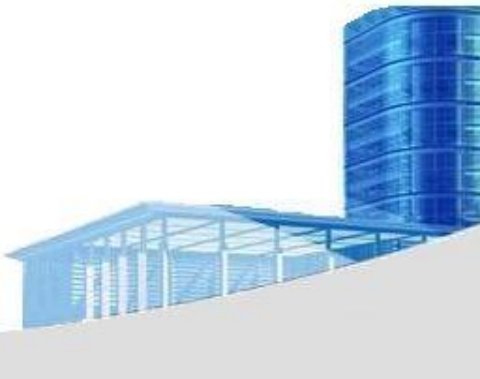
Ch.4 Process Models



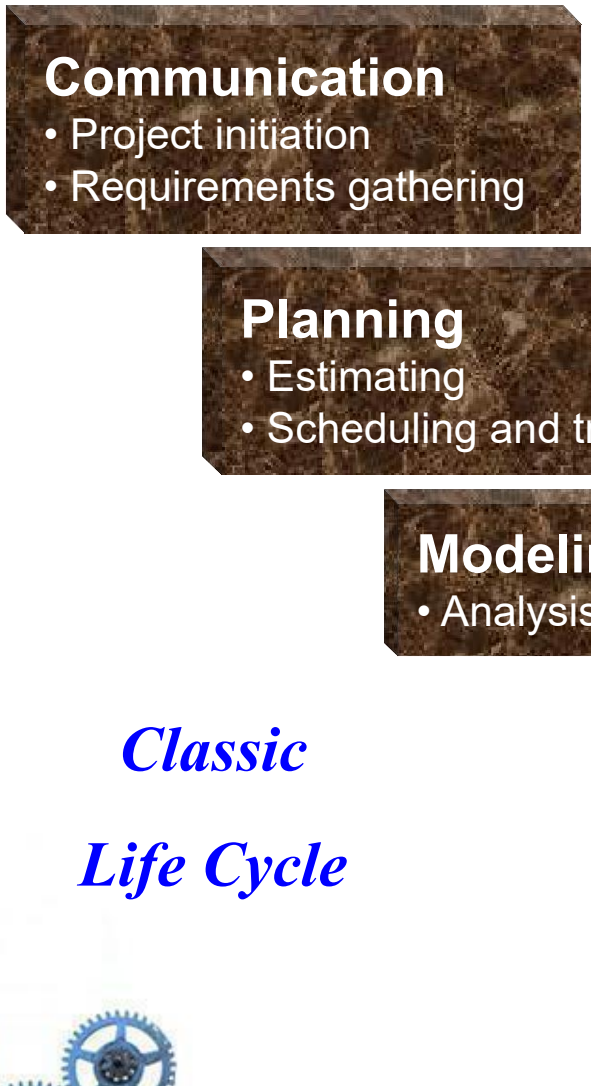
4.1 Prescriptive Models

- **Prescriptive process models advocate an orderly approach to software engineering**

- **Questions:**

1. If prescriptive process models strive for structure and order, are they inappropriate for a software world that thrives on change?
2. Yet, if we reject traditional process models (and the order they imply) and replace them with something less structured, do we make it impossible to achieve coordination and coherence in software work?

4.1.1 The Waterfall Model

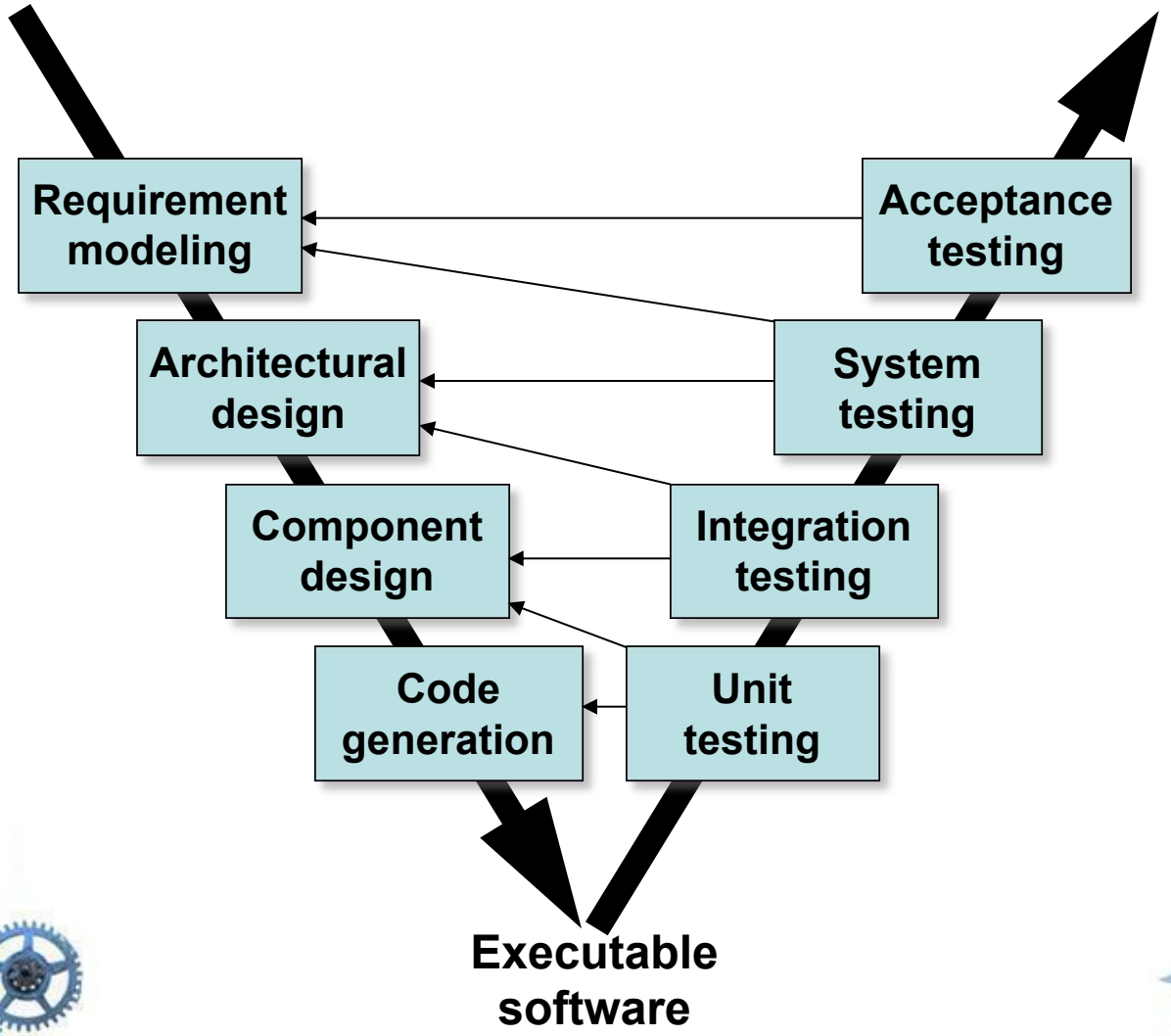


- Real projects rarely follow the sequential flow.
- Customers usually can't state all requirements explicitly.
- A working version will not be available until late in the project time-span.

Classic Life Cycle

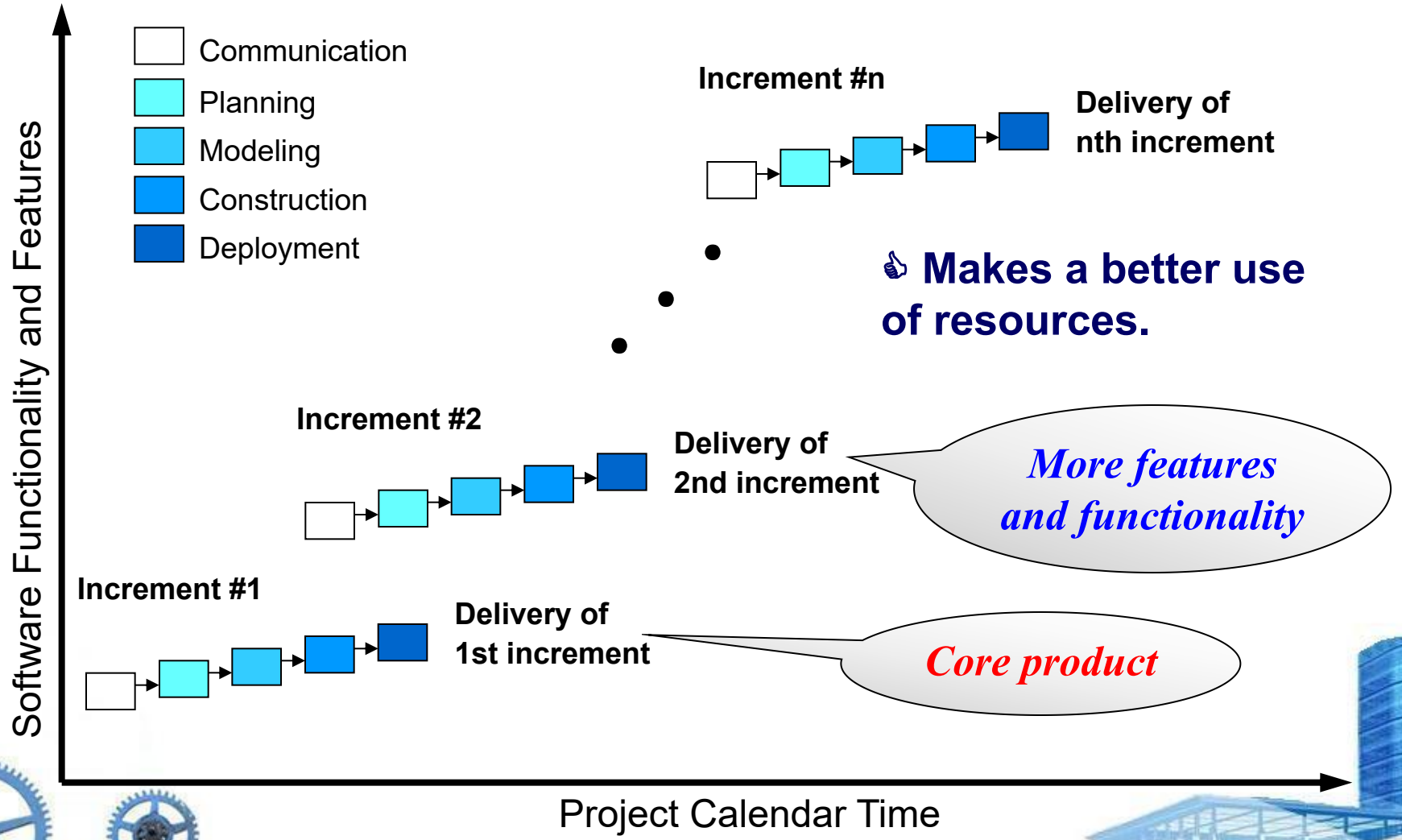
4.1.1 The Waterfall Model

- The V-model



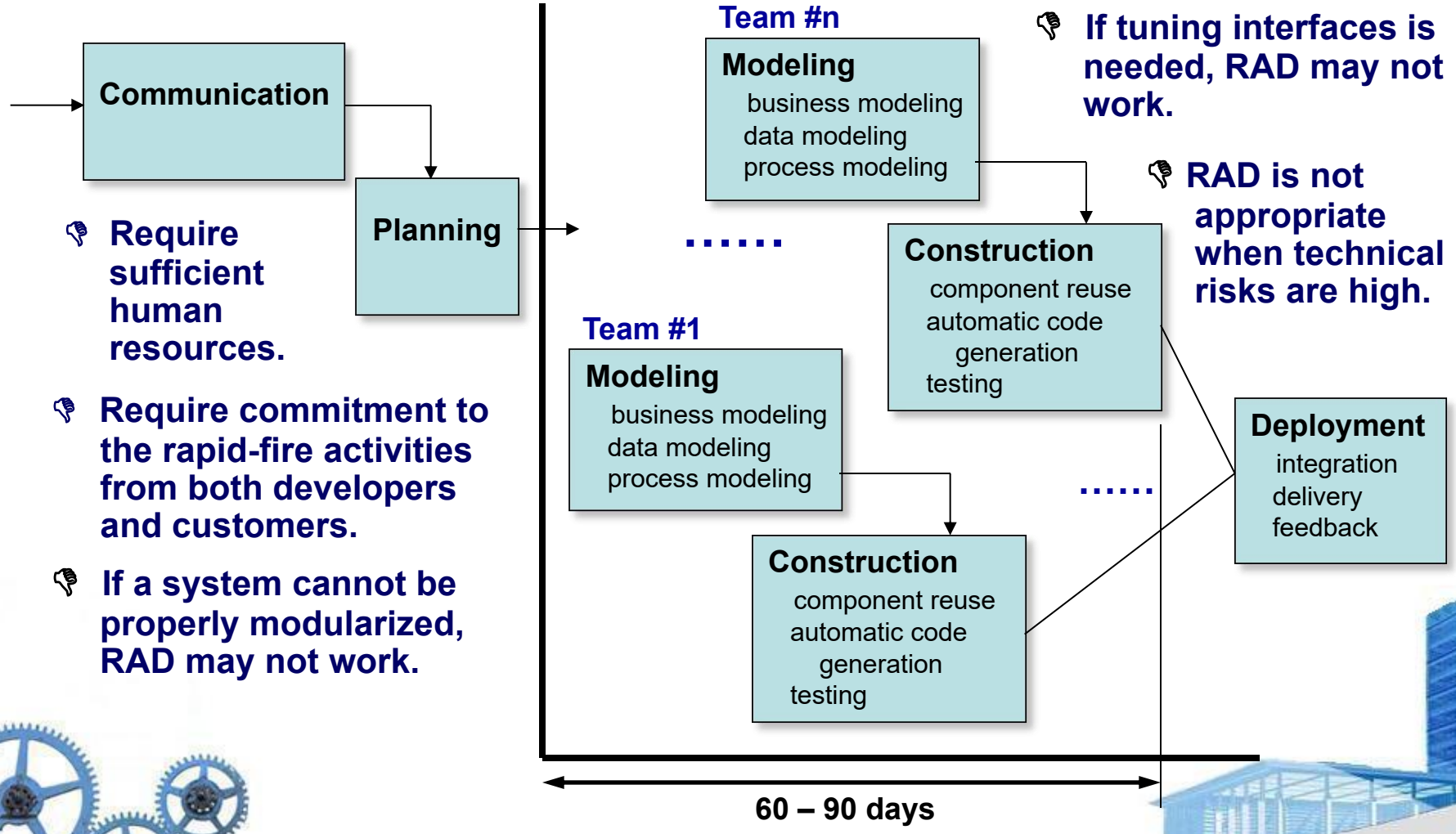
4.1.2 Incremental Process Models

- **The Incremental Model**



4.1.2 Incremental Process Models

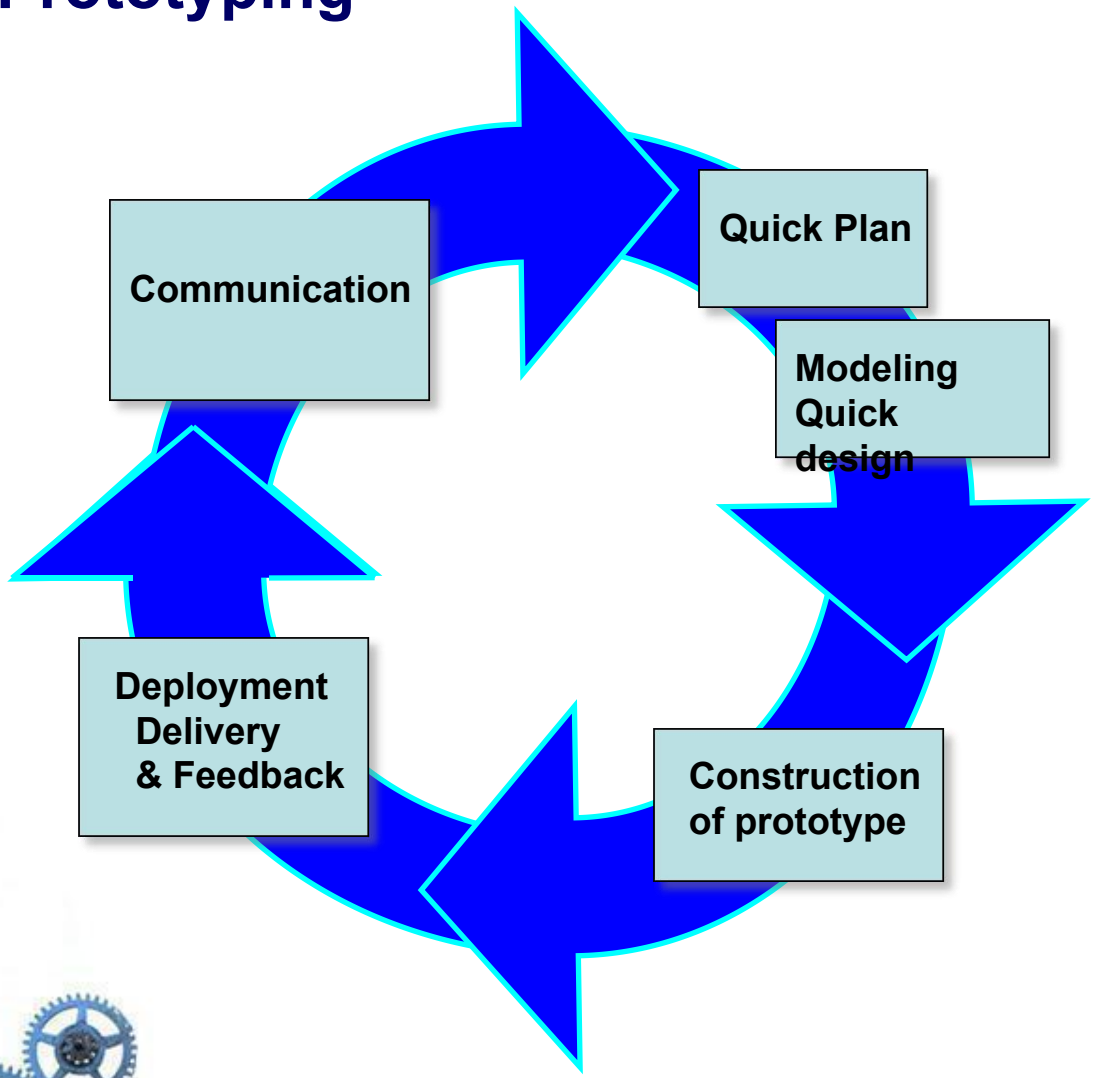
• The Rapid Application Development (RAD) Model



- Require sufficient human resources.
- Require commitment to the rapid-fire activities from both developers and customers.
- If a system cannot be properly modularized, RAD may not work.
- If tuning interfaces is needed, RAD may not work.
- RAD is not appropriate when technical risks are high.

4.1.3 Evolutionary Process Models

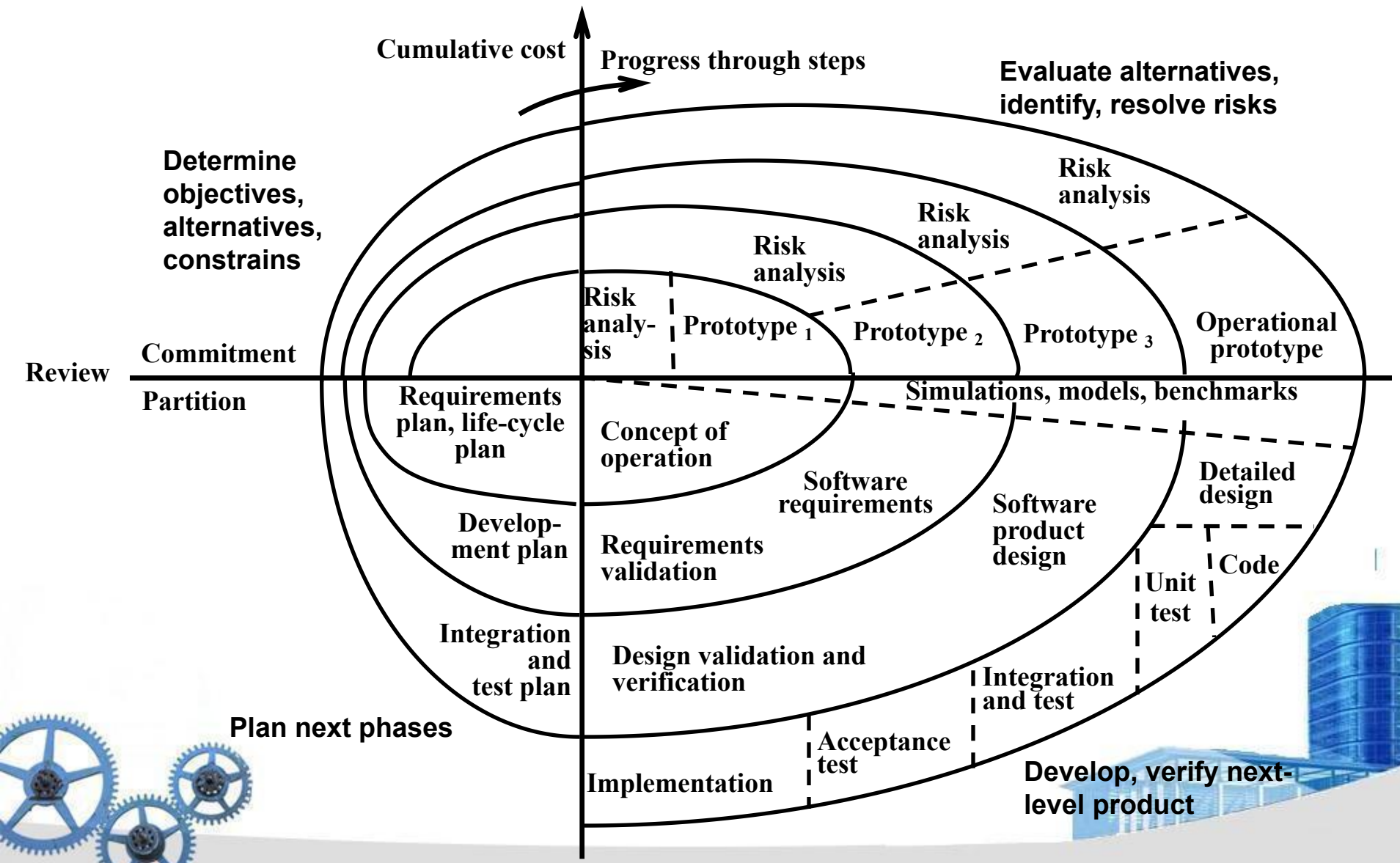
- **Prototyping**



- Good first step when customer has a legitimate need, but is clueless about the details
- The prototype must be thrown away

4.1.3 Evolutionary Process Models

- The Spiral Model



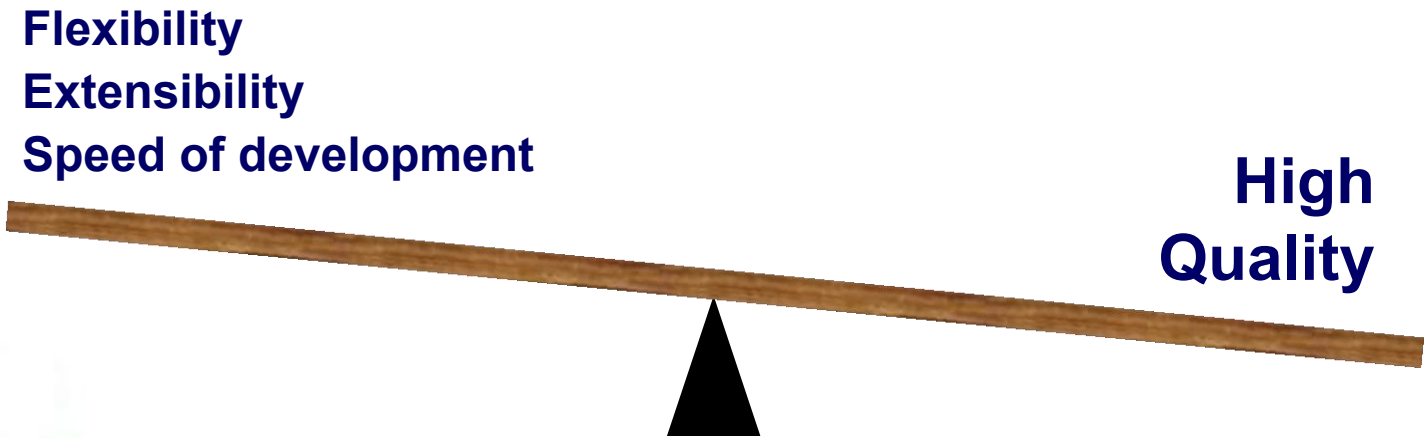
4.1.4 Evolutionary Process Models

- **The Concurrent Development Model**

➢ Defines a series of events that will trigger transitions from state to state for each of the activities, actions or tasks.

➢ Especially good for client/server applications.

➢ Defines a network of activities instead of linear sequence of events.



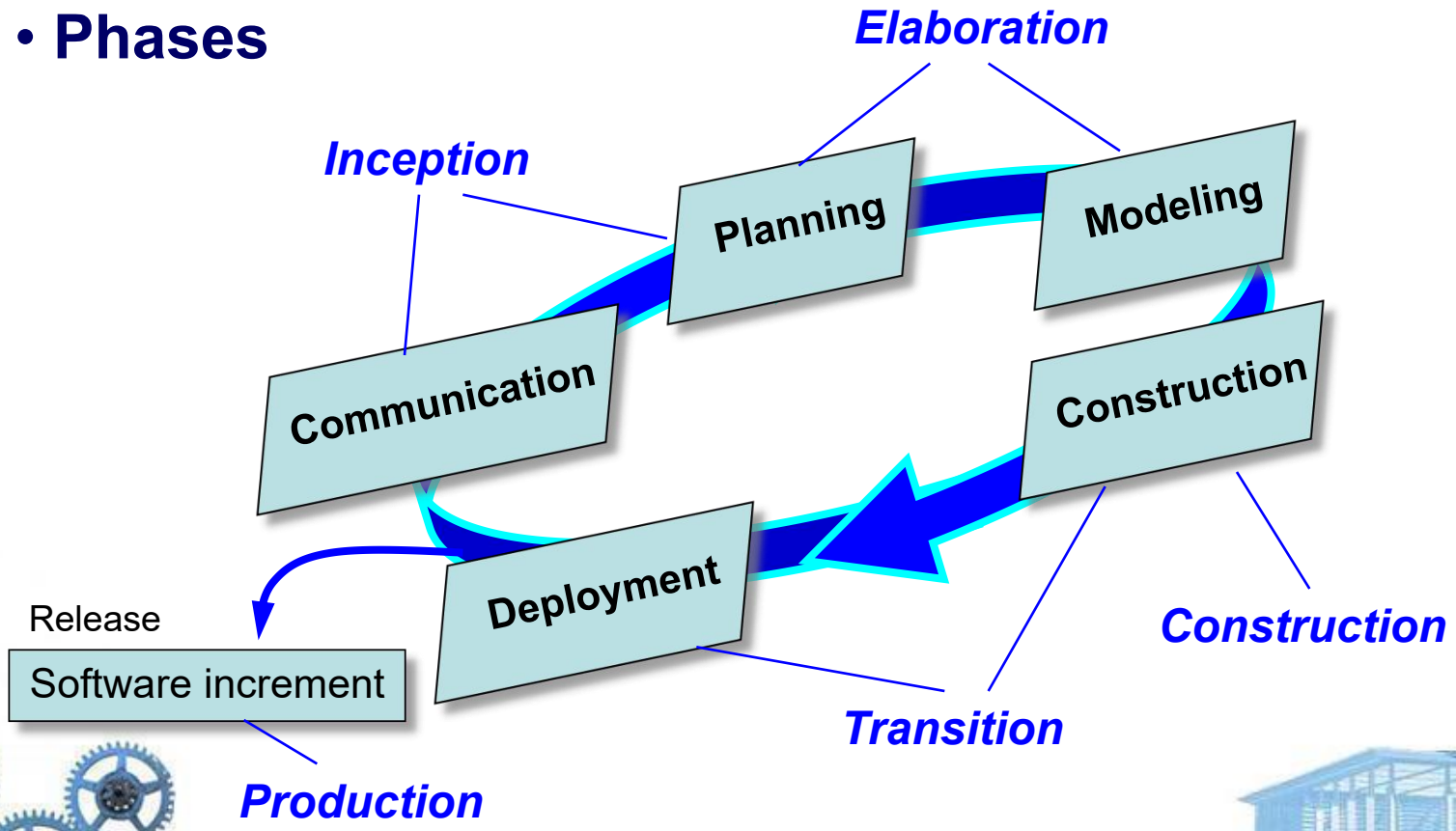
4.2 Specialized Process Models

- **Component based development** — the process to apply when reuse is a development objective
- **Formal methods** — emphasizes the mathematical specification of requirements
- **Aspect-Oriented Software Development** — provides a process and methodological approach for defining, specifying, designing, and constructing aspects

4.3 The Unified Process

- A "**use-case** driven, **architecture**-centric, **iterative** and **incremental**" software process closely aligned with the **U**nified **M**odeling **L**anguage (**UML**)

- **Phases**



4.3 The Unified Process

- **Work Products**

Inception phase

- Vision document
- Initial use-case model
- Initial project glossary
- Initial business case
- Initial risk assessment
- Project plan
  phases and iterations
- Business model
- Prototypes

Elaboration phase

- Use-case model
- Functional and non-functional requirements
- Analysis model
- Software architecture description
- Executable architectural prototype
- Preliminary design model
- Revise risk list
- Project plan
  iteration plan, workflow, milestones
- Preliminary user manual

Construction phase

- Design model
- Software components
- Integrated software increment
- Test plan
- Test cases
- Support documentation
  user
  installation
  increment

Transition phase

- Delivered software increment
- Beta test reports
- User feedback

4.4 Personal and Team Process Models

- **Personal Software Process (PSP)**

➢ Recommends five framework activities:

1. Planning
2. High-level design
3. High-level design review
4. Development
5. Postmortem

➢ Stresses the need for each software engineer to identify errors early and as important, to understand the types of errors

4.4 Personal and Team Process Models

- **Team Software Process (TSP)**

  - Each project is “launched” using a “script” that defines the tasks to be accomplished
  - Teams are self-directed
  - Measurement is encouraged
  - Measures are analyzed with the intent of improving the team process