Unified Process:

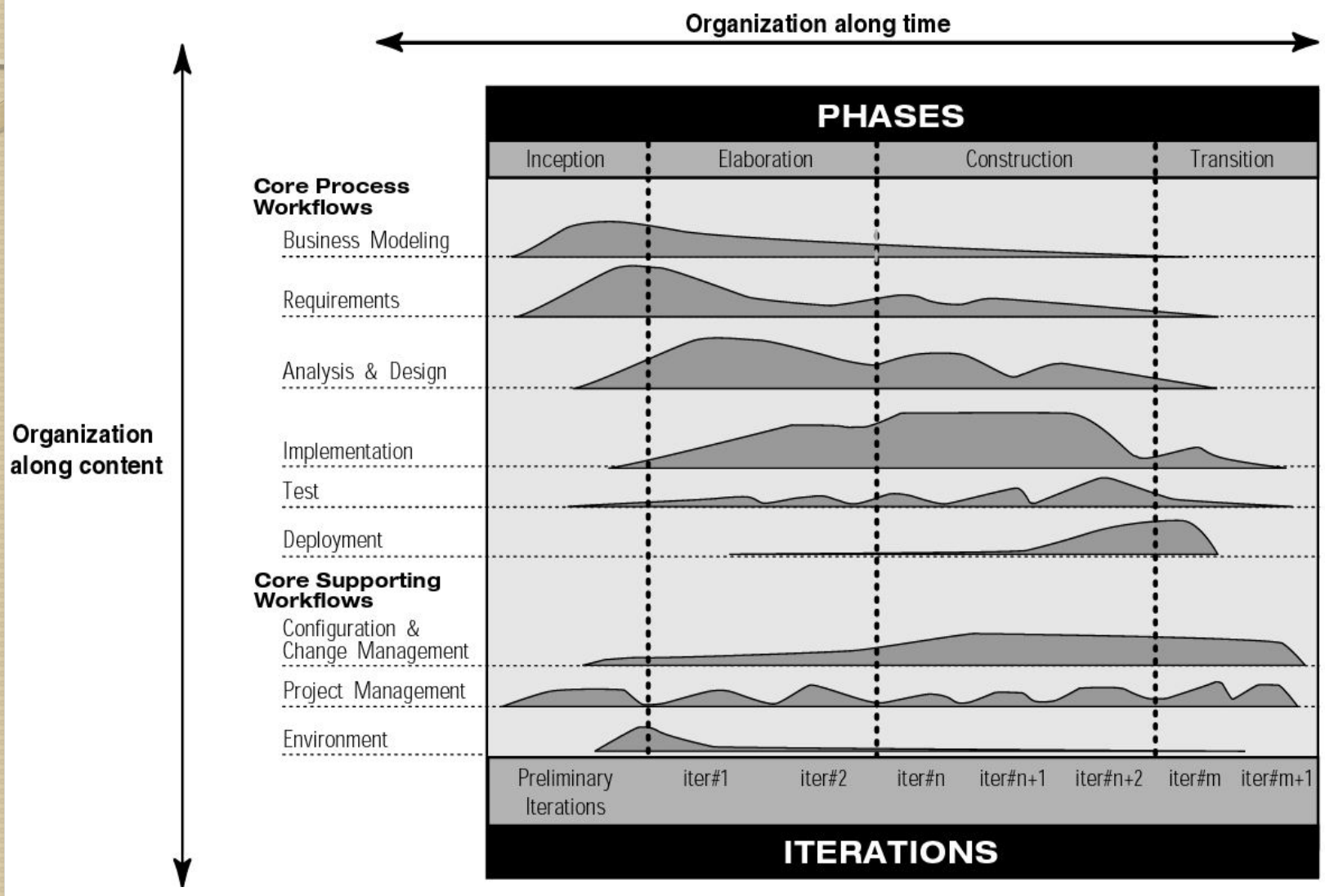
- **Best Practices for Software development Teams**
- ***Rational Software White Paper TP026B, Rev 11/01 1998.***

Unified Process:

- **Two Dimensions**
- The process can be described in two dimensions, or along two axis:
  - the horizontal axis represents time and shows the dynamic aspect of the process as it is enacted, and it is expressed in terms of cycles, phases, iterations, and milestones.
  - the vertical axis represents the static aspect of the process: how it is described in terms of activities, artifacts, workers and workflows.

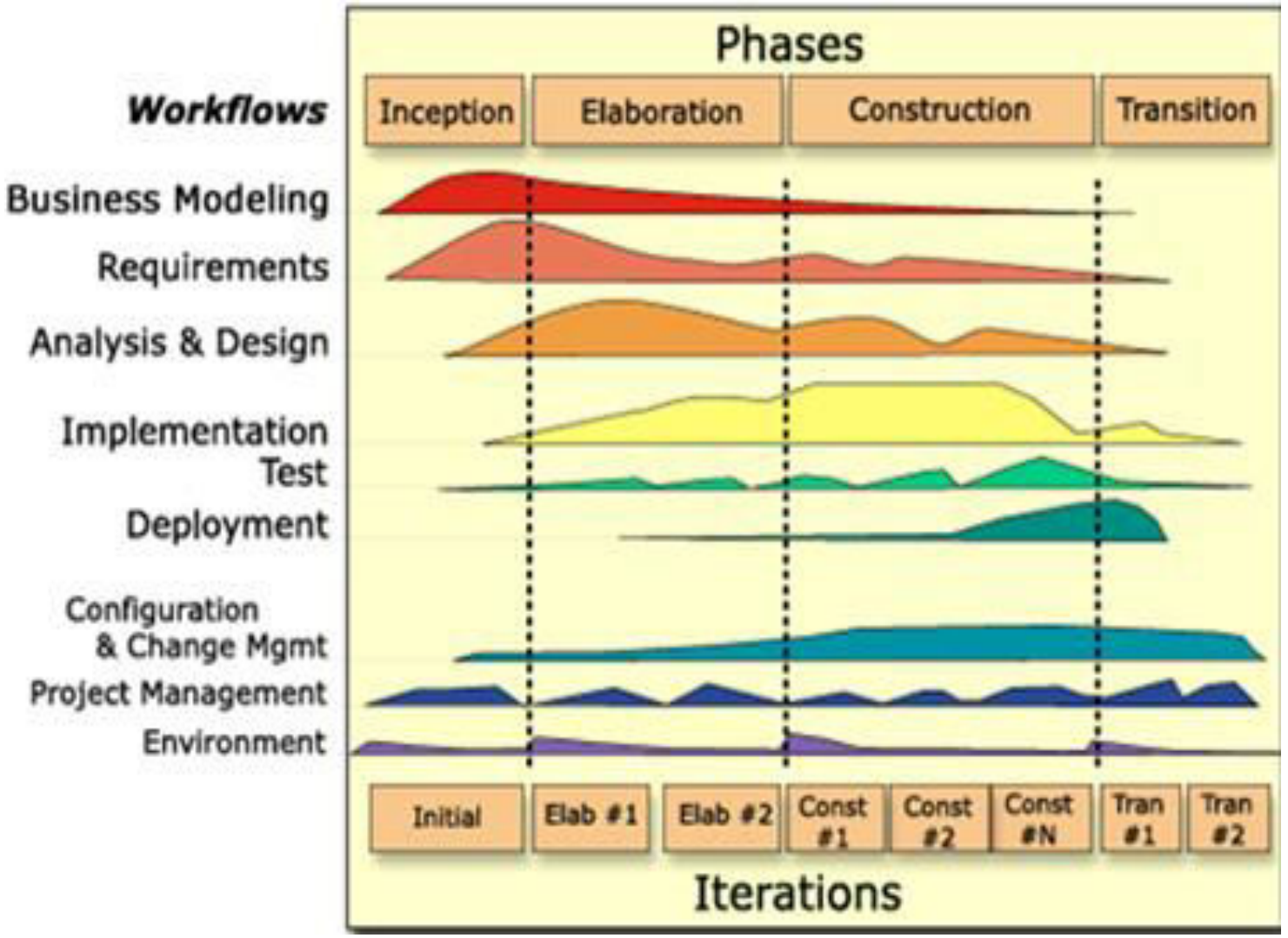
Unified Process:

The Iterative Model graph shows how the process is structured along two dimensions



Unified Process:

Phases and Iterations - The Time Dimension

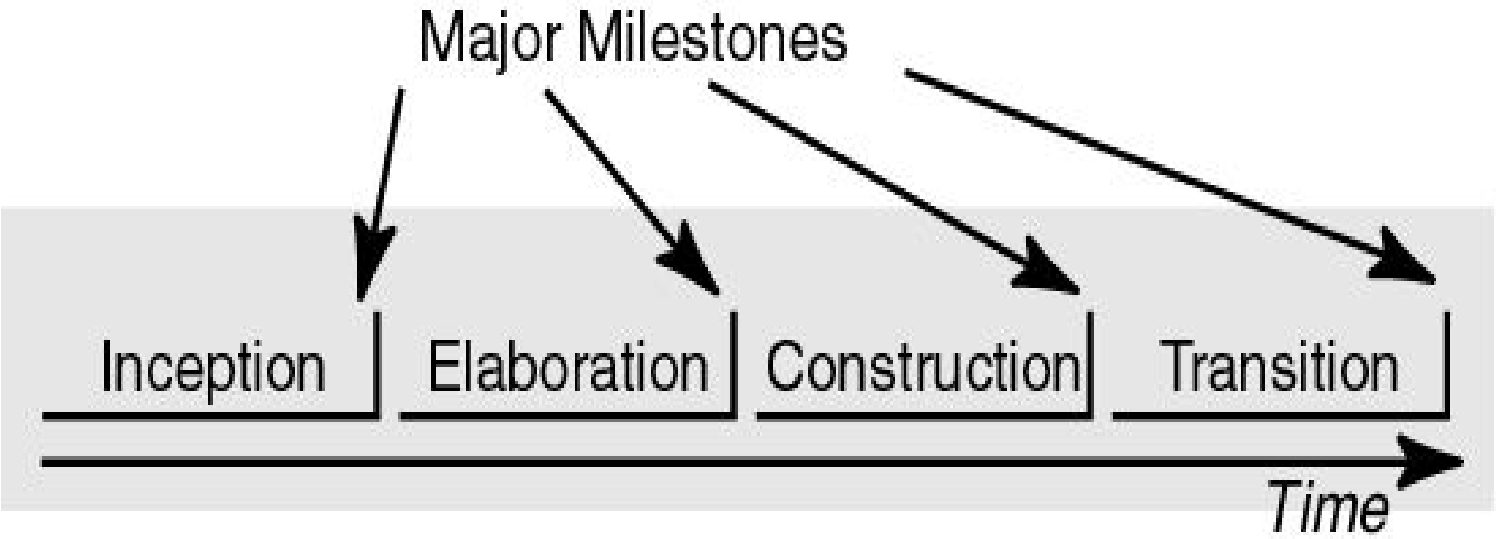


Unified Process:

- This is the dynamic organization of the process along time.
- The software lifecycle is broken into *cycles*, each cycle working on a new generation of the product.
- The Rational Unified Process divides one development cycle in four consecutive *phases* [10]
  - Inception phase
  - Elaboration phase
  - Construction phase
  - Transition phase

Unified Process:

- Each phase is concluded with a well-defined *milestone*—a point in time at which certain critical decisions must be made, and therefore key goals must have been achieved [2].



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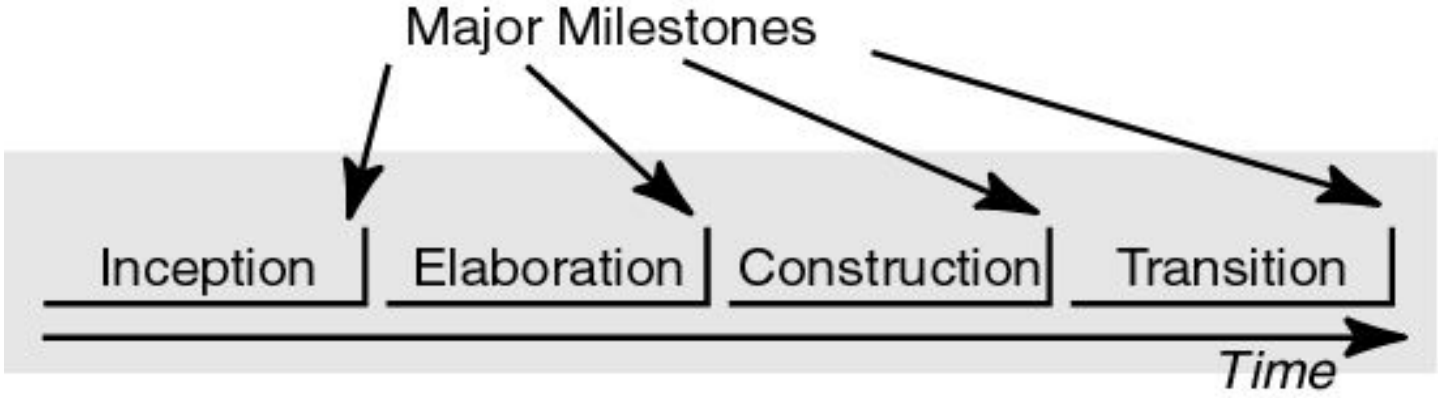


•The phases and major milestones in the process.
•Each phase has a specific purpose.

Unified Process: Inception Phase

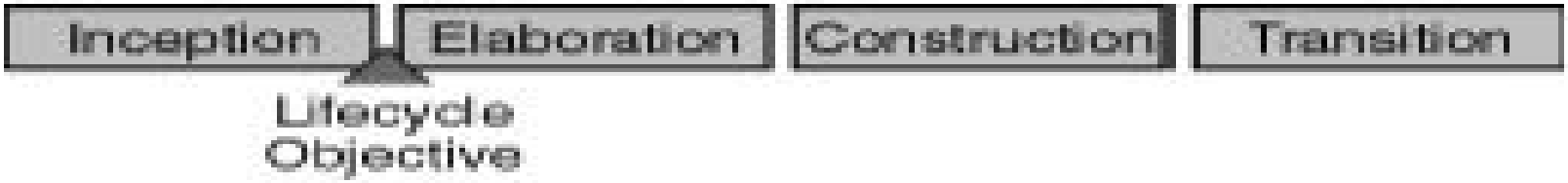
- During the inception phase,
- you establish the business case for the system and delimit the project scope.
- To accomplish this you must identify all external entities with which the system will interact (actors) and
- define the nature of this interaction at a high-level.
- This involves
  - identifying all use cases and
  - describing a few significant ones.
- The business case includes
  - success criteria,
  - risk assessment, and
  - estimate of the resources needed, and
  - a phase plan showing dates of major milestones.
- [10, 14]

Unified Process: Inception Phase

- The outcome of the inception phase is:
- A vision document: a general vision of the core project's requirements, key features, and main constraints.
- A initial use-case model (10% -20%) complete).
- An initial project glossary (may optionally be partially expressed as a domain model).
- An initial business case, which includes
  - business context,
  - success criteria (revenue projection,
  - market recognition, and so on), and
  - financial forecast.
- An initial risk assessment.
- A project plan, showing phases and iterations.
- A business model, if necessary.
- One or several prototypes.

Unified Process: Inception Phase

- *Milestone : Lifecycle Objectives*



Unified Process: Inception Phase

- At the end of the inception phase is the first major project milestone: the Lifecycle Objectives Milestone.
- The evaluation criteria for the inception phase are:
  - Stakeholder concurrence on scope definition and cost/schedule estimates.
  - Requirements understanding as evidenced by the fidelity of the primary use cases.
  - Credibility of the cost/schedule estimates, priorities, risks, and development process.
  - Depth and breadth of any architectural prototype that was developed.
  - Actual expenditures versus planned expenditures.

The project may be cancelled or considerably re-thought
if it fails to pass this milestone.

Unified Process: Elaboration Phase

- The purpose of the elaboration phase is
  - to analyze the problem domain,
  - establish a sound architectural foundation,
  - develop the project plan, and
  - eliminate the highest risk elements of the project.
- To accomplish these objectives, you must have the "mile wide and inch deep" view of the system.
- Architectural decisions have to be made with an understanding of the whole system:
  - its scope,
  - major functionality
  - and nonfunctional requirements such as
    - performance requirements.

Unified Process: Elaboration Phase

- It is easy to argue that the elaboration phase is the most critical of the four phases.
- At the end of this phase, the hard "engineering" is considered complete and the project undergoes its most important day of reckoning: the decision on whether or not to commit to the construction and transition phases.
- For most projects, this also corresponds to the transition from a mobile, light and nimble, low-risk operation to a high-cost, high-risk operation with substantial inertia.

Unified Process: Elaboration Phase

- While the process must always accommodate changes, the elaboration phase activities ensure that
  - the architecture, requirements and plans are stable enough, and
  - the risks are sufficiently mitigated, so
    - you can predictably determine the cost and schedule for the completion of the development.

Unified Process: Elaboration Phase

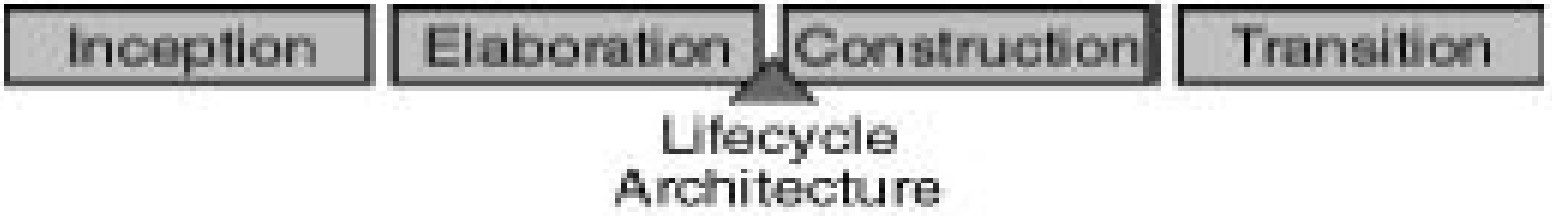
- Conceptually, this level of fidelity would correspond to the level necessary for an organization to commit to a fixed-price construction phase.
- In the elaboration phase, an executable architecture prototype is built in one or more iterations, depending on the scope, size, risk, and novelty of the project.
- This effort should at least address the critical use cases identified in the inception phase, which typically expose the major technical risks of the project.
- While an evolutionary prototype of a production-quality component is always the goal, this does not exclude the development of one or more exploratory, throwaway prototypes to mitigate specific risks such as
  - design/requirements trade-offs,
  - component feasibility study, or
  - demonstrations to investors, customers, and end-users.

Unified Process: Elaboration Phase

- The outcome of the elaboration phase is:
- A use-case model (at least 80% complete) — all use cases and actors have been identified, and most usecase descriptions have been developed.
- Supplementary requirements capturing the non functional requirements and any requirements that are not associated with a specific use case.
- A Software Architecture Description.
- An executable architectural prototype.
- A revised risk list and a revised business case.
- A development plan for the overall project, including the coarse-grained project plan, showing iterations" and evaluation criteria for each iteration.
- An updated development case specifying the process to be used.
- A preliminary user manual (optional).

Unified Process: Elaboration Phase

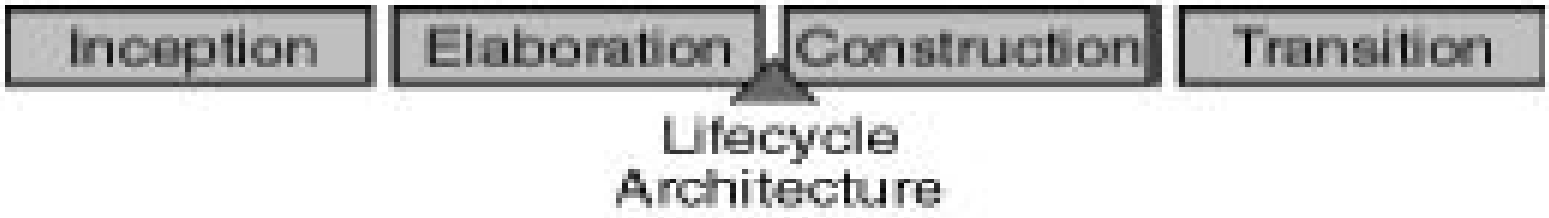
Milestone : Lifecycle Architecture



Unified Process: Elaboration Phase

Milestone : Lifecycle Architecture

- At the end of the elaboration phase is the second important project milestone, the Lifecycle Architecture Milestone.
- At this point, you examine the detailed system objectives and scope, the choice of architecture, and the resolution of the major risks.



Unified Process: Elaboration Phase

- The main evaluation criteria for the elaboration phase involves the answers to these questions:
- Is the vision of the product stable?
- Is the architecture stable?
- Does the executable demonstration show that the major risk elements have been addressed and credibly resolved?
- Is the plan for the construction phase sufficiently detailed and accurate? Is it backed up with a credible basis of estimates?
- Do all stakeholders agree that the current vision can be achieved if the current plan is executed to develop the complete system, in the context of the current architecture?
- Is the actual resource expenditure versus planned expenditure acceptable?
-
- The project may be aborted or considerably re-thought if it fails to pass this milestone.

Unified Process: Construction Phase

- During the construction phase, all remaining components and application features are developed and integrated into the product, and all features are thoroughly tested.
- The construction phase is, in one sense, a manufacturing process where emphasis is placed on managing resources and controlling operations to optimize costs, schedules, and quality.
- In this sense, the management mindset undergoes a transition from the development of intellectual property during inception and elaboration, to the development of deployable products during construction and transition.

Unified Process: Construction Phase

Many projects are large enough that parallel construction increments can be spawned. These parallel activities can significantly accelerate the availability of deployable releases; they can also increase the complexity of resource management and workflow synchronization.

A robust architecture and an understandable plan are highly correlated.

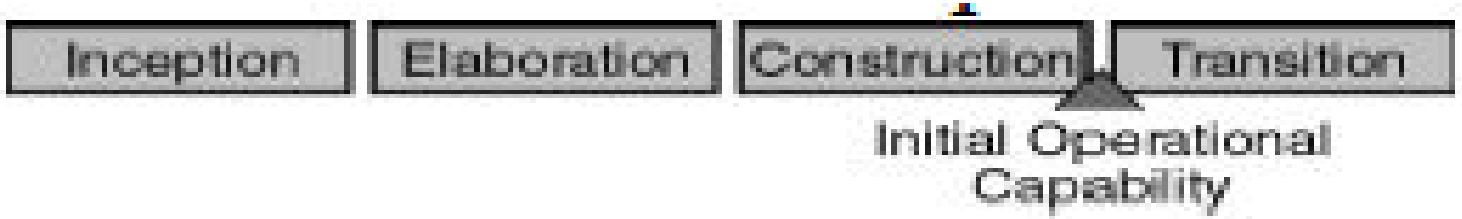
- In other words, one of the critical qualities of the architecture is its ease of construction.
- This is one reason why the balanced development of the architecture and the plan is stressed during the elaboration phase.

Unified Process: Construction Phase

- The outcome of the construction phase is
  - a product ready to put in hands of its end-users. At minimum, it consists of:
    - The software product integrated on the adequate platforms.
    - The user manuals.
    - A description of the current release.

Unified Process: Construction Phase

- *Milestone : Initial Operational Capability*
- At the end of the construction phase is the third major project milestone (Initial Operational Capability Milestone).
- At this point, you decide if the software, the sites, and the users are ready to go operational, without exposing the project to high risks. This release is often called a "beta" release.



Unified Process: Construction Phase

- The evaluation criteria for the construction phase involve answering these questions:
- Is this product release stable and mature enough to be deployed in the user community?
- Are all stakeholders ready for the transition into the user community?
- Are the actual resource expenditures versus planned expenditures still acceptable?
-
- Transition may have to be postponed by one release if the project fails to reach this milestone.

Unified Process:
Transition Phase

- The purpose of the transition phase is to transition the software product to the user community.
- Once the product has been given to the end user, issues usually arise that require you to develop new releases, correct some problems, or finish the features that were postponed.
- The transition phase is entered when a baseline is mature enough to be deployed in the end-user domain.

Unified Process: Transition Phase

- This typically requires that some usable subset of the system has been completed to an acceptable level of quality and that user documentation is available so that the transition to the user will provide positive results for all parties.
- This includes:
  - "beta testing" to validate the new system against user expectations
  - parallel operation with a legacy system that it is replacing
  - conversion of operational databases
  - training of users and maintainers
  - roll-out the product to the marketing, distribution, and sales teams

Unified Process:
Transition Phase

- The transition phase focuses on the activities required to place the software into the hands of the users.
- Typically, this phase includes several iterations, including beta releases, general availability releases, as well as bug-fix and enhancement releases.
- Considerable effort is expended in developing user-oriented documentation, training users, supporting users in their initial product use, and reacting to user feedback.
- At this point in the lifecycle, however, user feedback should be confined primarily to product tuning, configuring, installation, and usability issues.

Unified Process:
Transition Phase

- The primary objectives of the transition phase include:
- Achieving user self-supportability
- Achieving stakeholder concurrence that deployment baselines are complete and consistent with the evaluation criteria of the vision
- Achieving final product baseline as rapidly and cost effectively as practical
- This phase can range from being very simple to extremely complex, depending on the type of product. For example, a new release of an existing desktop product may be very simple, whereas replacing a nation's air-traffic control system would be very complex.

Unified Process: Transition Phase

Milestone: Product Release

- At the end of the transition phase is the fourth important project milestone, the Product Release Milestone.
- At this point, you decide if the objectives were met, and if you should start another development cycle.
- In some cases, this milestone may coincide with the end of the inception phase for the next cycle.
- The primary evaluation criteria for the transition phase involve the answers to these questions:
  - Is the user satisfied?
  - Are the actual resources expenditures versus planned expenditures still acceptable?

Unified Process: Iterations

- Each phase in the Unified Process can be further broken down into iterations.
- An *iteration* is a complete development loop resulting in a release (internal or external) of an executable product, a subset of the final product under development, which grows incrementally from iteration to iteration to become the final system [10].
- Iteration (baştanalma, tekrarlama, yineleme) nihai sistem halini almak üzere tekrardan tekrara adım adım büyüyen ve geliştirilmekte olan nihai ürünün bir alt kümesi olan çalıştırılabilir bir ürünün bir sürümünü (dahili veya harici) sonuçlandıran eksiksiz bir geliştirme döngüsüdür.

Unified Process: Iterations

- *Benefits of an iterative approach*
- Compared to the traditional waterfall process, the iterative process has the following advantages:
  - Risks are mitigated earlier
  - Change is more manageable
  - Higher level of reuse
  - The project team can learn along the way
  - Better overall quality

Unified Process:
Static Structure of the Process

- A process describes *who* is doing *what*, *how*, and *when*.
- The Unified Process is represented using four primary modeling elements:
  - Workers, the 'who'
  - Activities, the 'how'
  - Artifacts, the 'what'
  - Workflows, the 'when'