SOFTWARE ARCHITECTURE

Architecture Architecting Architects

Action Guide

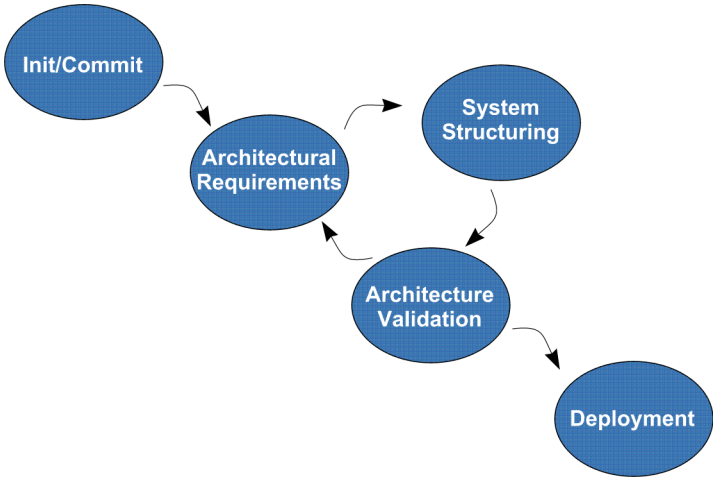
from Bredemeyer Consulting

Architecture

Software architecture is the high-level structure of a software system, comprising software components and the relationships among them. A good architectural description includes various views of the architecture, principles directing component design and evolution, and documentation of assumptions and rationale behind architectural choices linked to functional requirements and system qualities.

Architecting

The software architecting process involves the following steps:



1. **Init/Commit**: Gain management sponsorship and form the architecture team
2. **Requirements**: Establish and document the architectural requirements
3. **Structuring**: Define the architecture
4. **Validation**: Validate that the architecture meets the requirements
5. **Deployment**: Deploy the architecture to the developer community

The architectural requirements, system structuring, and architecture validation steps are best conducted iteratively, as shown in the diagram. The process steps are described below. Also, see our ***Resources for Software Architects*** web site (http://www.bredemeyer.com) for more.

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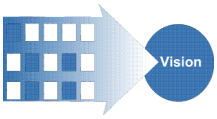

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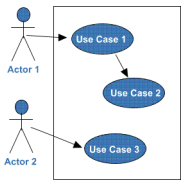
- Create an *architecture vision* showing how the architecture contributes to long-term business success to help align the architecture team and gain management sponsorship.
- Develop a *communication plan*. Identify the architecture stakeholders and their communication needs. Plan the activities that will produce the information, and the formats and timeframes in which to communicate the information.

Requirements



Establish and document the architectural requirements

- Establish which *business objectives* apply to the system to ensure that the architecture is aligned with the business agenda.
- Understand the system *context*. Determine the system boundary--what is in scope and what is out of scope. Understand the key organizational, business, competitive, and technical drivers affecting the architecture.
- State the system *value proposition*, establishing how the system will fit the users' agenda and top-level, high-priority goals.
- Document functional requirements by translating user goals into a set of *use cases*.
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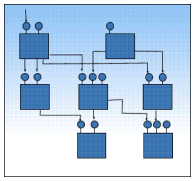

Define the architecture

- Based on studying other architectures, and past experience, formulate the *architectural style, concepts, mechanisms* and *principles* that will guide the architecture team during the next steps of structuring.
- Decompose the system into *components.* Identify the *responsibilities* of each component and *interconnections* between components.
- Model the dynamic behavior of the system, using *UML collaboration diagrams* to think through and refine the responsibilities and interfaces of the components.
- Create *component specifications*. Each should include a summary description of services the component provides, the component owner's name, IID and version names, message signatures (IDL), a description of the operations, constraints or pre-post conditions for each operation (these may be represented in a state diagram), the concurrency model, constraints on component composition, a lifecycle model, how the component is instantiated, how it is named, a typical use scenario, a programming example, exceptions, and a test or performance suite.
- Map the components onto the processes of the physical system. Evaluate alternative solutions against requirements such as performance and scaling.

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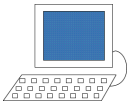

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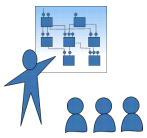

Deploy the architecture to the developer community

- Help the developer community understand the architecture and its rationale through *consulting, tutorials* and demos.
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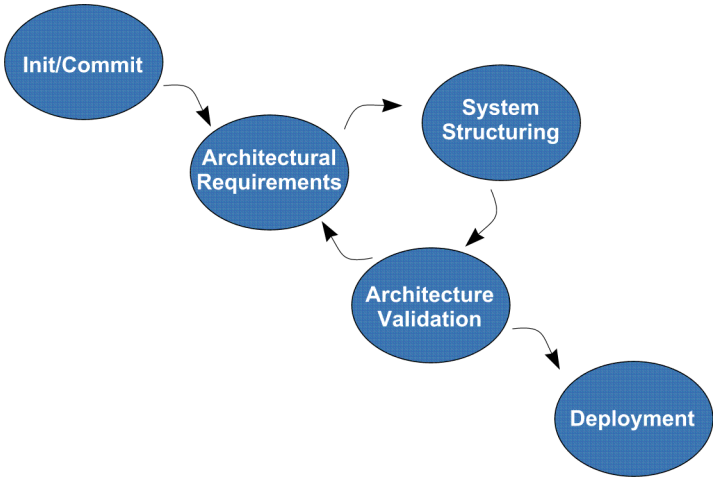

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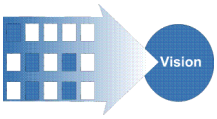

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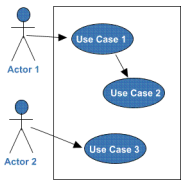

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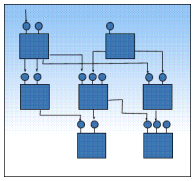

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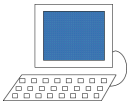

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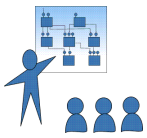

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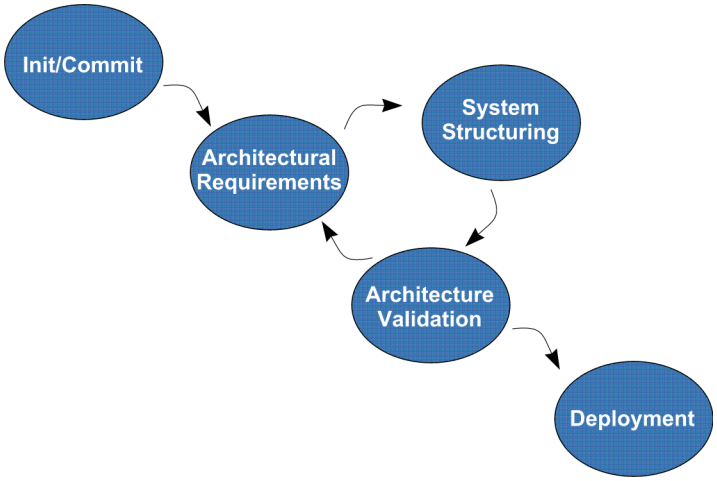

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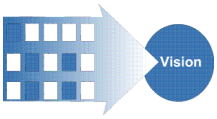

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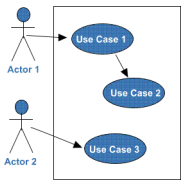

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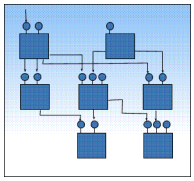

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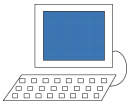

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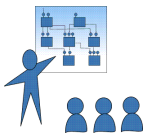

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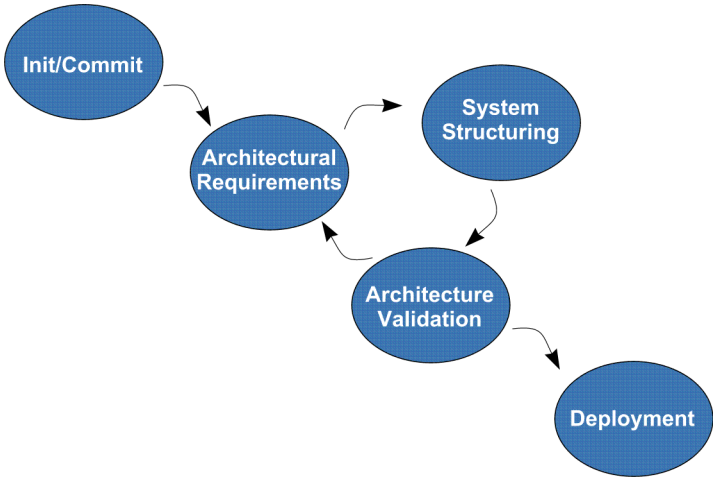

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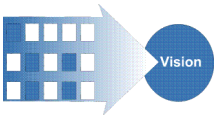

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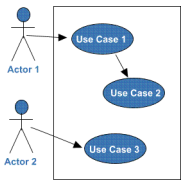

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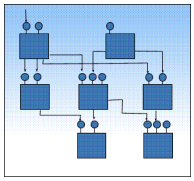

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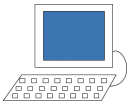

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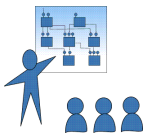

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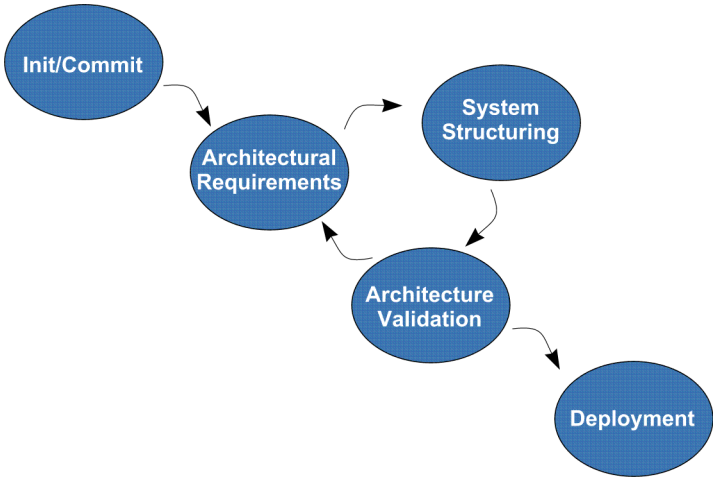

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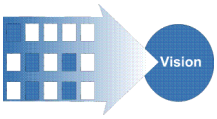

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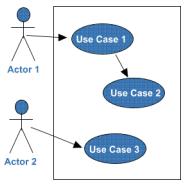

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- Establish which *business objectives* apply to the system to ensure that the architecture is aligned with the business agenda.
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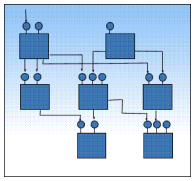

Define the architecture

- Based on studying other architectures, and past experience, formulate the *architectural style, concepts, mechanisms* and *principles* that will guide the architecture team during the next steps of structuring.
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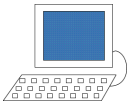

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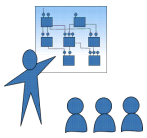

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- Help the developer community understand the architecture and its rationale through *consulting, tutorials* and demos.
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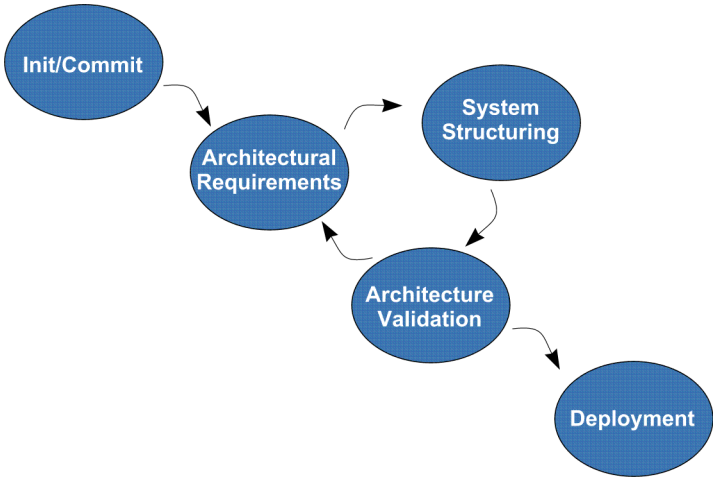

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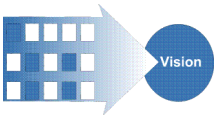

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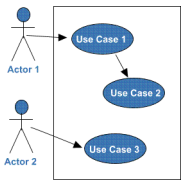

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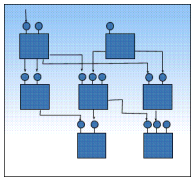

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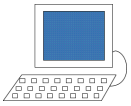

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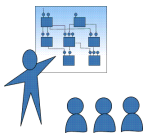

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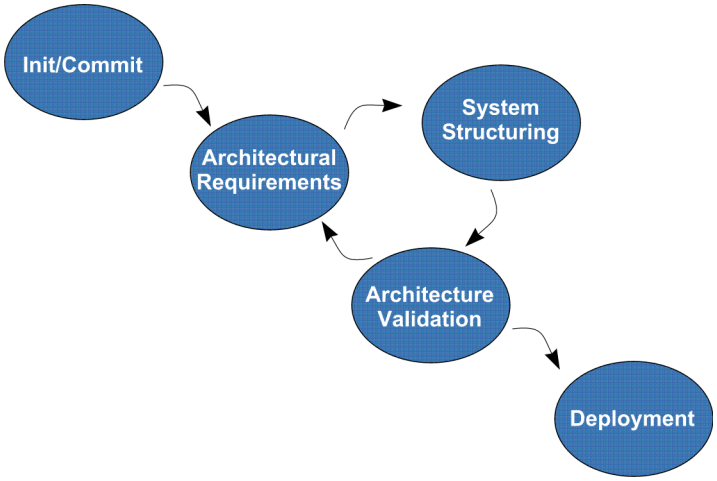

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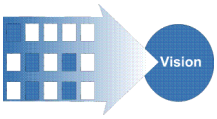

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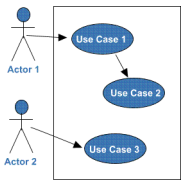

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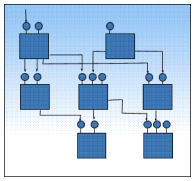

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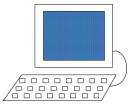

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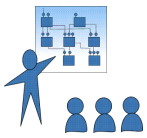

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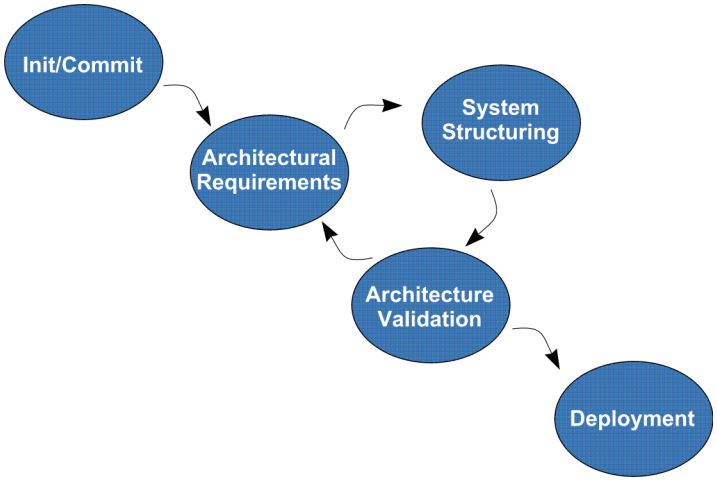

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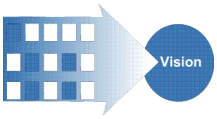

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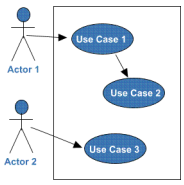

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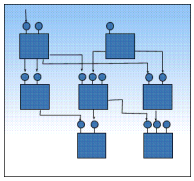

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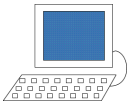

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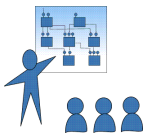

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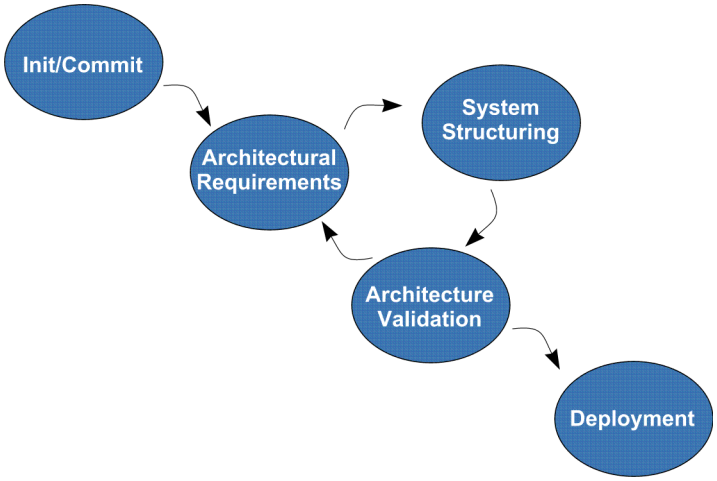

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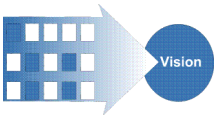

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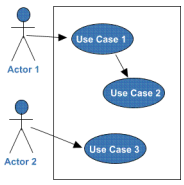

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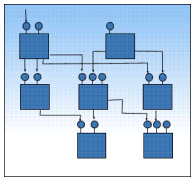

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- Based on studying other architectures, and past experience, formulate the *architectural style, concepts, mechanisms* and *principles* that will guide the architecture team during the next steps of structuring.
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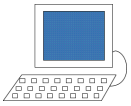

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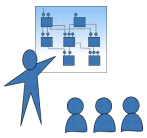

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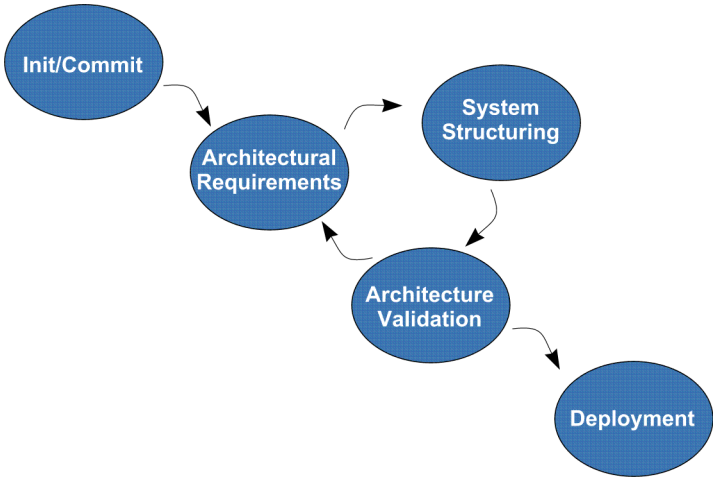

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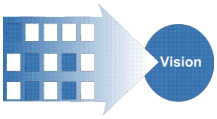

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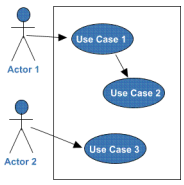

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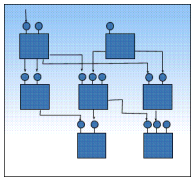

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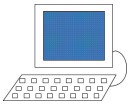

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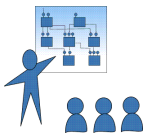

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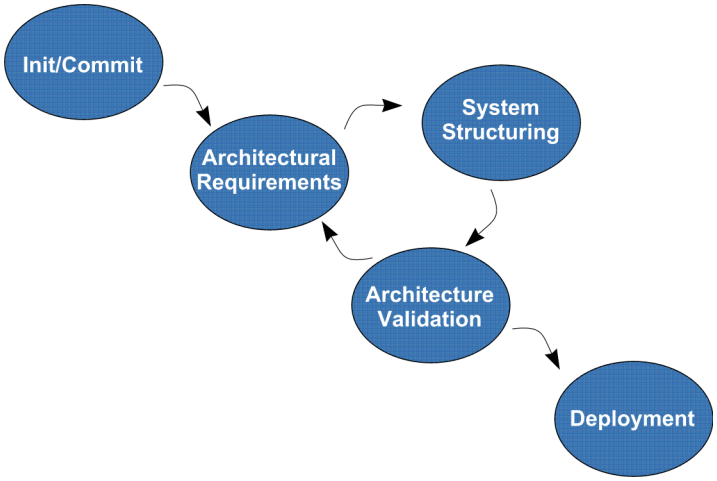

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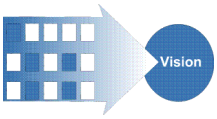

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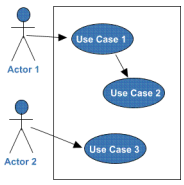

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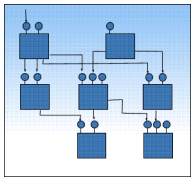

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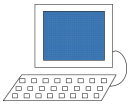

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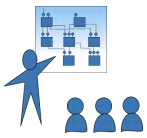

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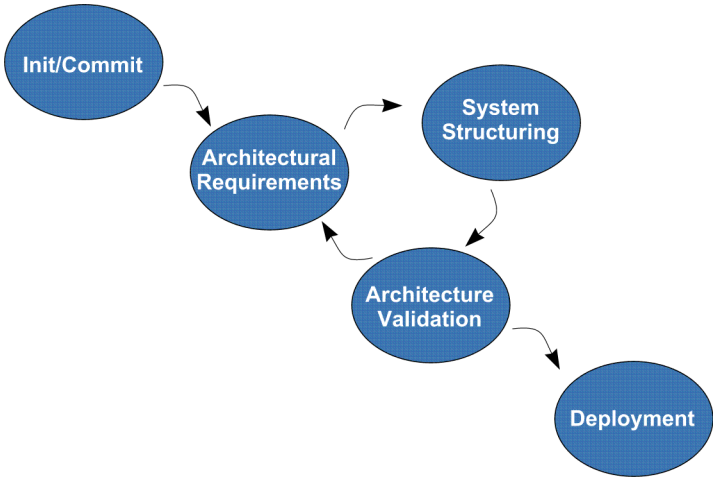

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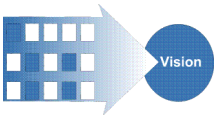

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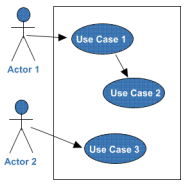

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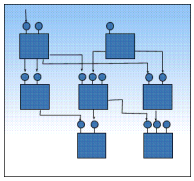

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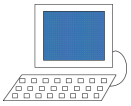

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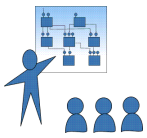

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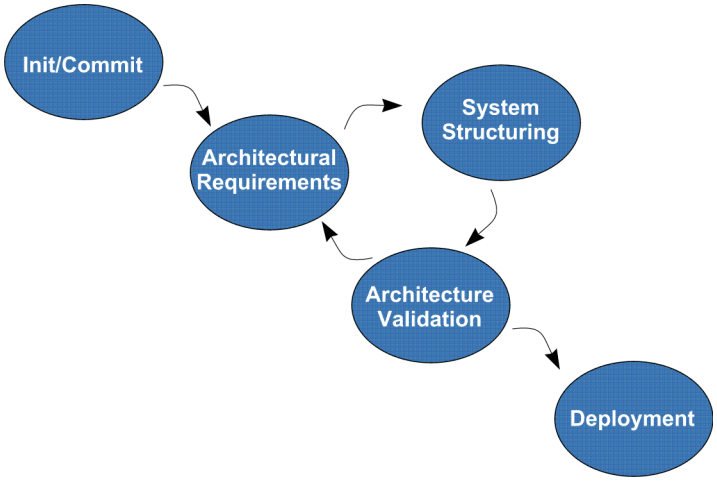

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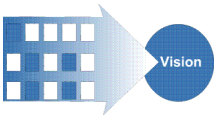

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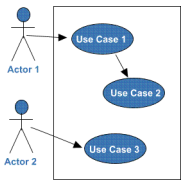

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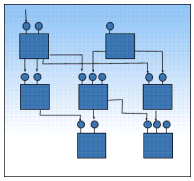

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- Based on studying other architectures, and past experience, formulate the *architectural style, concepts, mechanisms* and *principles* that will guide the architecture team during the next steps of structuring.
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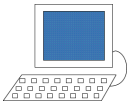

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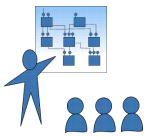

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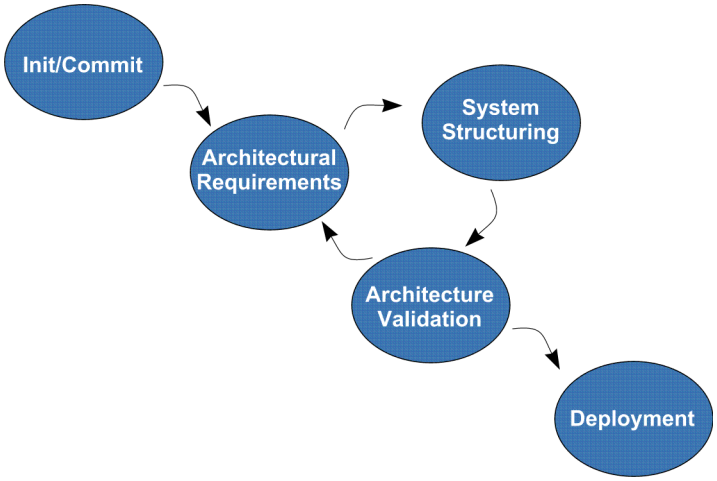

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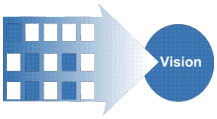

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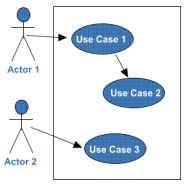

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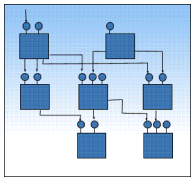

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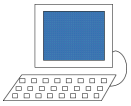

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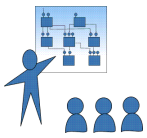

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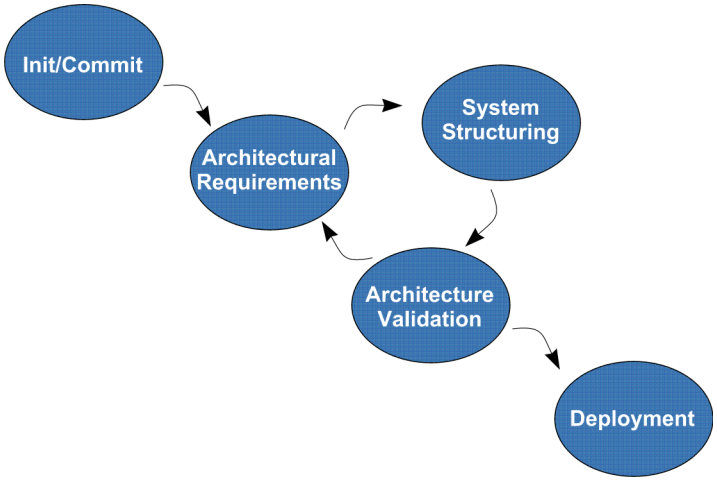

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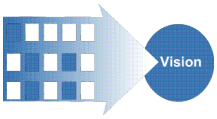

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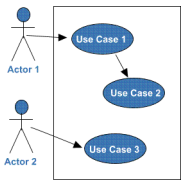

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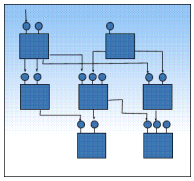

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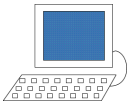

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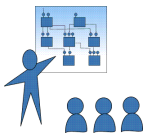

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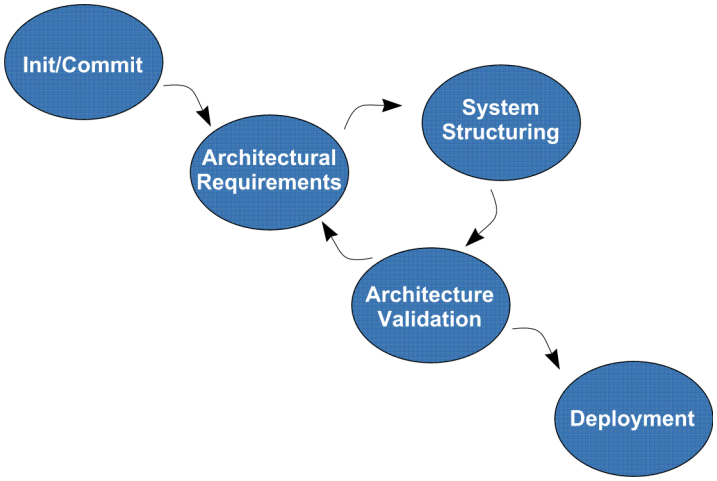

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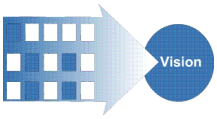

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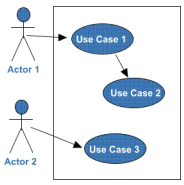

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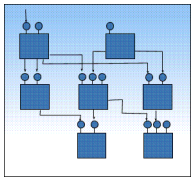

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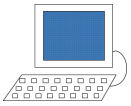

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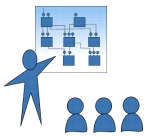

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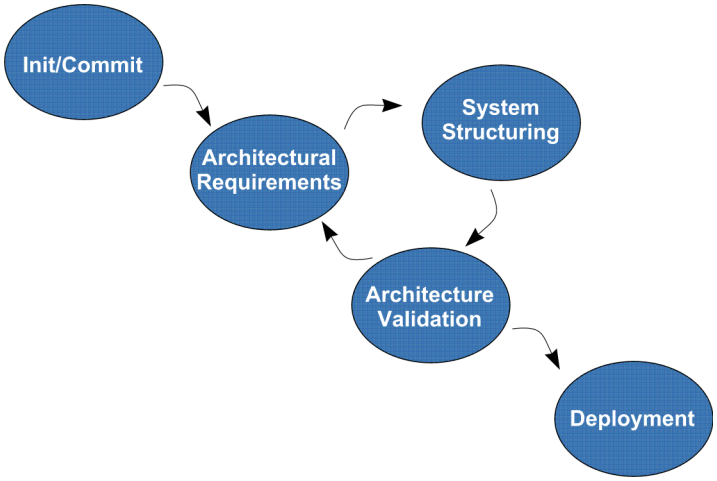

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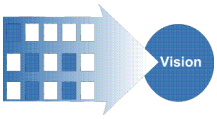

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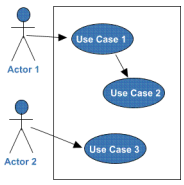

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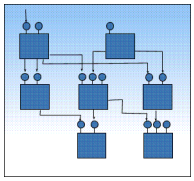

Define the architecture

- Based on studying other architectures, and past experience, formulate the *architectural style, concepts, mechanisms* and *principles* that will guide the architecture team during the next steps of structuring.
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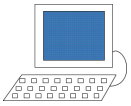

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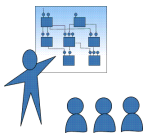

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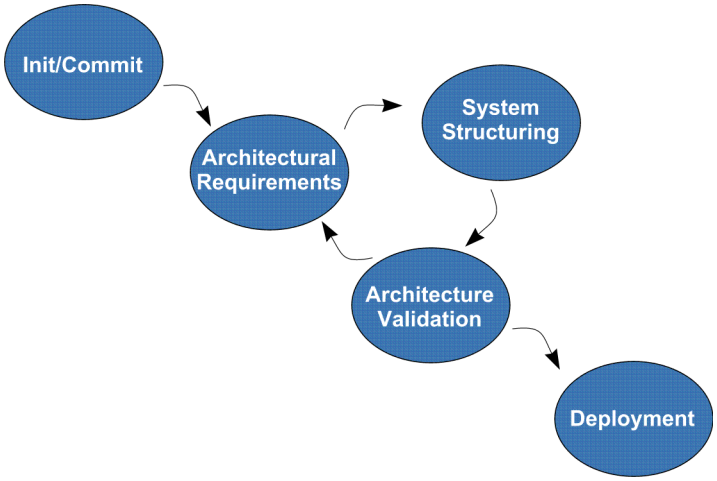

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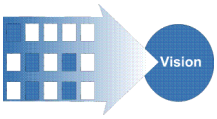

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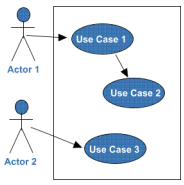

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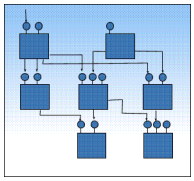

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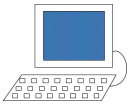

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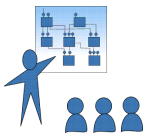

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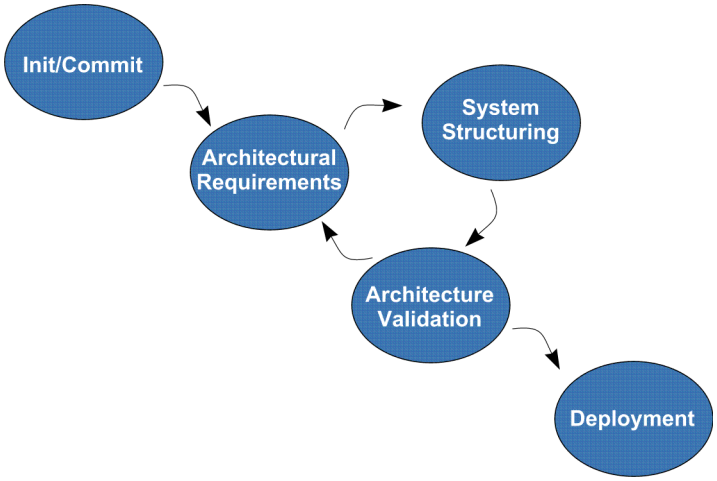

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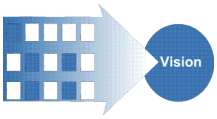

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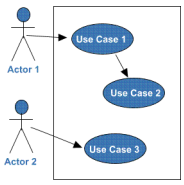

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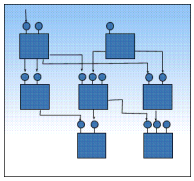

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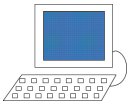

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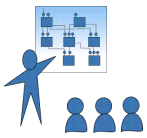

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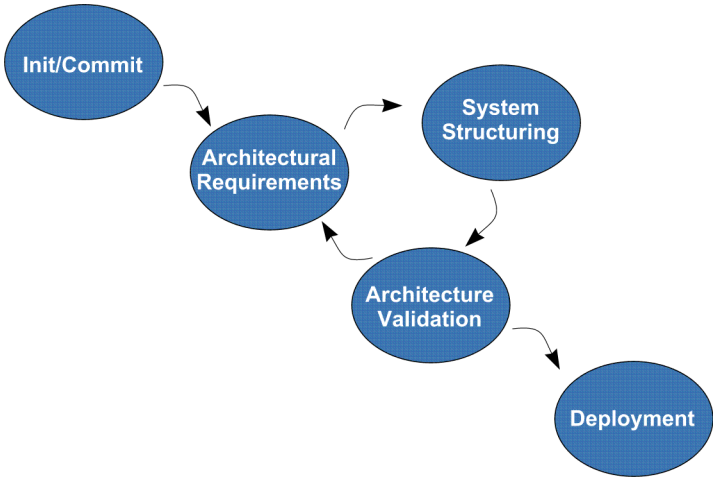

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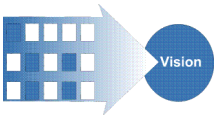

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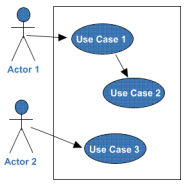

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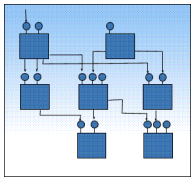

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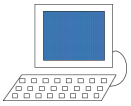

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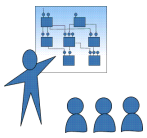

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