REALIZATION
Execution Intelligence for Complex Projects™

IMPROVING PROJECT DELIVERY:
Requires Implementing both a Planning and Execution Logic

The industry belief is that projects cannot be done faster. They believe the delivery of projects cannot be shortened because of uncertainties and the fact organizations have limited shared resources.

We appreciate that reducing cycle times in large complex projects is not easy. Even if all the work scope were certain and time and resources required to perform tasks were deterministic, scheduling of daily tasks across projects and resource groups would still be very difficult. Once you inject delays, technical uncertainties, changes of work scope and uncertainties related to resources, the scheduling problem becomes difficult.

At the same time, there is now sufficient evidence from other organizations that the problem can be solved, and performance can be substantially improved. Sample customer results:

CASE 1: US NAVY F-18 DEPOT MAINTENANCE

PERFORMANCE METRIC	BEFORE	AFTER
Project Completions	6 per year	11 per year
Group Readiness or Availability	36 aircraft on station	17 aircraft on station

CASE 2: DELTA ENGINE MAINTENANCE

PERFORMANCE METRIC	BEFORE	AFTER
Project Completions	476 engines per year	586 engines per year
Project Cycle Time or Duration	30 to 90 days, mean 46 days	15 to 65 days, mean 32 days

CASE 3: US AIR FORCE OPERATIONAL TEST & EVALUATION CENTER

PERFORMANCE METRIC	BEFORE	AFTER
Reduce Cycle Times	Long cycle times	30% reduction in cycle times
Increase Utilization	High costs and low throughput	30% increase in resource utilization

CASE 4: BOEING SPACE AND INTELLIGENCE SYSTEMS

PERFORMANCE METRIC	BEFORE	AFTER
Project Cycle Time or Duration	All projects were late	Cycle times reduced 28%
Profit	Losing $200M per quarter	Turning a profit

CASE 5: AMDOCS

PERFORMANCE METRIC	BEFORE	AFTER
Pressure to Reduce Cycle Times		20% reduction in cycle times
Projects in Crisis	8 projects requiring CEO attention	0 projects in crisis

Without improved execution, a project portfolio will constantly be changing. Our solution provides a project portfolio management solution that enables Execution Intelligence that makes for a stable project portfolio (few changes and re-planning required) and enables more projects to be completed faster.

Differentiating Planning Logic from Execution Logic

Getting all the execution details right at the time of planning is not only impossible but also unnecessary. Schedules created in planning serve a different purpose than schedules required during execution, and we don't need detailed execution schedules to fulfill planning objectives. This **simple insight** is the key to solving the scheduling problem in projects.

For example:

- Whereas the purpose of planning is to establish due-dates for key milestones, the primary concern in execution is that resources work on the right tasks at the right time. Exact start and end dates for every step in the repair process are neither practical nor required at the time of planning: approximate task durations are good enough for calculating reliable milestone due-dates.
- At the time of planning, resource managers need an aggregate forecast of resource requirements, but during execution, they need to know exactly how many resources to allocate to which projects. Exact resource requirements with precise timing for every step in the project are neither possible to provide nor required; approximate resource requirements for major steps or phases are good enough.
- It's not sufficient to provision enough management reserves (time, resources, and money) for unplanned work; during execution, managers need to know where and when to spend those reserves.
- Only the synchronization at major integration points can be assured at the time of planning; day-to-day synchronization is the domain of execution schedules.

Current scheduling practices and tools require planners to try and get all the details of daily execution precisely right at the time of planning — from the breakdown of work into hourly activities and specifying technical dependencies between those activities, to the exact schedules for tasks and resources. As a result:

- Plans are overly complex, with thousands of tasks and dependencies. Not only is such planning error-prone (especially the technical dependencies), but resulting plans are impossible to keep up-to-date as changes happen in execution.
- Plans are too rigid to follow in execution anyway, and managers simply ignore them. They make execution decisions based on limited information ("I really don't know if this is the right thing to work."); local optimization ("let me just keep my people busy," or "let me just maximize my Earned Value.") and even irrational considerations ("who is screaming the loudest?").
- When plans are not followed, all synchronization is lost, and managers rely more on subjective judgment rather than objective measures to determine which problems are most critical to solve with their limited bandwidth.
- Significant Management time is spent reactively firefighting and reallocating resources in a reactive manner.

Good project management systems can no longer be built just with planning logic. Execution logic is also a must; without it you end up with **unusable plans** and **unsynchronized execution**.

Details of the Solution

Untangling execution logic from planning raises an obvious question, "What data and algorithms should be used in planning versus execution?" Categorizing the uncertainties involved can help answer this question (if there were no uncertainties, we could have all the details at the time of planning and use the same logic for planning as for execution).

In general, there are two categories of uncertainties that afflict projects for which a three-part solution is required:

(1) Uncertainty of Work and Flow, Solved by Organizing Projects as 2-Tiered Workflows.

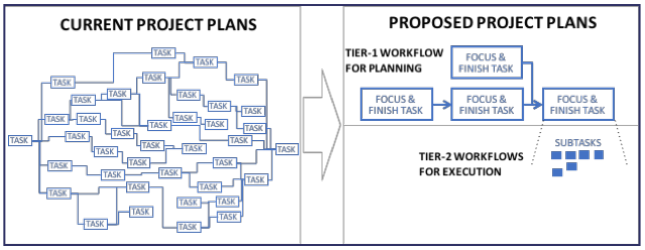
Project networks, which capture the tasks to be done and the sequence in which to do them, are constantly changing. Tasks themselves change as requirements change, additional scope is discovered during testing and as technical issues are encountered. The sequence in which tasks are done also changes based on urgency, resource availability and individual preferences.

At the same time, there is always a certain level of granularity at which the workflow is stable. Consider a complex R&D project for example. While the end goal is known, the exact steps to get there and the timing of meetings to review ideas cannot be precisely scheduled. However, the general flow of the project can be mapped. First, there will be a concept design that will establish space requirements, heat dissipation requirements, etc. This may be followed by an analysis phase or even a prototype/proof of concept build. Next, there will be a final design and procurement. If the final product will be made in house, there the project will end with fab, assembly, and test. At the time of planning, project managers need not concern themselves with the nitty gritty details of the work, only with how long it will take to get each major step done and the resources needed.

This approach can be formalized by organizing project plans into 2-Tiered workflows:

a. Tier-1 Workflow: the end-to-end flow of work that can be established at the time of planning and remains stable in execution. This workflow should be granular enough to establish a project's critical path and resource requirements. Additionally, tasks in this workflow should be defined to minimize waiting time and switching costs: it will be faster and more efficient for resources to "focus and finish" a given Tier-1 task before starting the next rather than getting spread thin among many Tier-1 tasks.

b. Tier-2 Workflow: the detailed flow of work within a Tier-1 task that is required for execution. Managers and leads should have flexibility to define and modify this workflow based on day-to-day realities. Moreover, it's okay if only partial or even none of the data about Tier-2 tasks is available in planning; whatever is available is good enough.



The ratio of tasks in the Tier-1 workflow to the number of subtasks in Tier-2 workflows ranges between 1:20 and 1:75. For example, we have successfully modeled actual projects that traditionally have about 1,000 tasks as ~40 Tier-1 tasks and ~1,000 Tier-2 tasks. Such simplification of project plans is significant by itself; not only does it reduces data entry errors but also makes visualization, navigation, and maintenance of a project plan easy.

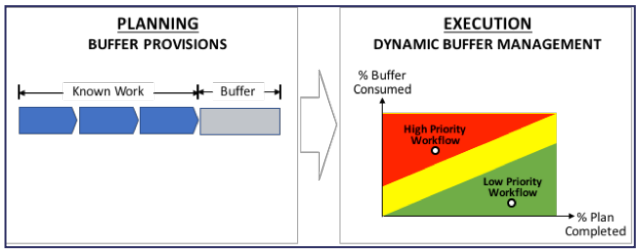
(2) Uncertainty of Timing and Resources, Handled with Dynamic Buffer Management

Even though Tier-1workflows are predictable, it is impossible to predict exactly when any Tier-1 task will be done due to uncertainty about how much time and effort it takes to complete it, when resources will be available, when information and approvals will be received, etc. Therefore:

a. Only key milestones that are important for the organization and customers should be precisely scheduled at planning time, not the individual tasks.

b. In addition to management reserves in the budget, we should also provision time and resource buffers that can be used by workflows that need them the most.

c. Monitoring time buffers is a quick and easy way of dynamically identifying the criticality of workflows. Workflows that are consuming their time buffers at the fastest rate get the highest priority when allocating and assigning resources; and budgetary reserves and resource buffers need to be spent only on those workflows that have consumed their time buffers to the extent that they are beginning to create risk for external commitments.

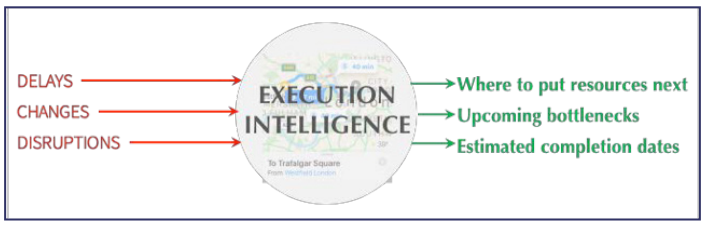


In summary, a combination of 2-Tiered Workflows and Dynamic Buffer Management solves longstanding scheduling problems:

- Tier-1 workflows, due-dates for key milestones and overall resource requirements, along with budget reserves and resource and time buffers, are established at the time of planning. Tier-2 workflows, task schedules and resource assignments are left flexible for execution.
- Monitoring time buffers in execution provides dynamic priorities for resources as well as forward-looking alerts for management intervention.
- Faster speed and higher efficiencies are achieved by adopting a "focus and finish" approach for Tier-1 tasks, and by working according to dynamic priorities and solving problems based on forward-looking alerts.

Project durations and labor costs in the industry have been reduced by at least 20% with the solution outlined above. There's a caveat though: scheduling is not a mathematical exercise that takes place on the planners' desks; the resulting schedules must be actualized in execution to impact time and cost performance.

Adding execution logic to a project management system is akin to moving from static maps to GPS systems for driving. As delays, changes and disruptions happen, the system can automatically direct resources to the most optimal tasks, and provides reliable estimates of completion dates and forward-looking alerts to management. It gets project teams to their "destination" faster and more efficiently.



(3) Organizational Implications of Change in Scheduling

Schedules cannot be actualized without **organizational processes and measurements** to support them. For example, processes and measurements related to daily task management, project resource assignment, weekly resource management, and problem identification and resolution, all need to be aligned with the planning and execution logic, and the resulting speed that comes with it.

Another important aspect is sustainment. Complex projects are unique in that managers need to have a certain amount of flexibility; at the same time, that flexibility should not be misused. Therefore, an operating motto is required that provides a practical approach for making good choices. Experience from our customers, "**Focus & Finish**" (focus on what you are working on, and finish it before starting the next block of work) is a suitable operating motto for projects.

Additionally, managers at all levels — from executives to leads need to be trained in both the value and principles of scheduling non-deterministic operations. (While they are generally great at soft aspects of management, the value and principles of scheduling are not well appreciated or understood by them.)

While organizational inertia is always a factor, the good news is that the change itself is **quite straightforward** and execution rates improve as soon as the schedules are put into practice.

Summary

In a world of complex projects with ever shortening deadlines, today's planning systems cannot give organizations the answers needed to be successful. Without a proven planning and execution scheduling logic working together, companies will continue to ask, "We had the perfect plan, what happened?" and struggle to deliver projects on-time. After 20 years of successfully delivering more projects faster, Focus & Finish along with 2-Tiered workflows has proven to be the breakthrough for complex, multi-project environments.