

Critical Chain Project Management

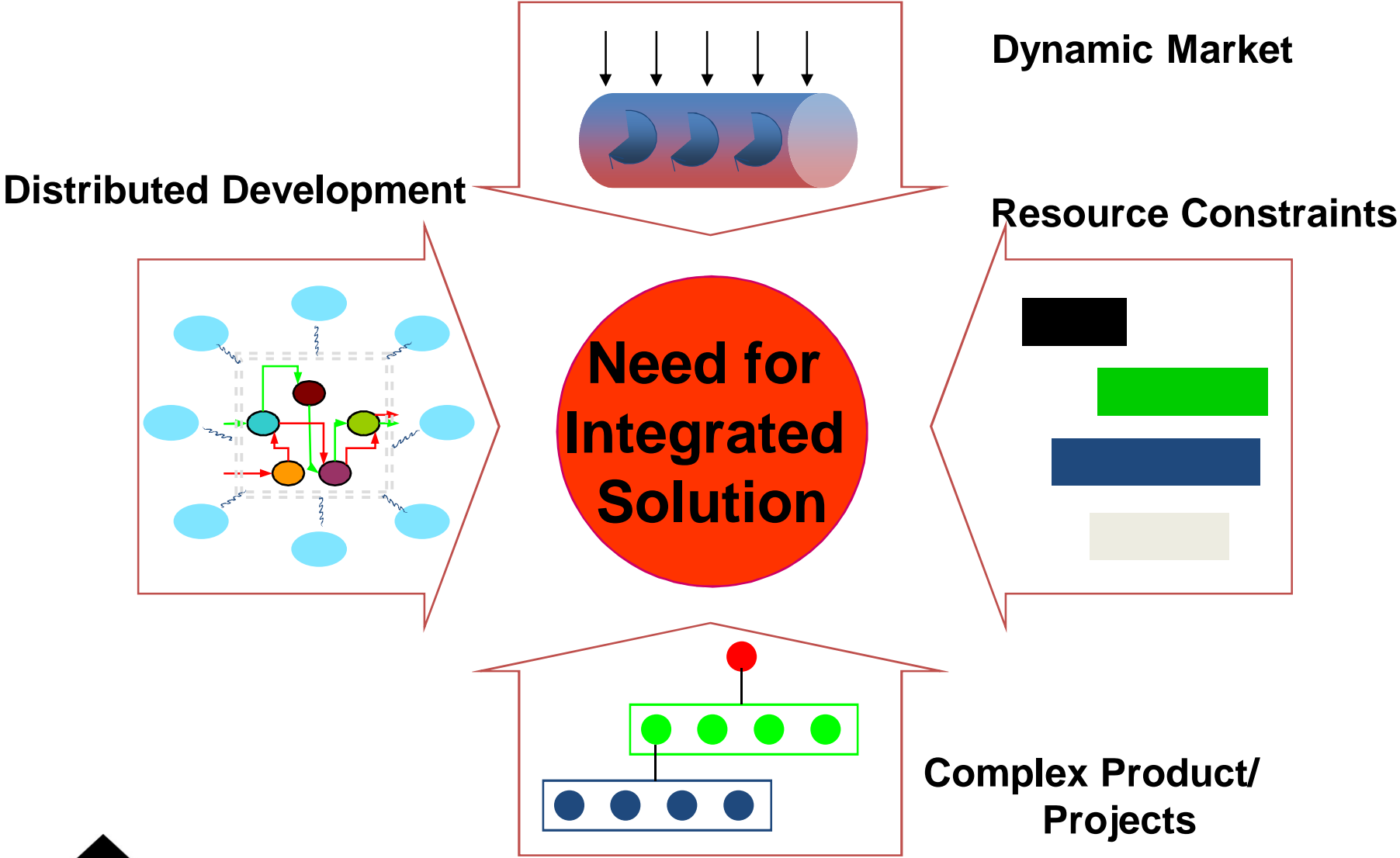
A new approach to project and programme management and the implications for HR

Dr Ted Hutchin – TOC-Lean Institute

The reality of projects today

- Time to market is now a critical success factor for most companies
 - This applies to both internal and external projects
- Applies to all aspects of the organisation, not just IT or product development
- Opportunity time for maximising profit is reducing
- However, the time to develop new products/services has not reduced, and in many cases has actually increased
- So what are the drivers that lie behind this scenario?

COMPLEXITY IS INCREASING

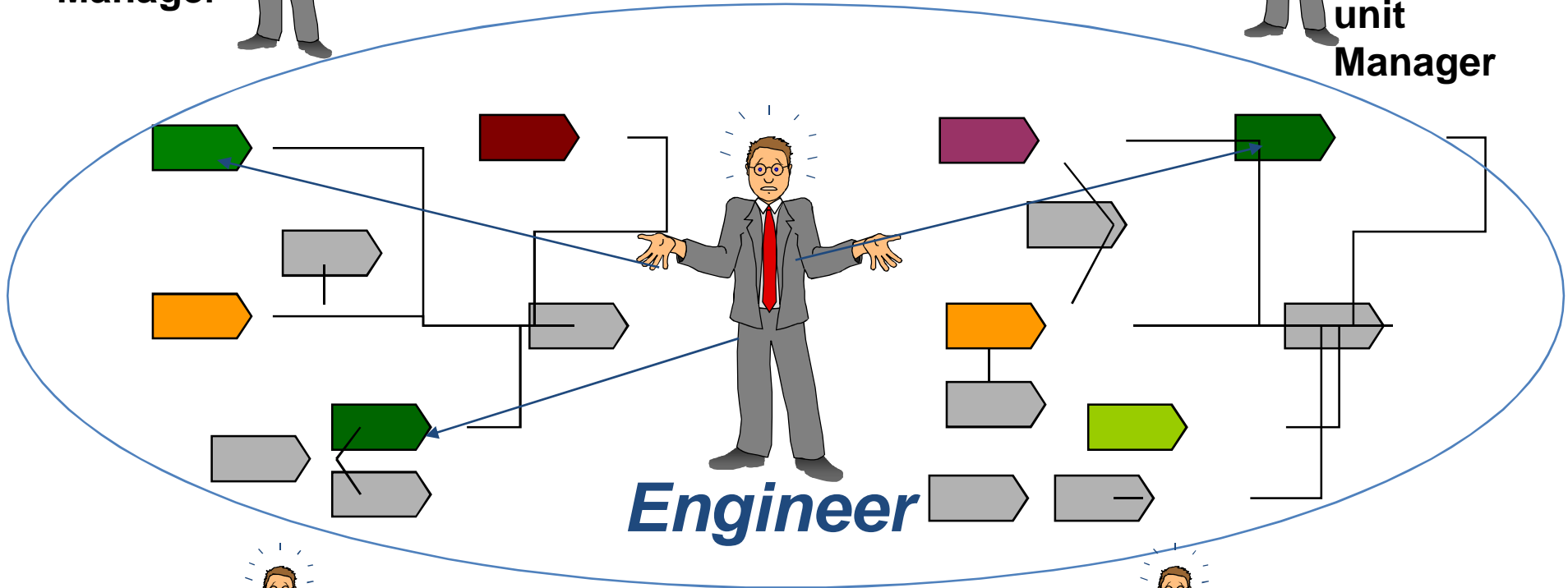
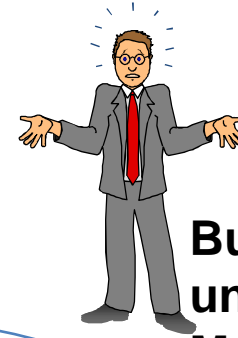


Projects are now more difficult to manage

Team Manager



Business unit Manager



Resource Manager



Programme Manager



A reality check: how many of these do you suffer from?

1. Increasing difficulty to meet project deadlines.
2. Constant pressure to increase resources.
3. Project scope too often compromised to meet dates.
4. Frequent conflicts between people.
5. Existing work is not complete before new projects force a shift in priorities.
6. Organization is too slow in responding to important market opportunities.
7. Too much rework activity, dragging key people away from new projects to repair old ones
8. Promised times longer than desired.

Are you searching for answers to the following questions?

- Should we reduce product's features in order to meet promised delivery date or promised launching date?
- Will adding resources reduce our company's Time to Market?
- How can we quantify impact of local decision on our company's performance?
- How should we deal with constant shortage of critical resources?

The Challenge

- Complexity and the problems of managing scarce resources lie at the heart of the problem
- Speed is mandatory—old methods don't work
- Resources and data are not a source of competitive advantage
- The essential differentiator of companies and performance are the decisions they make in terms of the following:
 - Speed
 - Effectiveness
 - Ability to “effect and align” decisions throughout the company

Critical Chain Project Management

- Critical Chain Project Management (CCPM) has been around for almost twenty years
- Fastest growing installed base in project management
- Used by leading companies to gain competitive edge over those using critical path
- USA Department of Defense is now a CCPM organisation and will soon require all suppliers to work with the same system

What is the goal of project driven organisations?

- To make money from sales related to project driven products and/or services
- To satisfy the market by
 - Delivering on time (*the original time*)
 - Meeting the full specification of the client
 - Meeting the budget (*the original budget*)
- To satisfy the team

The importance of value

- Certainty of delivery on:-
 - Time
 - Cost
 - Quality
 - Safety
 - Environment
- The ability to do more projects than today with little or no increase in cost/resources
- To enhance the productivity of the resources available to us
- But what of the uncertainty that exists in the market?

Common Issues we all seem to struggle with!

Common Issues

- Life is difficult
- There are daily conflicts
- My priorities are constantly changing
- My frustration is high
- My life is out of balance both at work and at home
- High levels of health related problems
- Home life is affecting my work life and vice versa
- Things may be tough but at least they are known, better the devil I know than the one I don't
- Sense of not being in control

How many of these do we recognise?

What might we add?

What does it mean to be blocked – the individual level

- Many individuals are blocked from making progress, within themselves, within the team and within the organisation
 - Life is difficult
 - Stress is high
 - Daily conflicts
 - Priorities changing
 - Frustration high
 - Staff turnover high
 - Health and related problems happen regularly
 - Life is out of balance
 - Home issues are affected and vice versa
 - Things may be tough, but at least they're "known"
 - Better devil you know than the devil you don't

What does it mean to be blocked – the team level

- Many teams are blocked from making progress, especially in terms of relationships within the team and to those outside
 - Conflicts abound
 - Projects fail
 - Ideas get dropped, or stolen!
 - Rules and procedures not followed
 - People think they know better
 - Too many obstacles stand in the way of our progress

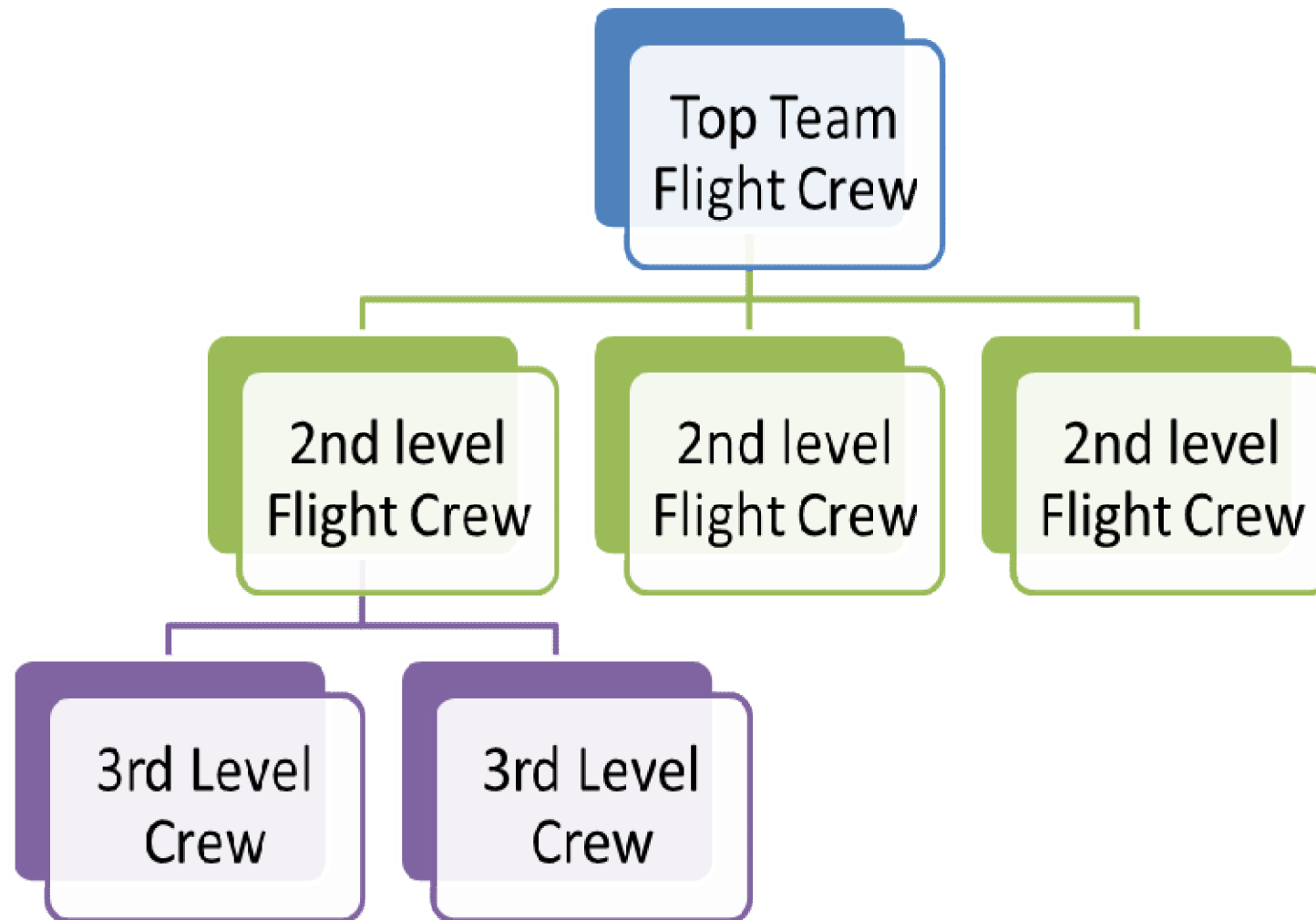
What does it mean to be blocked – the organisational level

- Many organisations are blocked from making progress
 - Blocked in terms of performance
 - Blocked in terms of the market
 - Blocked in terms of change
 - Blocked in terms of developing people to lead
 - Blocked in all manner of ways

Leading the organisation forward

OK so we have a solution – how do we implement it in such a way that it is sustainable into the future?

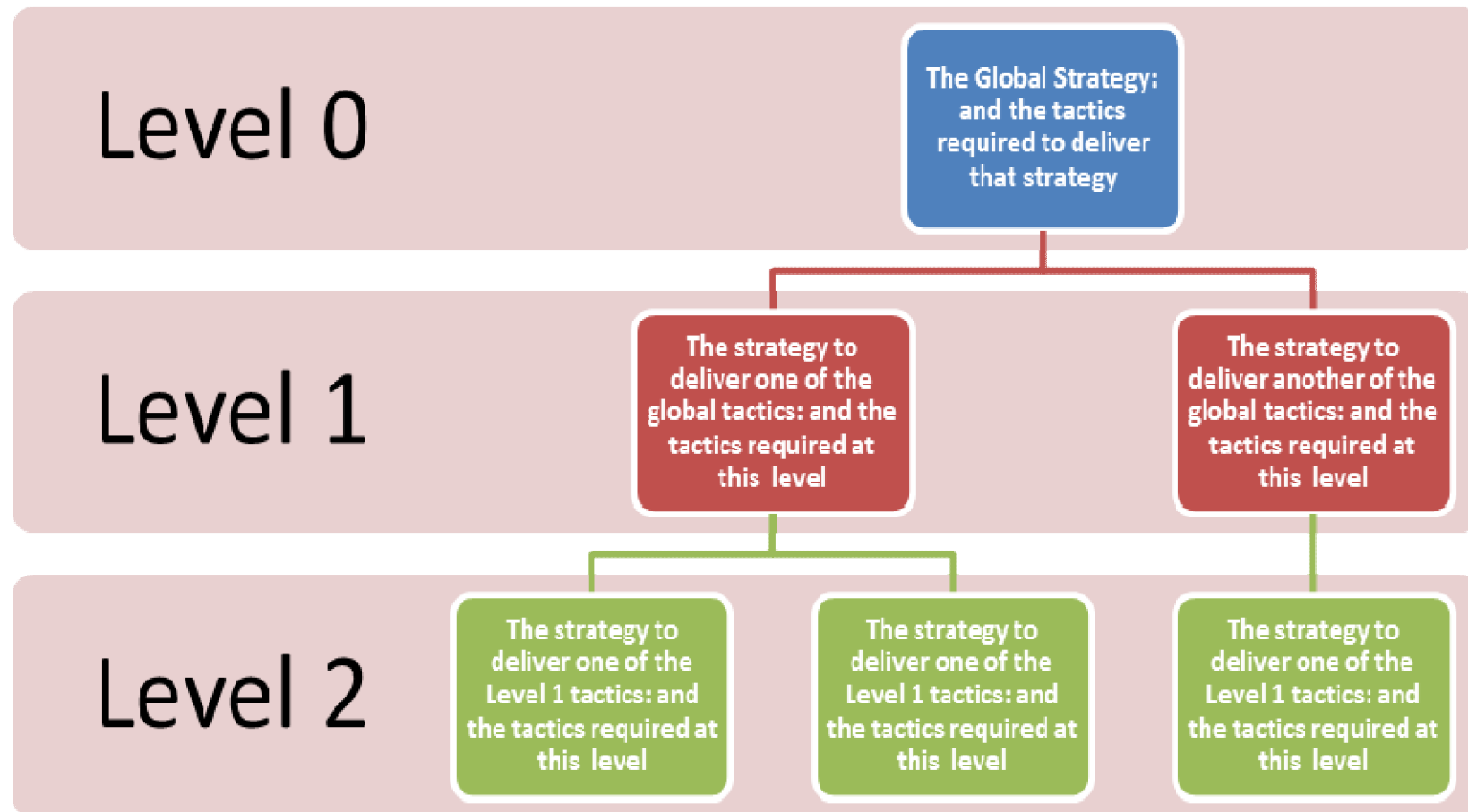
The Basic Flight Crew



Sustaining the direction

- The use of the flight crew in supporting the changes required now and in the future
- The use of the full TOC toolset and the links to the Strategy and Tactics approach
- Being ready to change the organisational structure as and when required
- The use of the coaching quadrant

The Basic Strategy and Tactics Structure



Creating an estimate

A recipe for disaster unless you are careful!!

Estimation: What's contained in a task estimate?

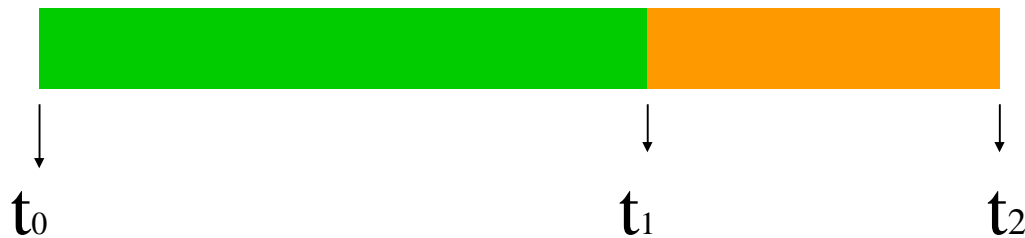
- The amount of time the task will take if everything goes reasonably well.



Determining a task estimate

The amount of time the task will take if everything goes reasonably well.

The amount of time to cope with uncertainty in the task.

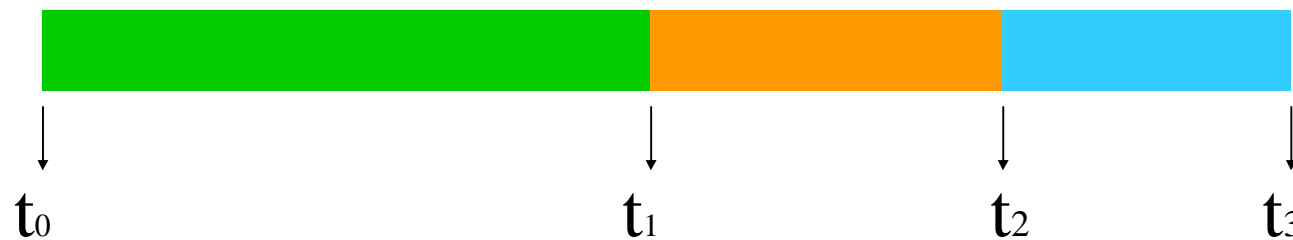


Task estimates

The amount of time the task will take if everything goes reasonably well.

The amount of time to cope with uncertainty in the task.

The amount of time spent working on other activities.



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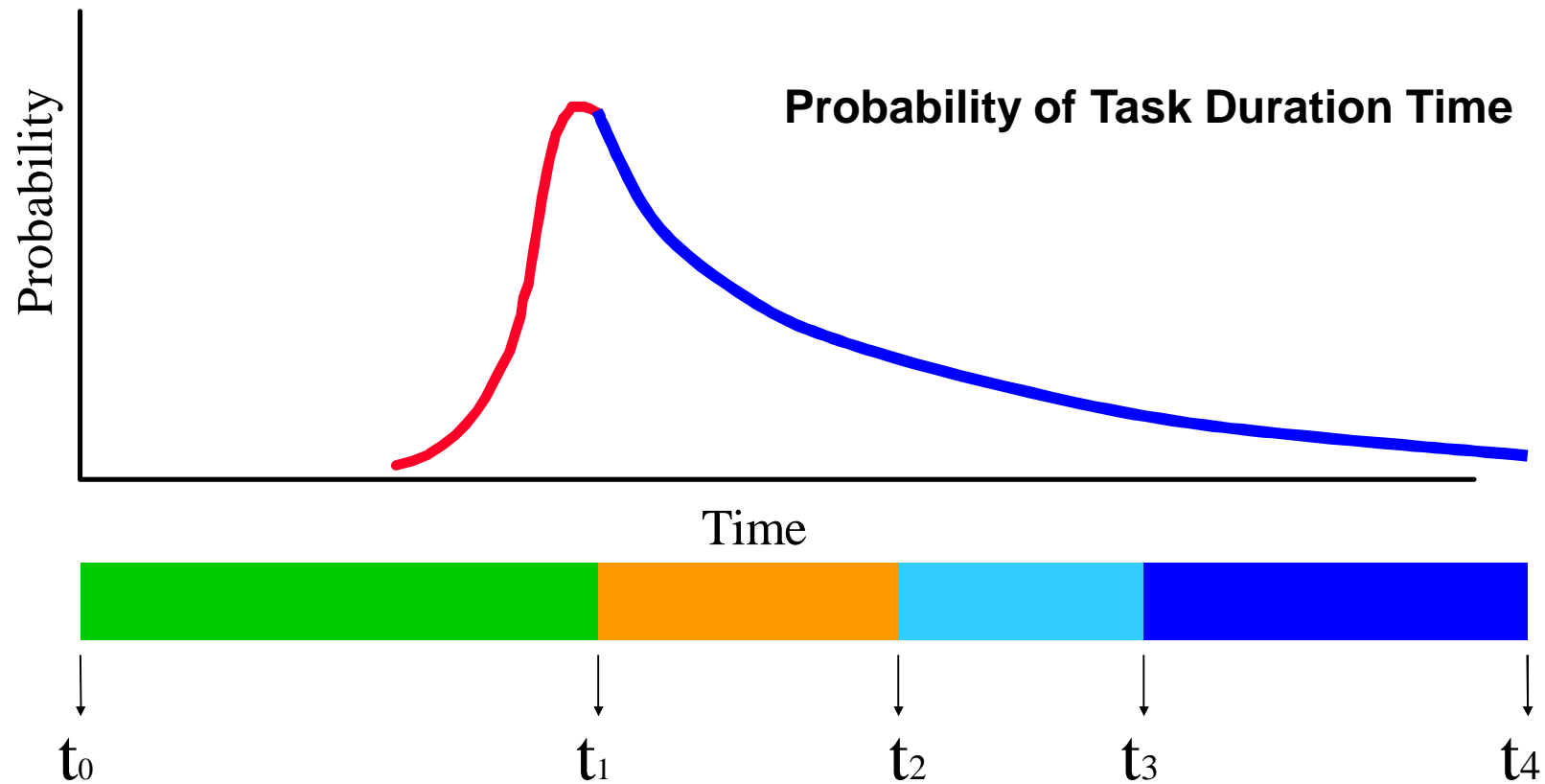
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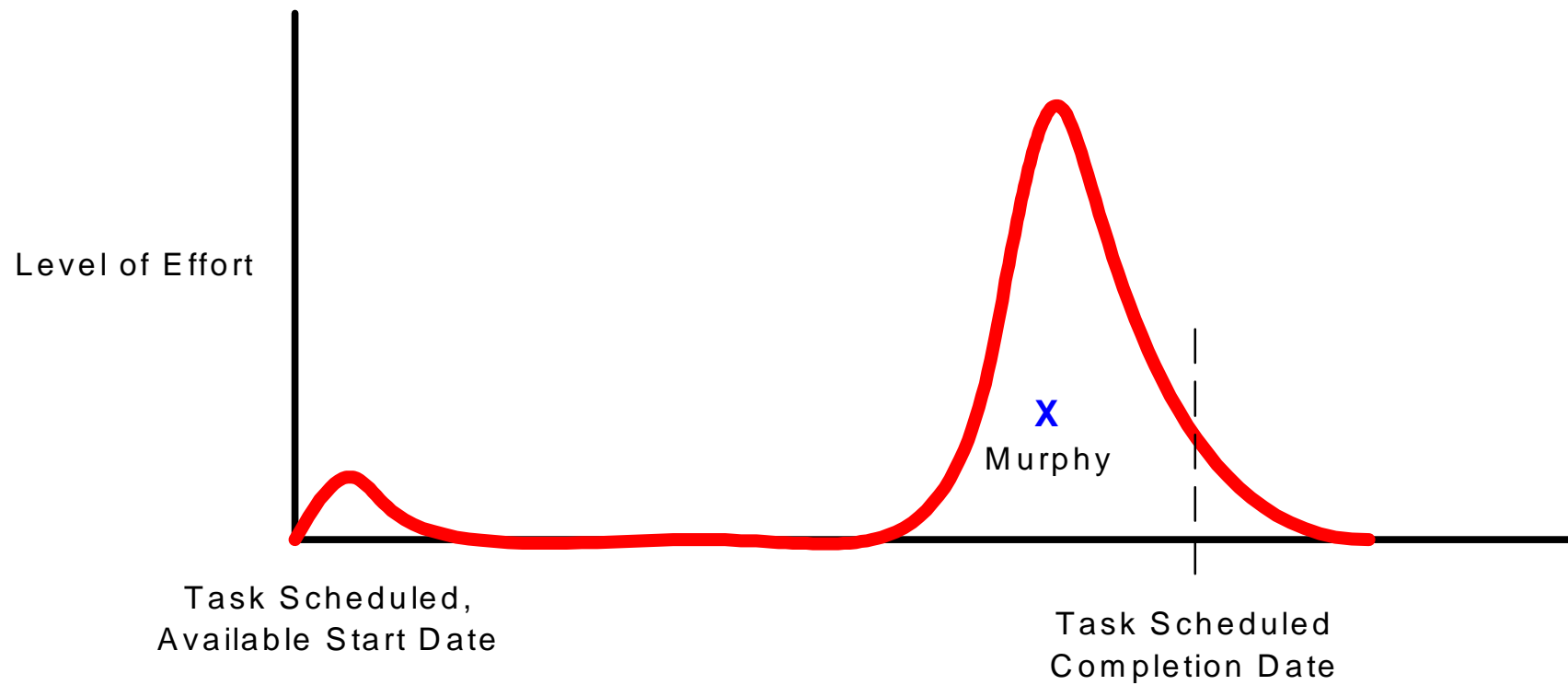
The amount of time we allow for interruptions.



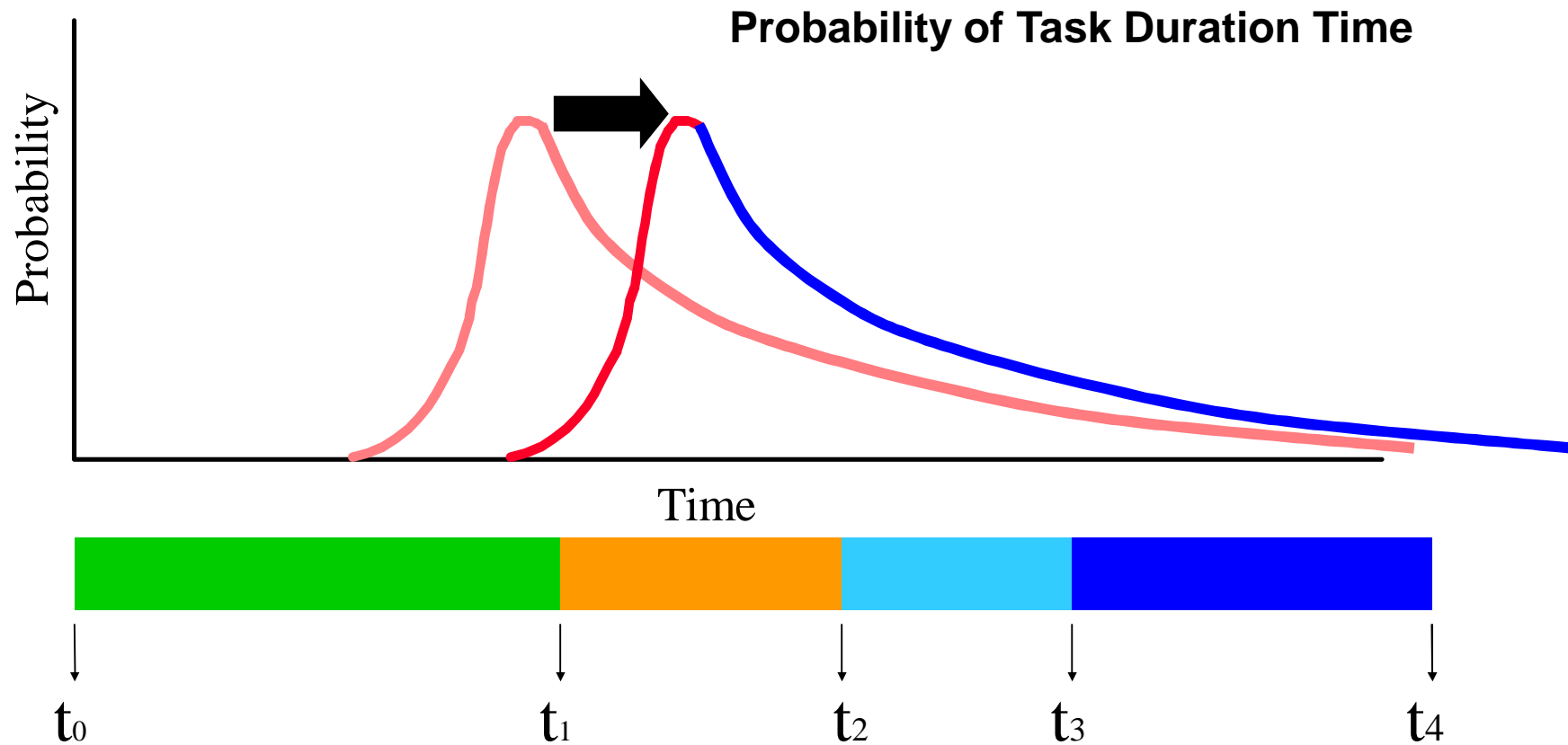
Which Time Are You Likely to Promise?



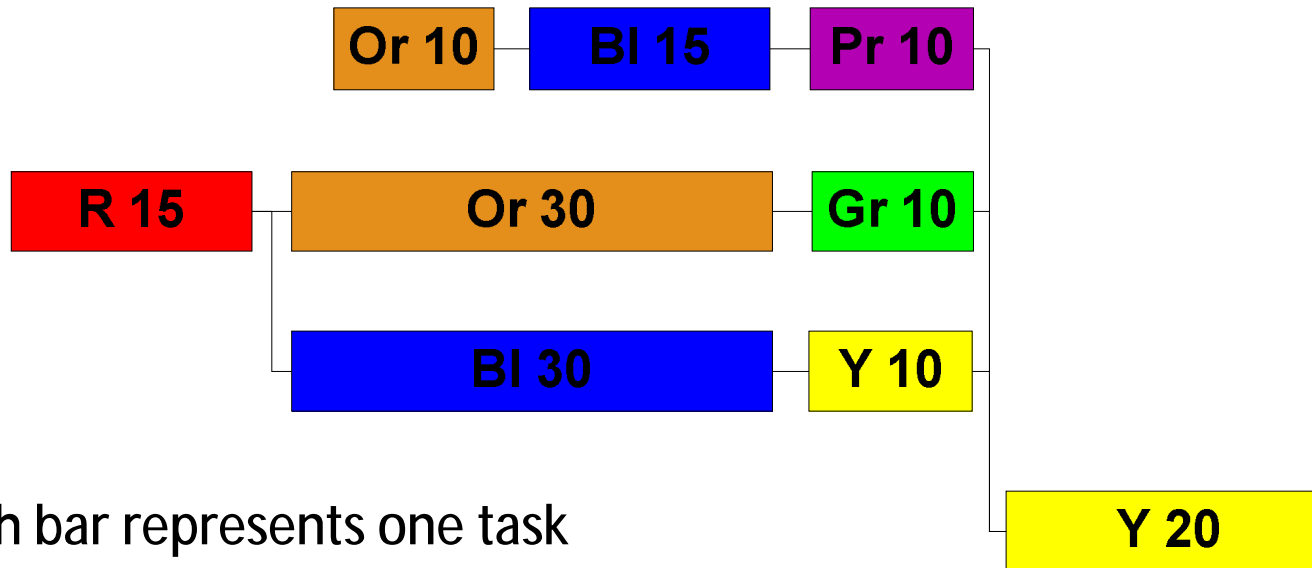
The “last minute” or “student” syndrome



The effect of student syndrome!



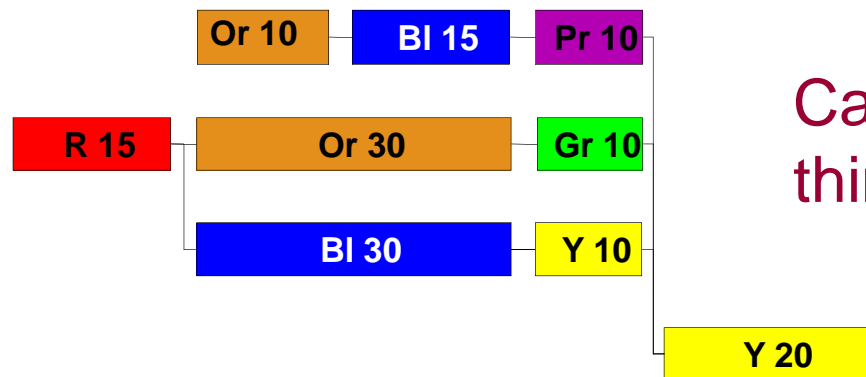
A Simple Project



- Each bar represents one task
- The dependencies are indicated by the lines
- Each colour represents one resource
- The number in each bar represents the time to complete the task, assuming that the task has no real difficulties. It is NOT the elapsed time for the task

First Pass Schedule

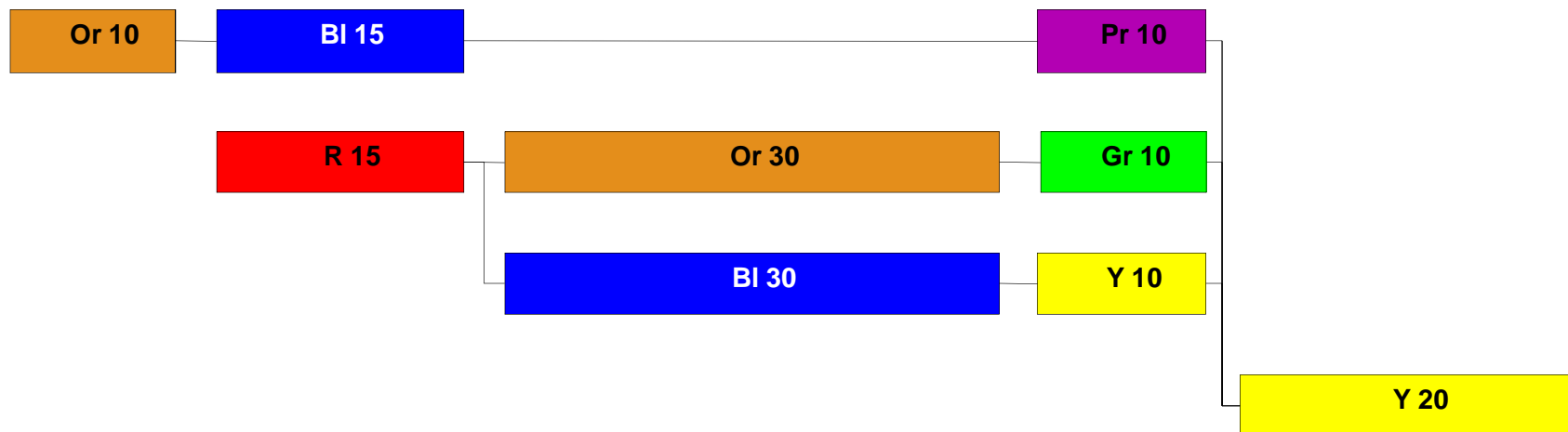
- A project network containing the necessary logic connections
- Tasks are scheduled to their latest start dates
- Task durations that represent the estimate of the actual time, as opposed to elapsed time, are used.



Can one resource do two things at once?

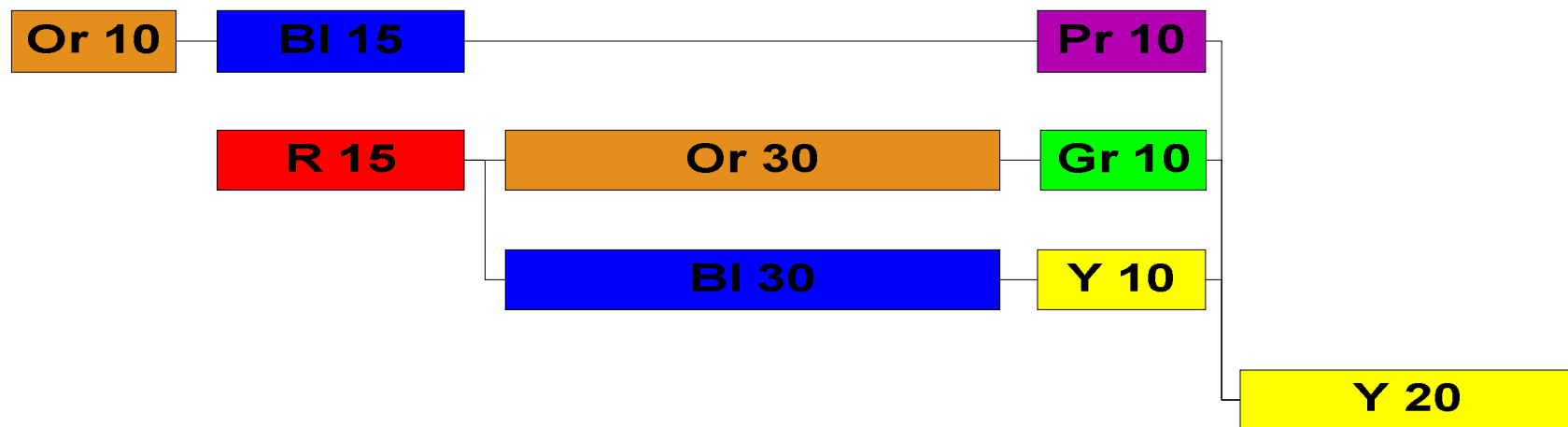
Resolve Resource Contention

- Allocate Resources and Stagger Resource Conflicts



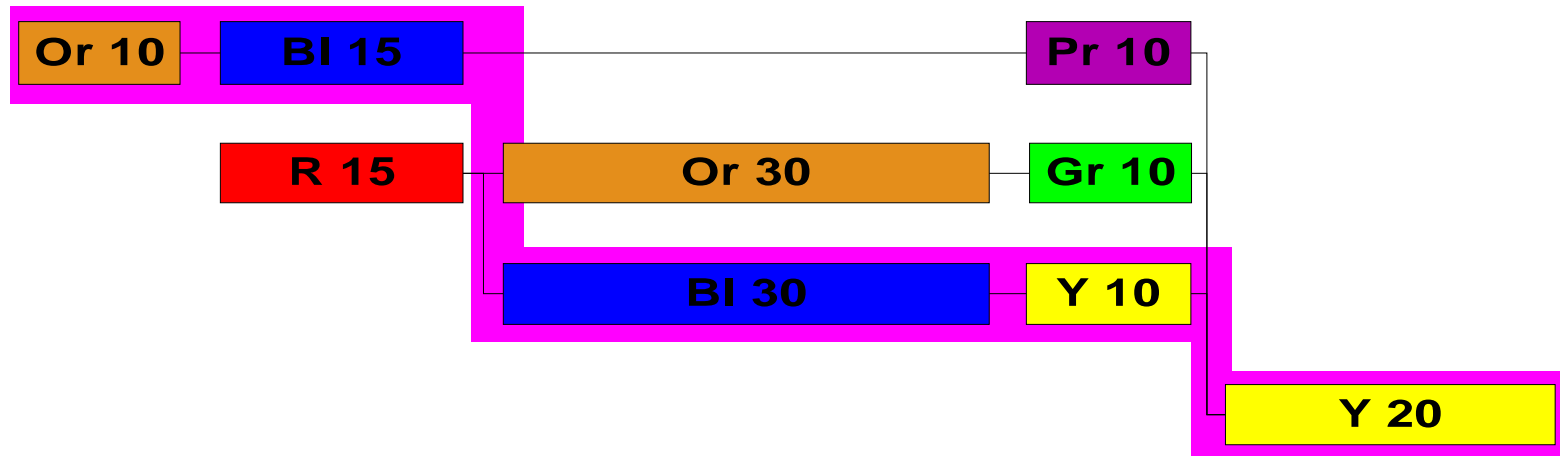
Step 1: Identify the Constraint

- If the goal of a project team is to finish a project as soon as possible, within specifications, and if the **CRITICAL CHAIN** is what prevents the project team from making further progress toward its goal,
then the **CRITICAL CHAIN** must be the constraint of the project team.



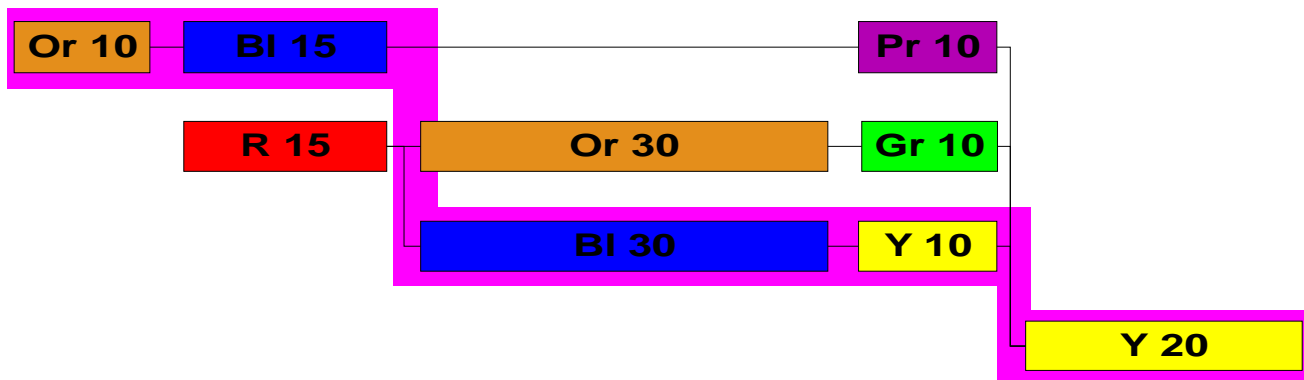
Step 1: Identify the Constraint

- The Critical Chain is the sequence of dependant events that prevents the project from being completed in a shorter interval, given finite resources.



How must people perform their work?

Step 2: Exploit the Constraint

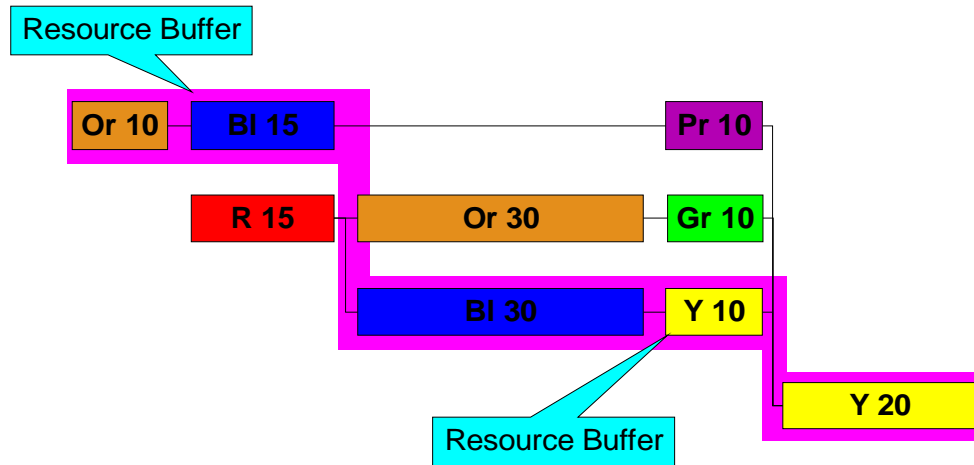


- People work at a full level of effort for the entire duration of each task.
- People turn over their output as soon as that output is ready.

Do people always show up on time?

What happens to the duration of the project if Mr. Blue is late for the start of the Blue-15 task?

Step 2: Exploit the Constraint

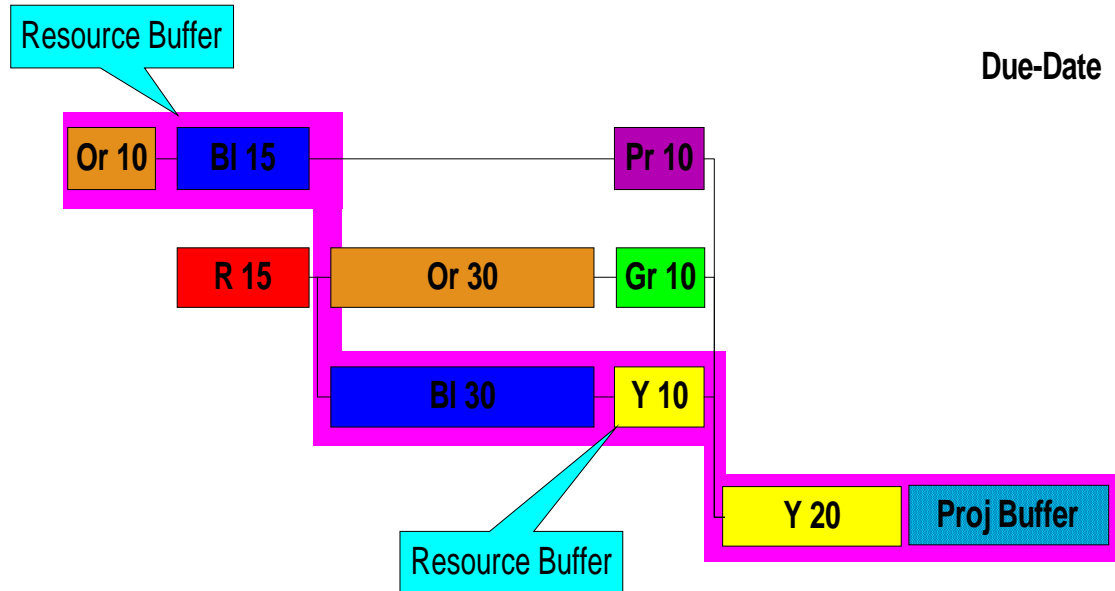


- Protect the start-dates of the Critical Chain tasks, from the untimely availability of resources, with resource buffers.

If we've used estimates that assume everything goes well, what is the probability the project will finish when this layout shows it finishing?

Should we promise the project for the duration indicated here?

Step 2: Exploit the Constraint



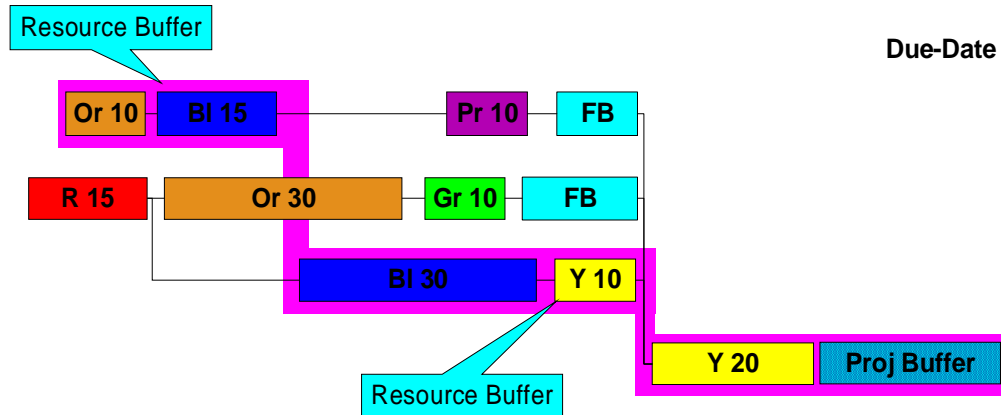
- Protect the entire project from variability in the duration of the Critical Chain tasks, with a project buffer.

What about the non-critical chain tasks?

What happens to the project if Gr10 takes longer than planned?

How can we protect the start-dates of the Critical Chain tasks from variability in the non-Critical Chain tasks?

Step 3: Subordinate



Subordinate everything else to your decision to exploit the Constraint

- Protect the start-dates of the Critical Chain tasks, from variability in the duration of the non-Critical Chain tasks, with feeding buffers.

No more of this!

Programs

Resources



Ogden overview

- C-130 MRO
- 6 models, 12 docks and 6 soft docks
- Throughput 48 per year not including unscheduled maintenance
- Highly unpredictable, impossible to know what will be required
- Workload increasing
- Demand for six more aircraft by reducing cycle time by 30%

Ogden ctd

- Results to date have shown:
 - 21 – 24 aircraft on station
 - Cycle time down from 160 days to 110 days
 - Disciplined procedures for the release of new projects (an aircraft is a project)
 - Buffer management to maintain focus throughout the process
 - Parts mgt has stopped delays in waiting for parts to arrive: no parts = no release

Ogden ctd

- They have flushed a large percentage of WIP out of the system
- Stopped all multitasking
- Now complete ten additional aircraft
- WIP today is 18, was 23 – 25
- OTIF = 25 out of 26
- # early = 191 (cumulative)
- Parts shortages are down from 40 – 45 to 5 or less
- Task completions 45 tasks/day target focus on task completion against schedule

Delta Airlines

- Create the plan with buffers as the starting point
- Control WIP
 - Staggered release
- Manage using buffers
- Exception management

Delta ctd

- You must have a centrally located release area
- Must have a robust process for exception list management
- Get CCPM in early (they had done lean and six sigma first)
- Get the right metrics in place
- Target investment capital
- Management involvement critical for full management, from the top

Delta results

- 25% increase in engine capacity (60 – 75)
- 23% increase in engine production (476 – 586)
- 50+ engines per month (63 in June 07)
- Engine TAT reduction (10 – 26% reduction)
- Disassembly and assembly areas 18 – 38% reduction
- Revenue increased

Delta ctd

- “TOC concepts has given us a clear understanding of where to apply six sigma and lean methods to achieve bottom-line results”

Gary Adams Delta Engineering Maintenance manager

If you want to know more

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