Performance Modeling Process

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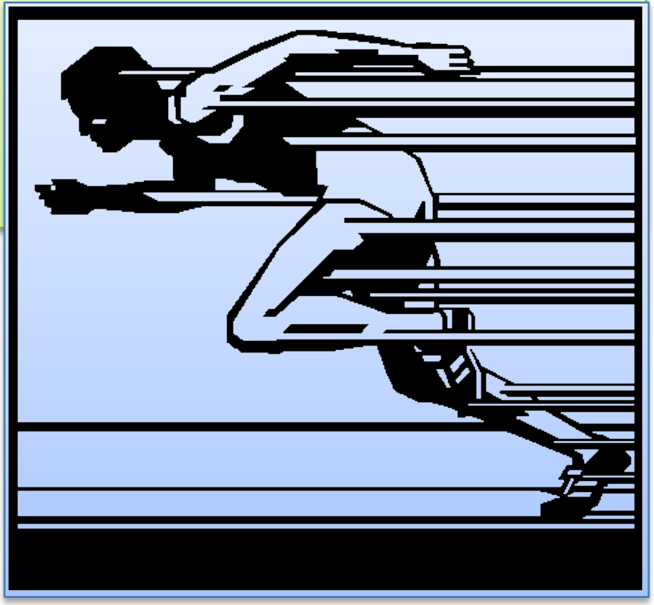
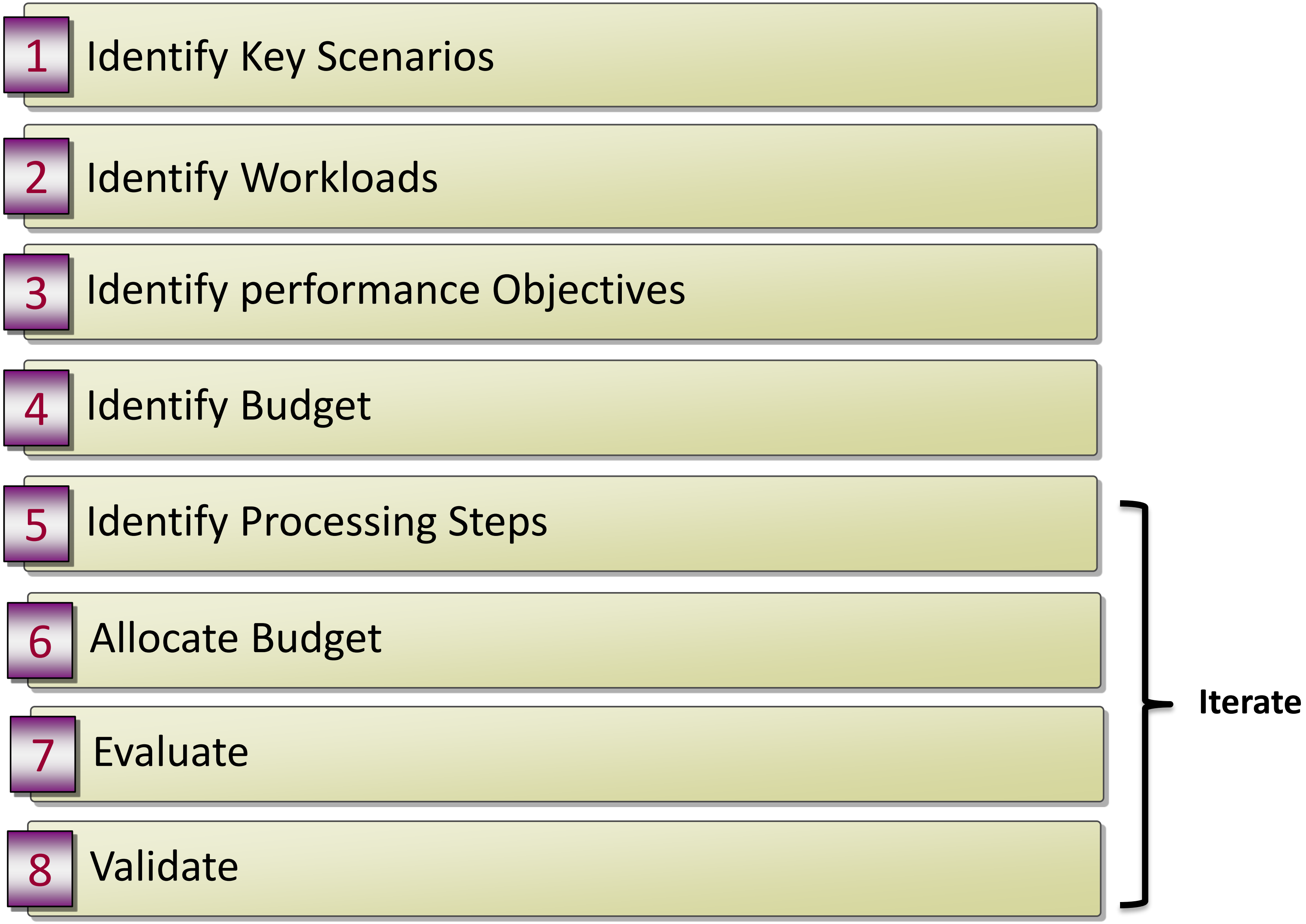
Performance objectives are specified in terms of

- Response time
- Throughput
- Resource utilization
- Workload



Performance modeling helps you set performance objectives for your application upfront.

Performance Modeling Process



1 Identify Key Scenarios

2 Identify Workloads

3 Identify performance Objectives

4 Identify Budget

5 Identify Processing Steps

6 Allocate Budget

7 Evaluate

8 Validate

Identify Key Scenarios

1. **Critical Scenarios :** Performance Critical Scenarios.

2. **Significant Scenarios :** Not performance critical but would impact critical scenarios.
   a) Scenarios that run in parallel to a performance-critical scenario.
   b) Scenarios that are frequently executed.
   c) Scenarios that have a high percentage of system use.
   d) Scenarios that consume significant system resources..

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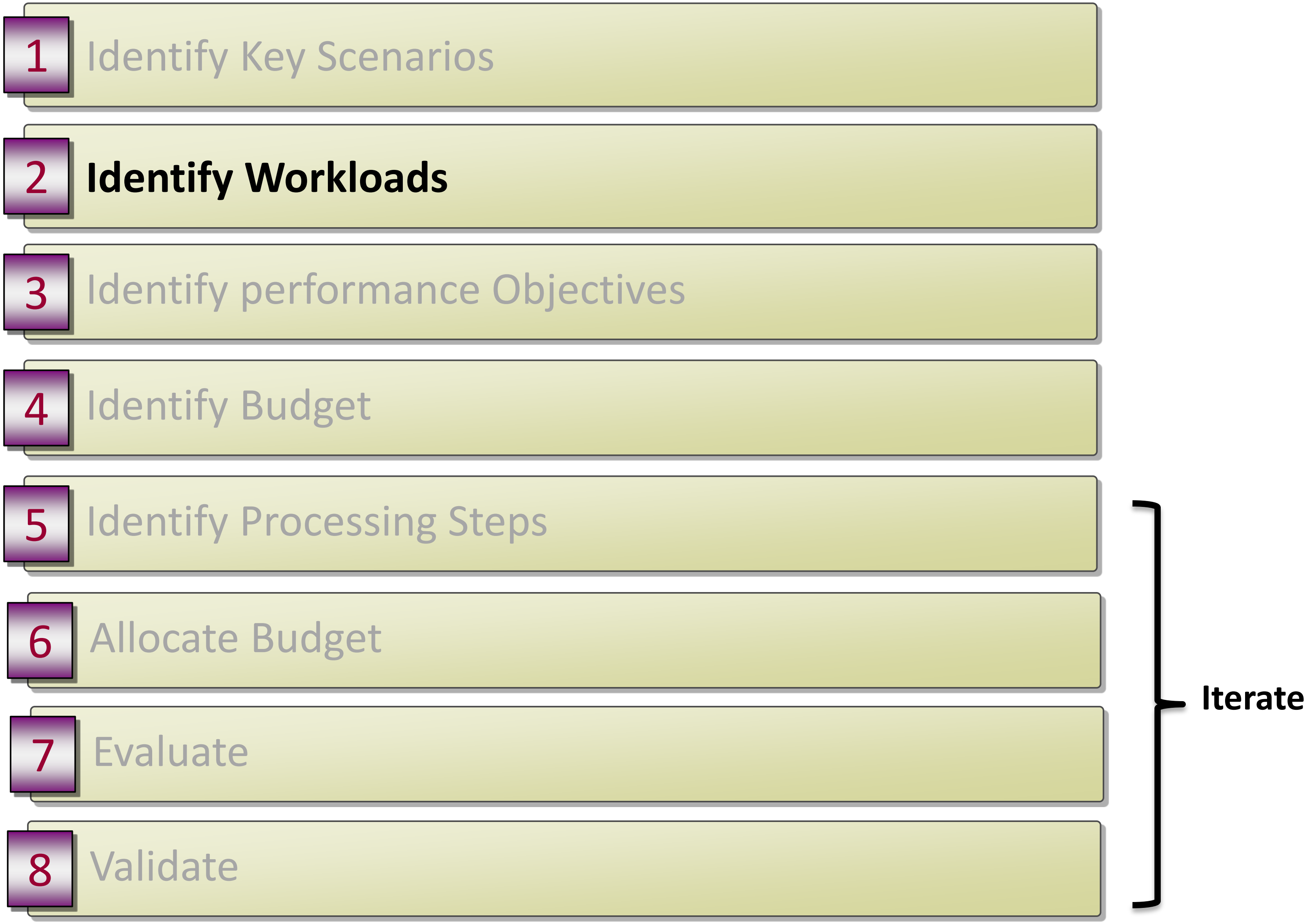

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2. **Identify Workloads**
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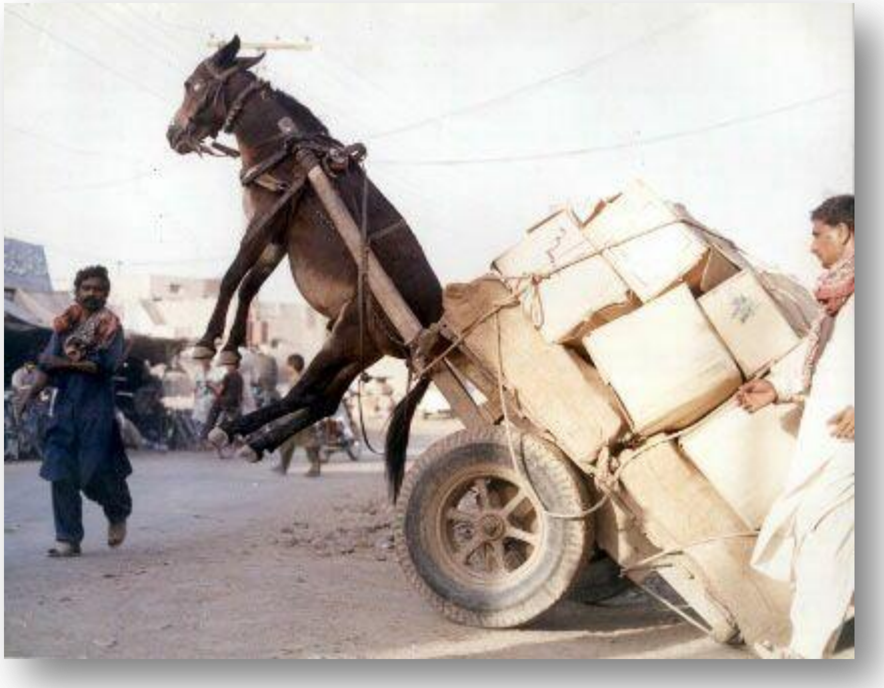
Iterate

Identify Workload

Workload is associated with an individual scenario. Workload is derived from marketing data.

1. Total users.
2. Concurrently active users.
3. Data volumes.
4. Transaction volumes.



The workload is documented in the Supplementary Specification will be used as inputs for both **load testing** and **stress testing**.

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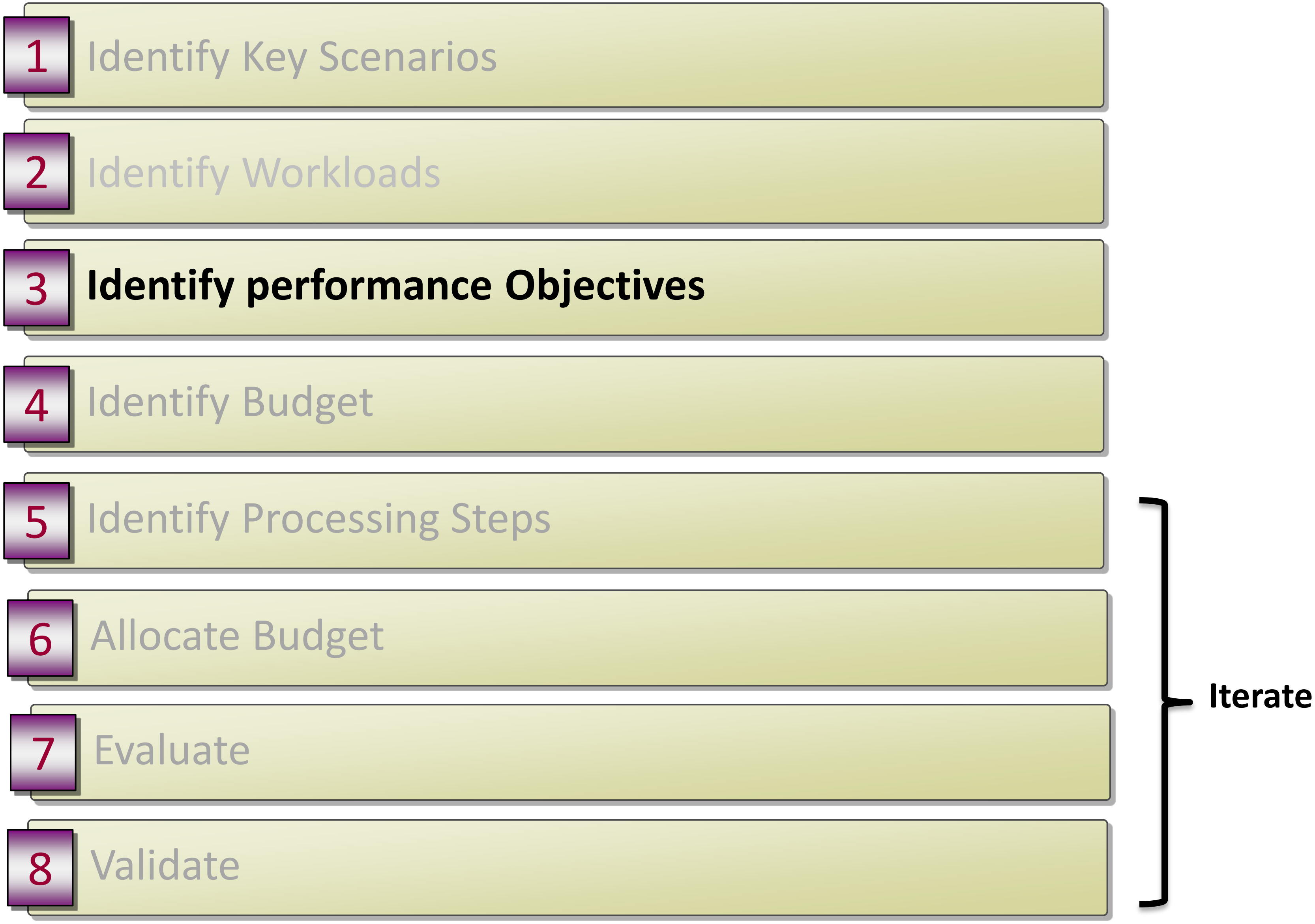

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Identify Performance Objectives

For each scenario identified in Step 1, define performance objectives.

a) Response time. The product catalog must be displayed in less than 3 seconds.

b) Throughput. The system must support 100 transactions per second.

c) Resource utilization. A frequently overlooked aspect is how much resource your application is consuming, in terms of CPU, memory, disk I/O, and network I/O.

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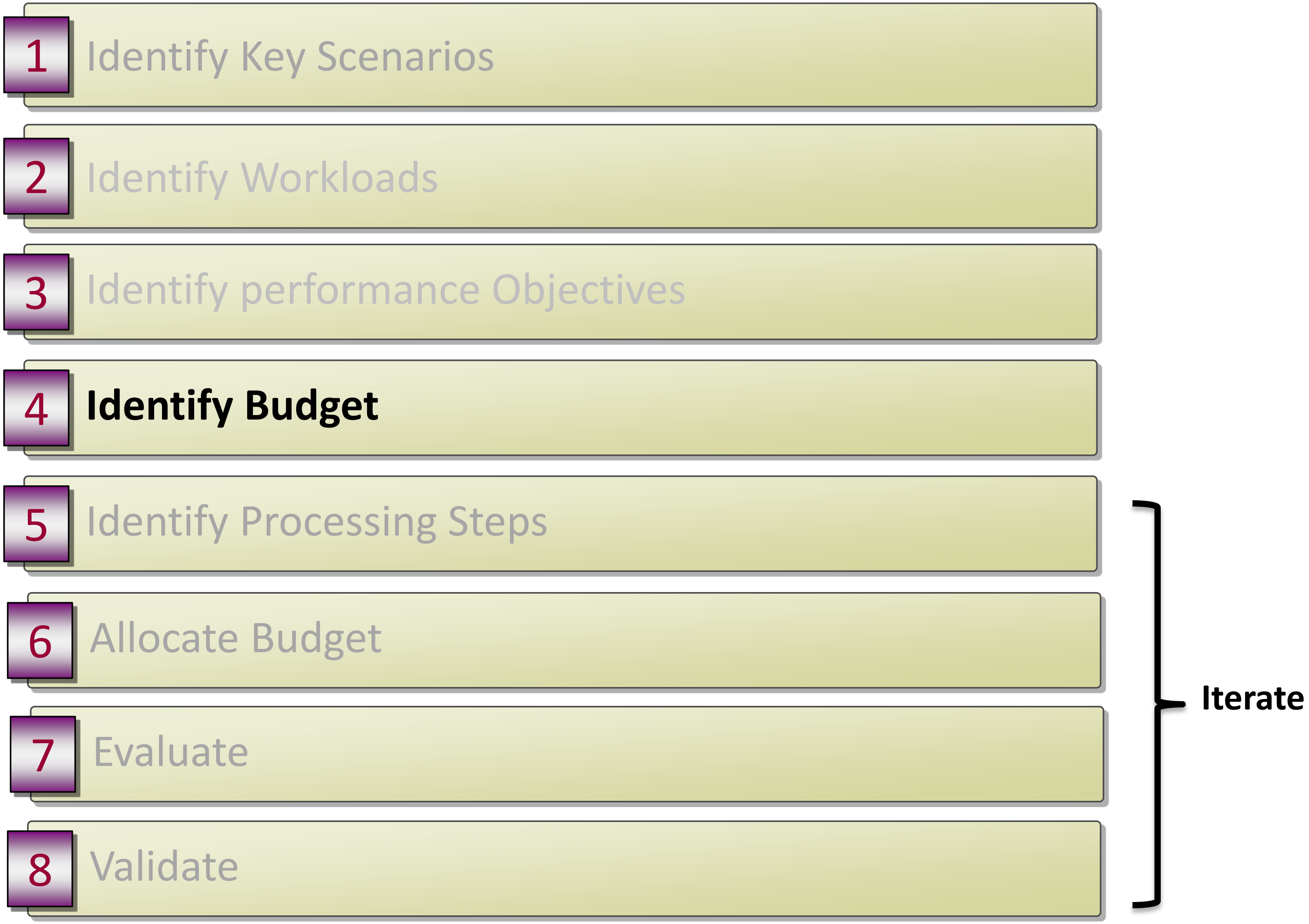

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Identify Budget (Constraints)

1. Execution time.

.

2. Resource utilization.

- CPU.
- Memory.
- Network Bandwidth.
- Disk I/O.
- Hardware (Servers).
- Project resources. (time,cost)

For each scenario identified in Step 1, identify Budget. Example, you might have a peak processor utilization limit of 75 percent and your memory consumption must not exceed 50 MB.

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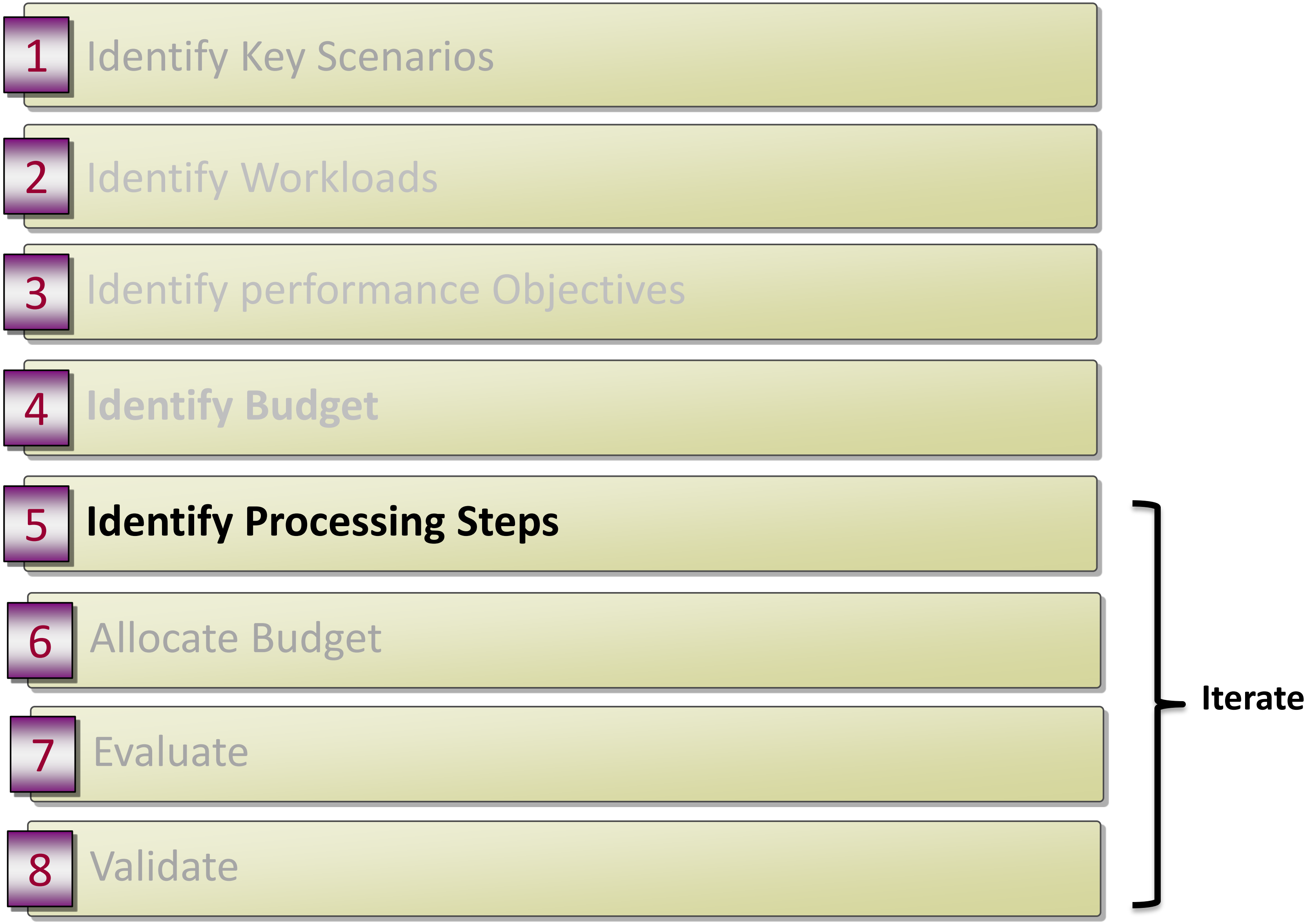

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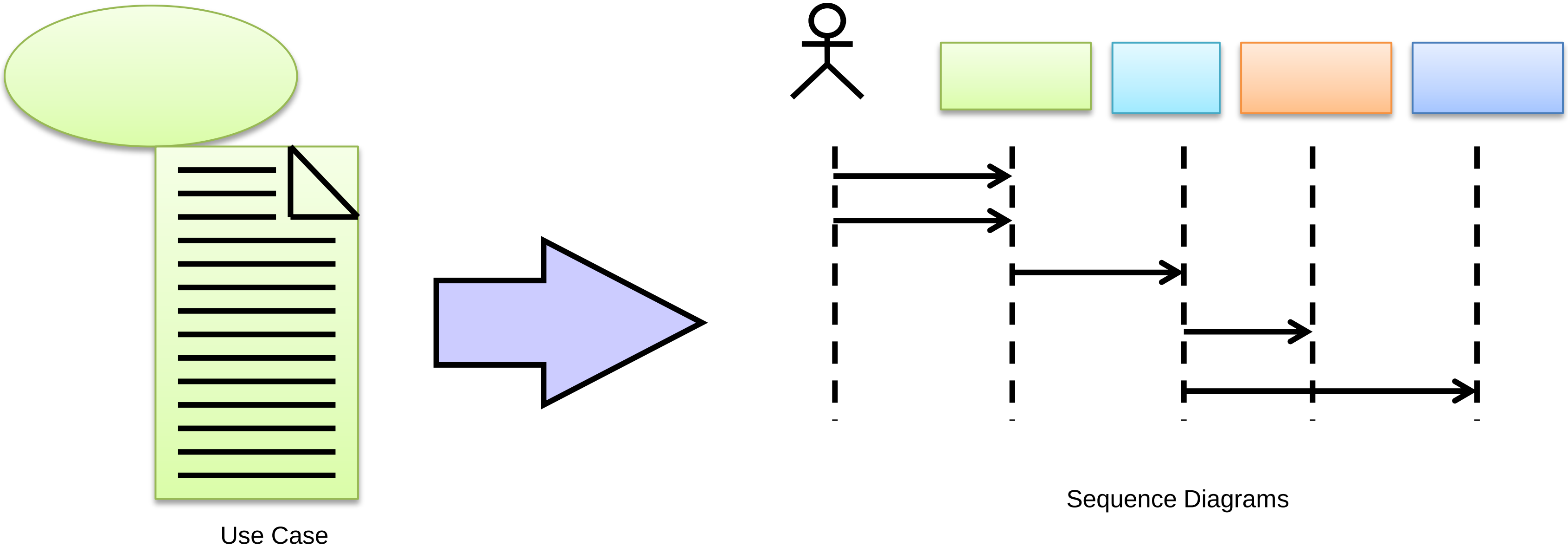
Identify Processing Steps



For each scenario identified in Step 1, identify processing steps. Also helps you identify those points within your application where you should consider adding custom instrumentation.

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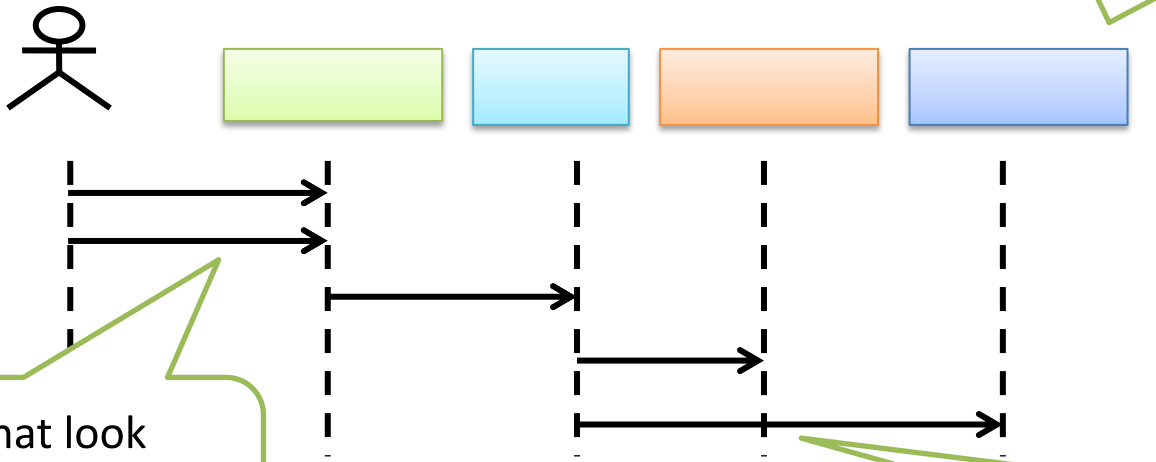
Allocate Budget

Know the cost of your materials.

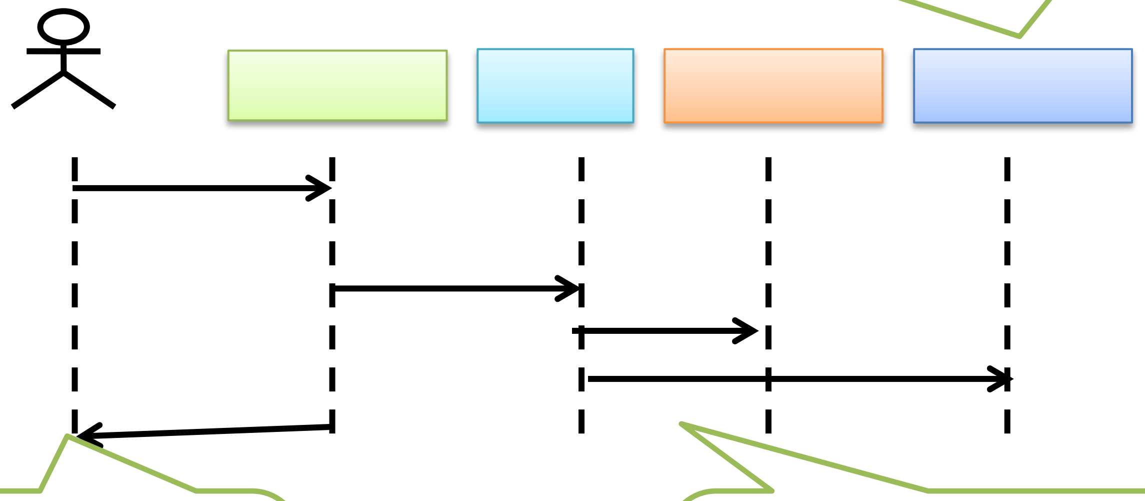


For the ones that look risky, conduct some experiments (prototypes)

if you do not know how much time to assign, simply divide the total time equally between the steps.

Spread your budget determined in Step 4 across your processing steps determined in Step 5. Initially on use case steps, later allocate on design sequence diagram

Allocate Budget



Server latency is the time the server takes to complete the execution of a request. Server latency does not include network latency.

Client latency is the time that it takes for a request to reach a server and for the response to travel back.

Network latency is the additional time that it takes for a request and a response to cross a network.

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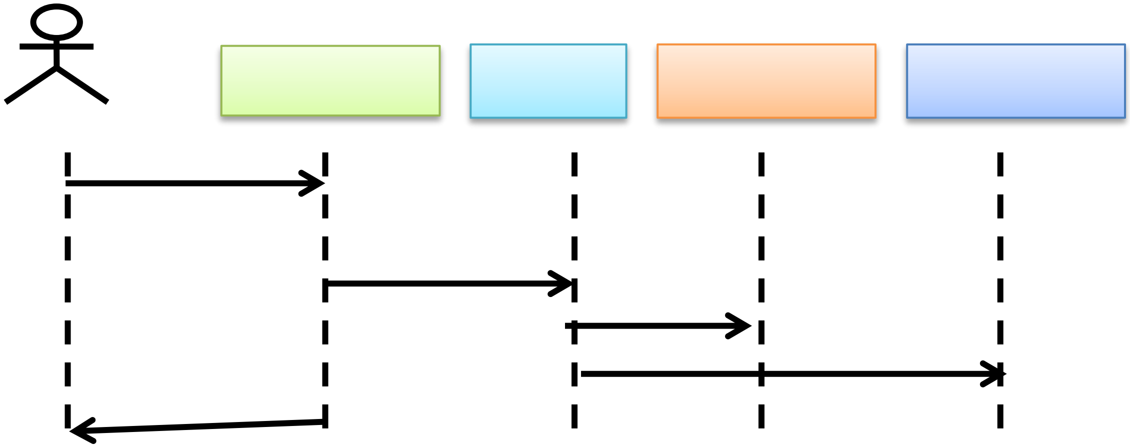
Evaluate



1. Does the budget meet the objectives?
2. Is the budget realistic?
3. What are you trading off?
4. Does the model identify a resource hot spot?

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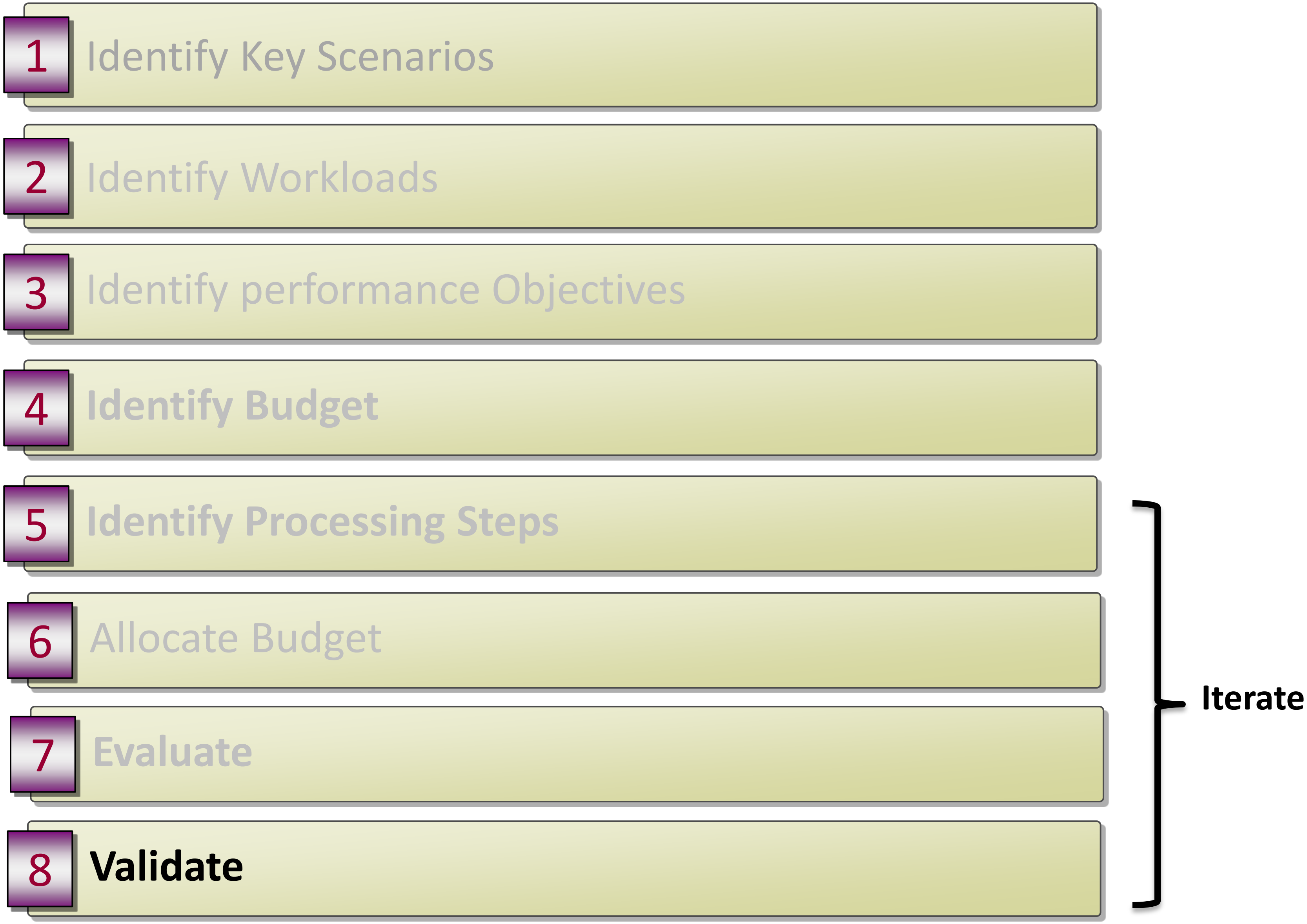

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Validate

The further you are in your project's life cycle, the greater the accuracy of the validation. Early on, validation is based on available benchmarks and prototype code. Later, you can measure the actual code as your application develops.

Validate

Metrics are the actual measurements obtained by running performance tests.

The team will execute load testing against a normally expected (median) load as well as a peak load. They will often run stress tests that will identify the system bottlenecks.

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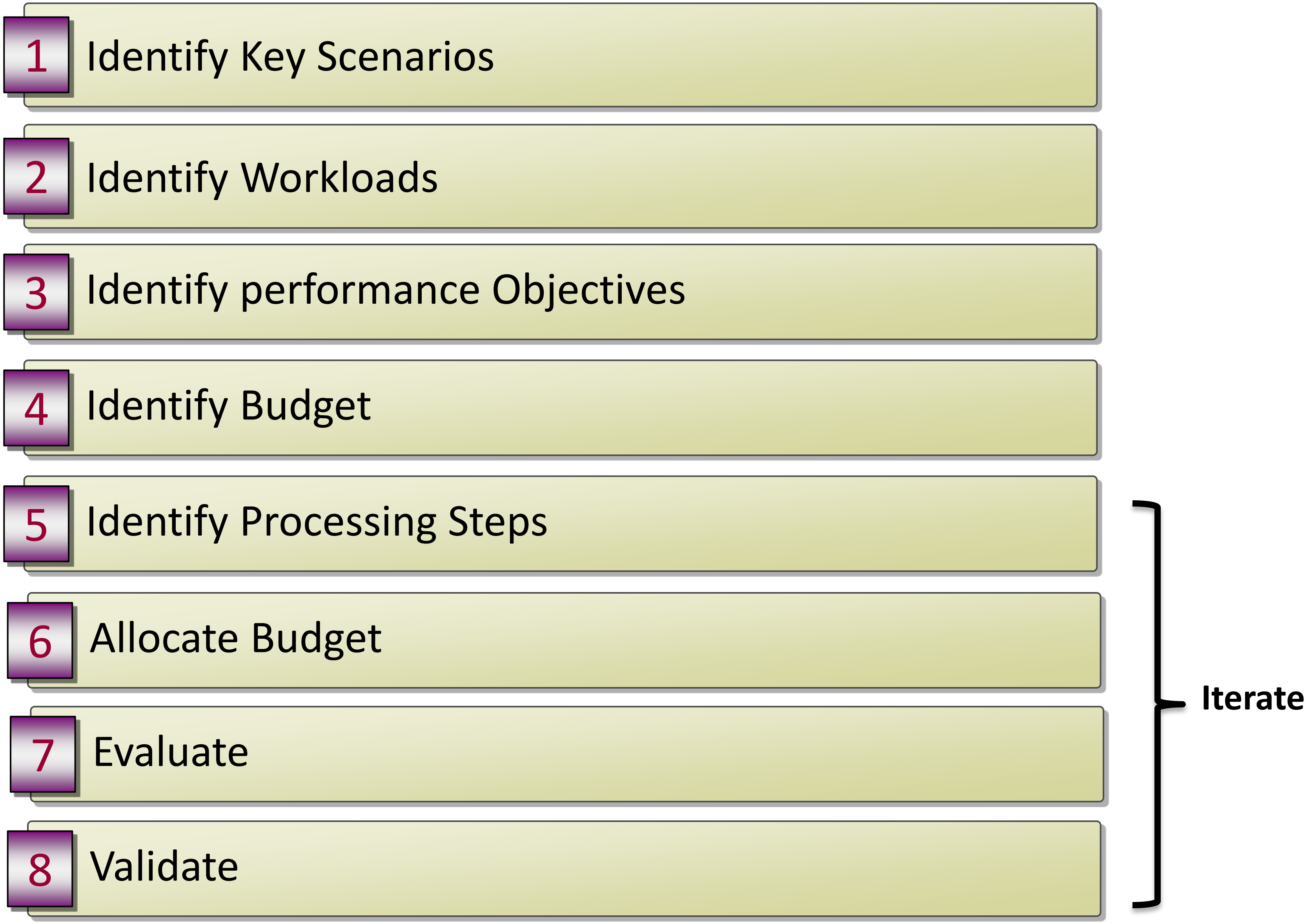

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Document

- **Risk List :** High level risks that may impact system performance are identified and described in the risk list document.
- **Supplementary Specification :** Performance requirements are captured in the Supplementary Specification.
- **Use Case:** Each critical use case must have an associated NFR. These are the use cases that will be subjected to script driven performance testing.