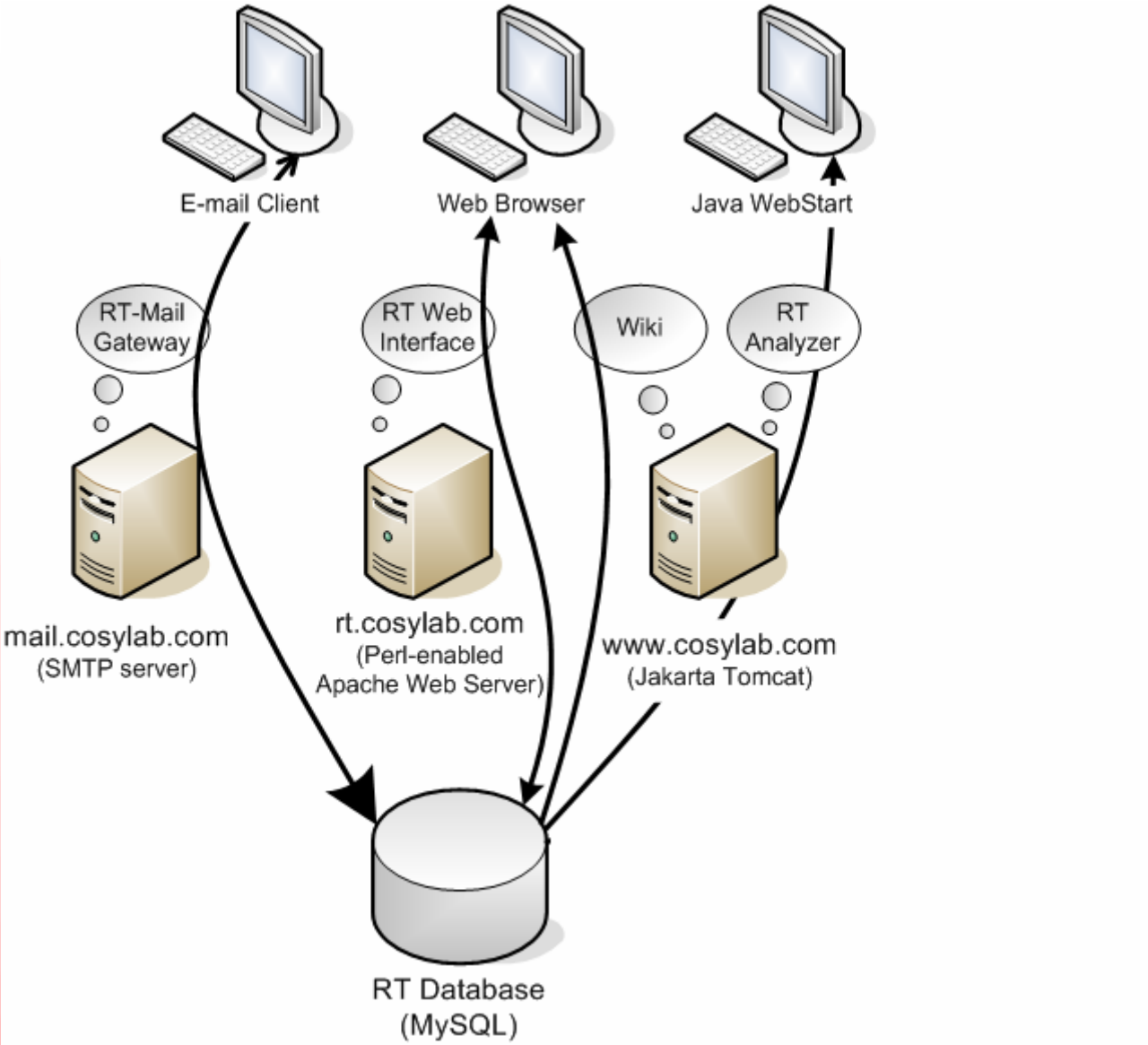
Only first two levels are formalized:

- *Master*: root ticket of the project
- *Contract task*: breakdown into well defined units

Otherwise use the tickets "as usual" - no overhead

Closing a Project

- Grading of tasks and developers
  - RT keywords are used (1 - 5 scale)
- For Cosylab - calculation of monetary awards
  - for positive stimulation of developers
- Final project statistics
  - on time, on budget?
- Learning experience for the team
- Building knowledge base of "Case studies"


E-mail Client
Web Browser
Java WebStart
RT-Mail Gateway
RT Web Interface
Wiki
RT Analyzer
mail.cosylab.com
(SMTP server)
rt.cosylab.com
(Perl-enabled Apache Web Server)
www.cosylab.com
(Jakarta Tomcat)
RT Database
(MySQL)

Introducing the System in Real Life

- The cultural aspect
- The system must
  - introduce **minimal** overhead
  - show immediate benefits
- Introduce the system gradually
  - Lectures
  - Coaching and support for users

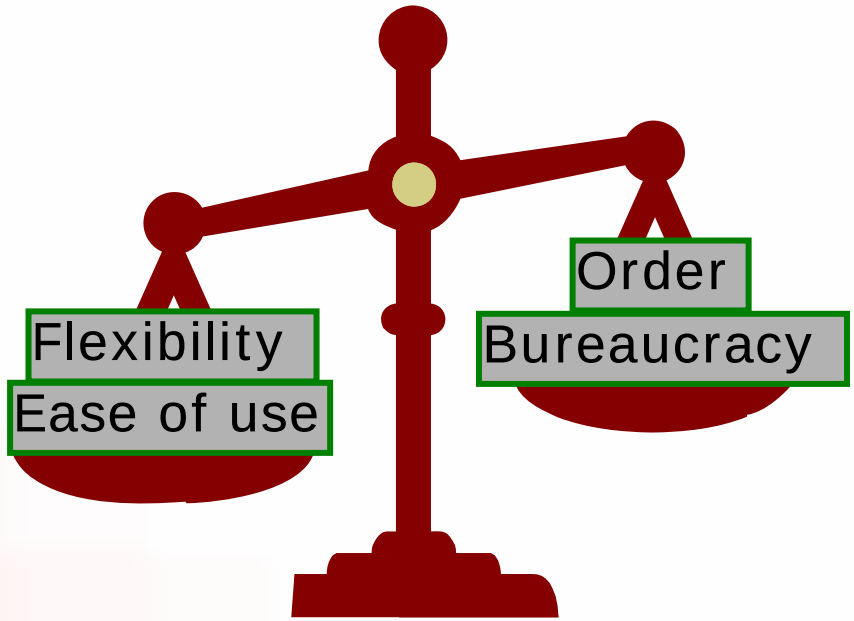
Experience from DESY

- Project: Control System for Petra III - upgrade of the machine into a synchrotron
  - Collaboration with Reinhard Bacher
  - in the stage of project definition
  - not much feedback from users yet
- **Relative units** vs. time in minutes
  - indicate how far is each task, e.g. 45/200
  - developer reports ***progress***, not time
  - more suitable for research groups

Conclusion

- Management system is always a trade off

- Our solution
  - flexible, little overhead
  - but still has very powerful features



Ideal solution for research institutes!