

Smaug

Resource Protect and Restore Workflow

Smaug Resource Operations Workflow

- In **Protect** and **Restore** operations, each resource has work to be done (for example: backup data, restore data, etc). Such work is named **Activity**
- The **Activity** is implemented in the resource Protection Plugin (for example: CinderBackup Protection Plugin for a Volume)

Activities

In order for Smaug to be able to handle all use cases, there are three types of Activities:

- **PreActivity** - invoked before any activity for this resource and child resources has began
- **WorkerActivity** - invoked after the resource PrepareActivity completed, and independently of child resources' activities
- **PostActivity** - starts after all the resource activities and child resources' activities are complete

Activities are supplied as **methods** or added to an **Activity** object (depending on implementation) by the **Protection Plugin**.

Activities

Typical uses for each type of activity:

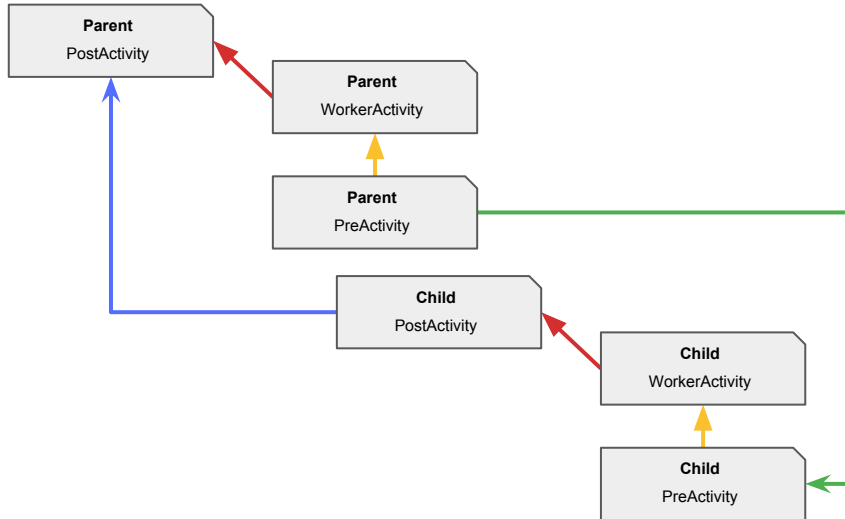
- **PreActivity** - interact with guest agent, stop services, flush buffers, complete transactions
- **WorkerActivity** - heavy-lifting of data backup/restore, backup/restore of metadata, operations which don't depend on child resources
- **PostActivity** - interact with guest agent, start services, tasks that depend on child resource's operation finished

Implementation should provide activities the means to poll asynchronous operations and/or let the the async operation notify when done

Activities

Infrastructure is responsible for:

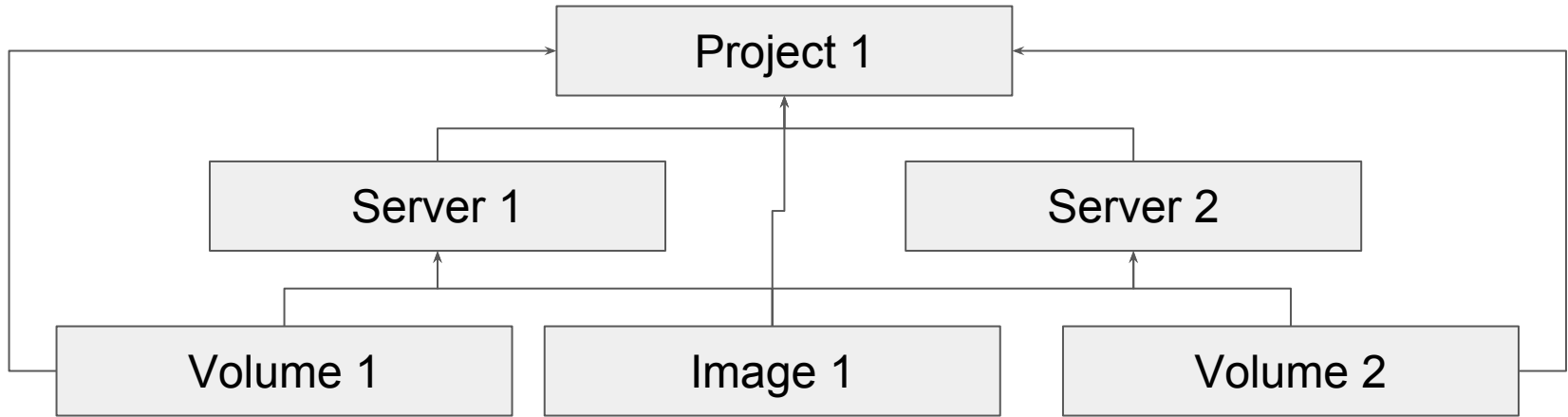
- Constructing **taskflow** tasks from **PrepareActivity**, **WorkerActivity**, **PostActivity**
- Linking the child resource **PreActivity** to the depend on its parent resource **PreActivity** (in **green**)
- Linking the resource **WorkerActivity** to depend on the resource **PreActivity** (in **yellow**)
- Linking the resource **PostActivity** to depend on the resource **WorkerActivity** (in **red**)
- Linking the parent resource **PostActivity** to depend on the child resource's **PostActivity** (in **indigo**)



Task Flow Construction

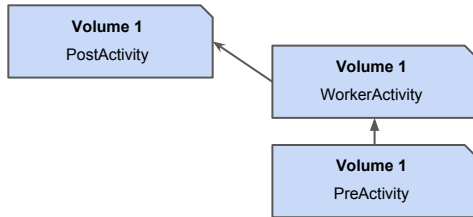
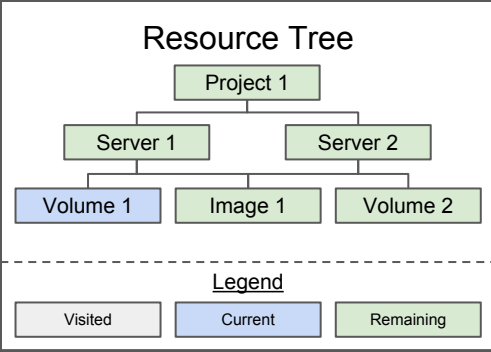
Example of constructing a task flow from an existing resource tree

Example Resource Tree

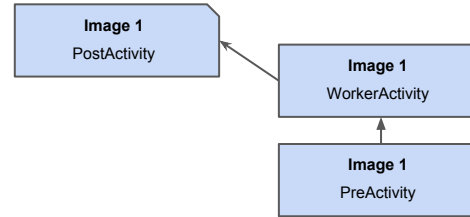
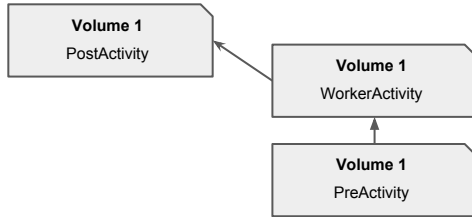
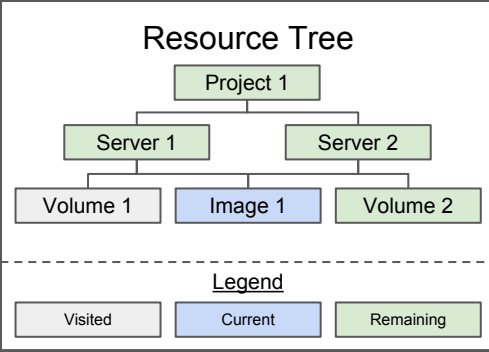


(For convenience, Project links to Volumes and Images in the resource tree will not be displayed from now on)

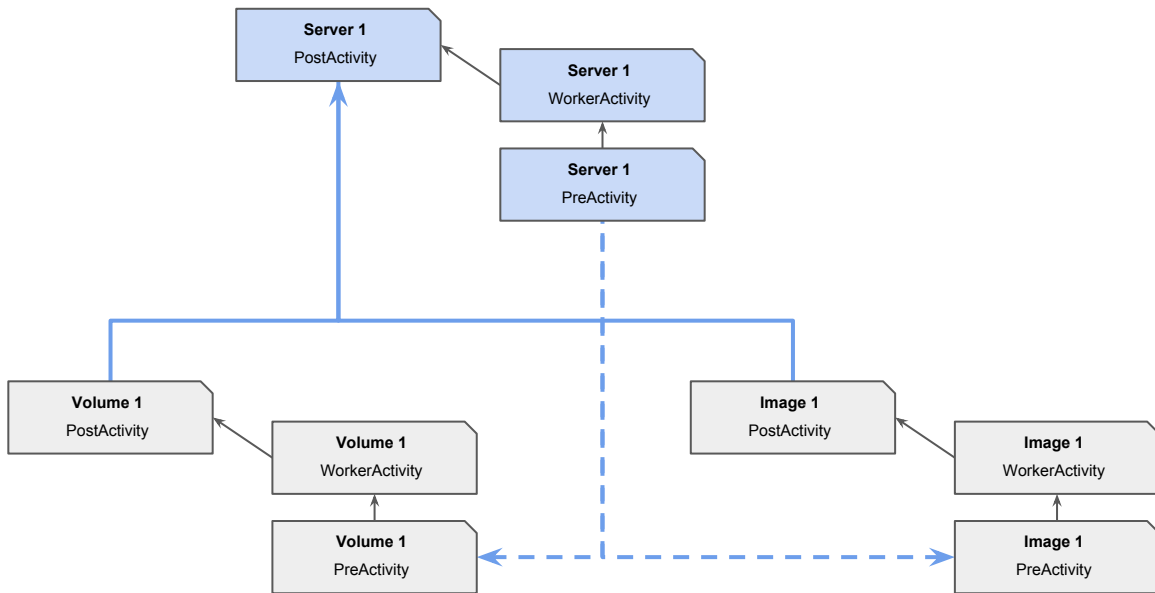
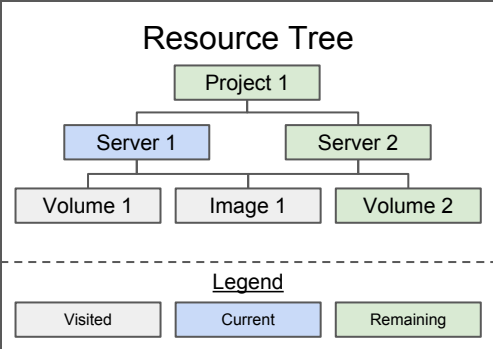
Constructing Activity Tasks Based on Resource Tree



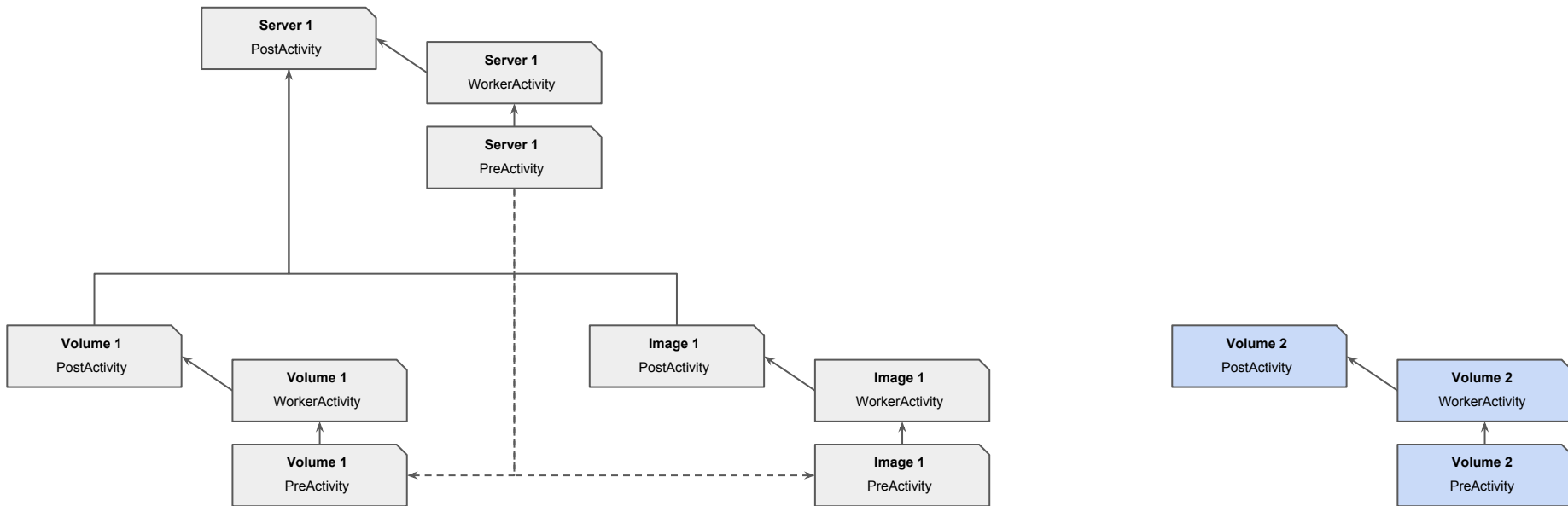
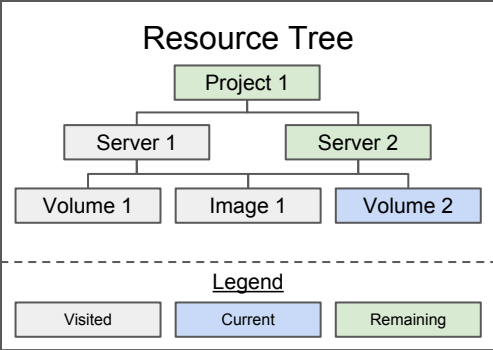
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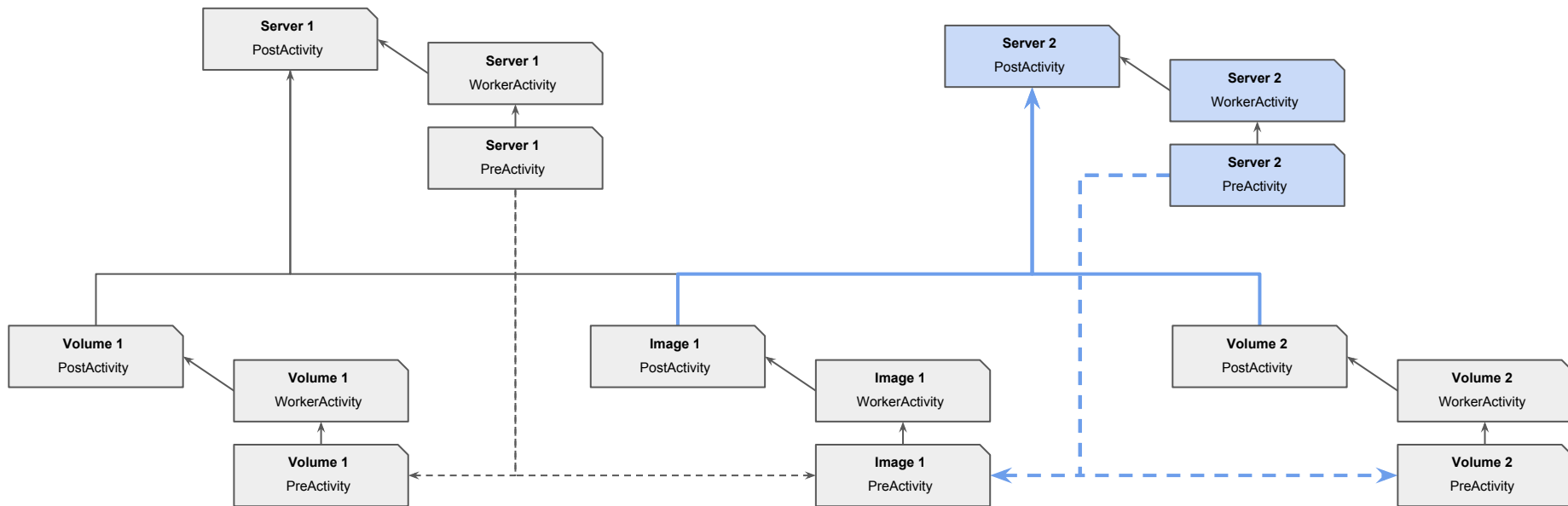
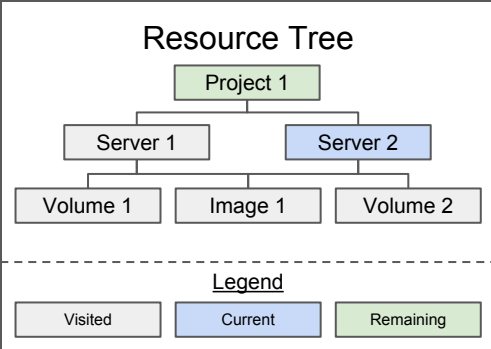
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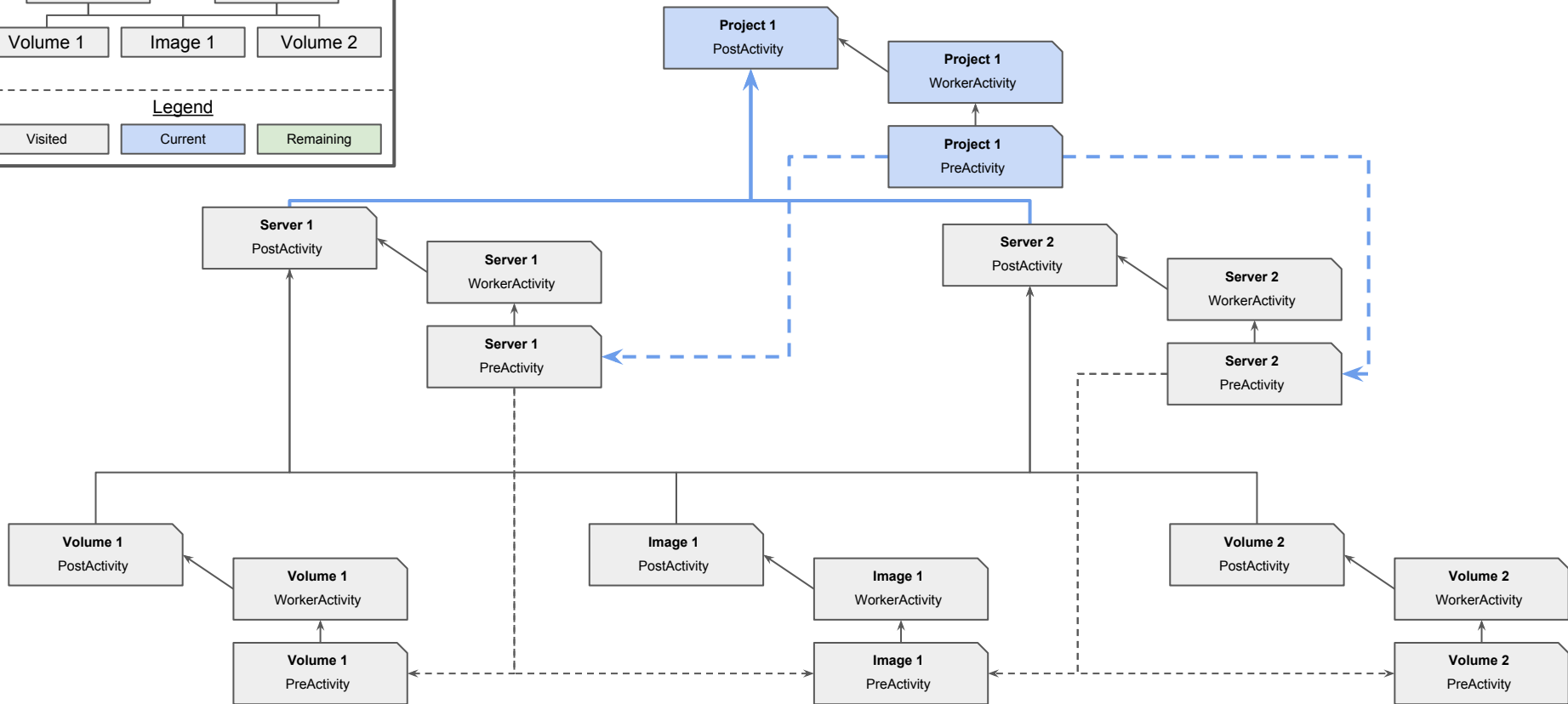
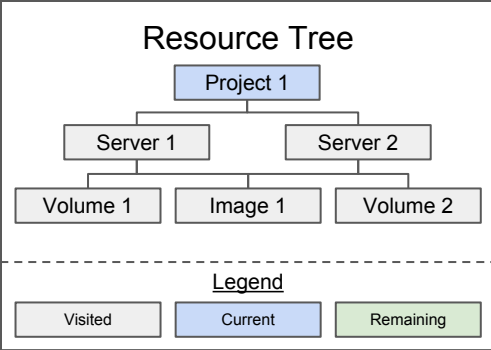
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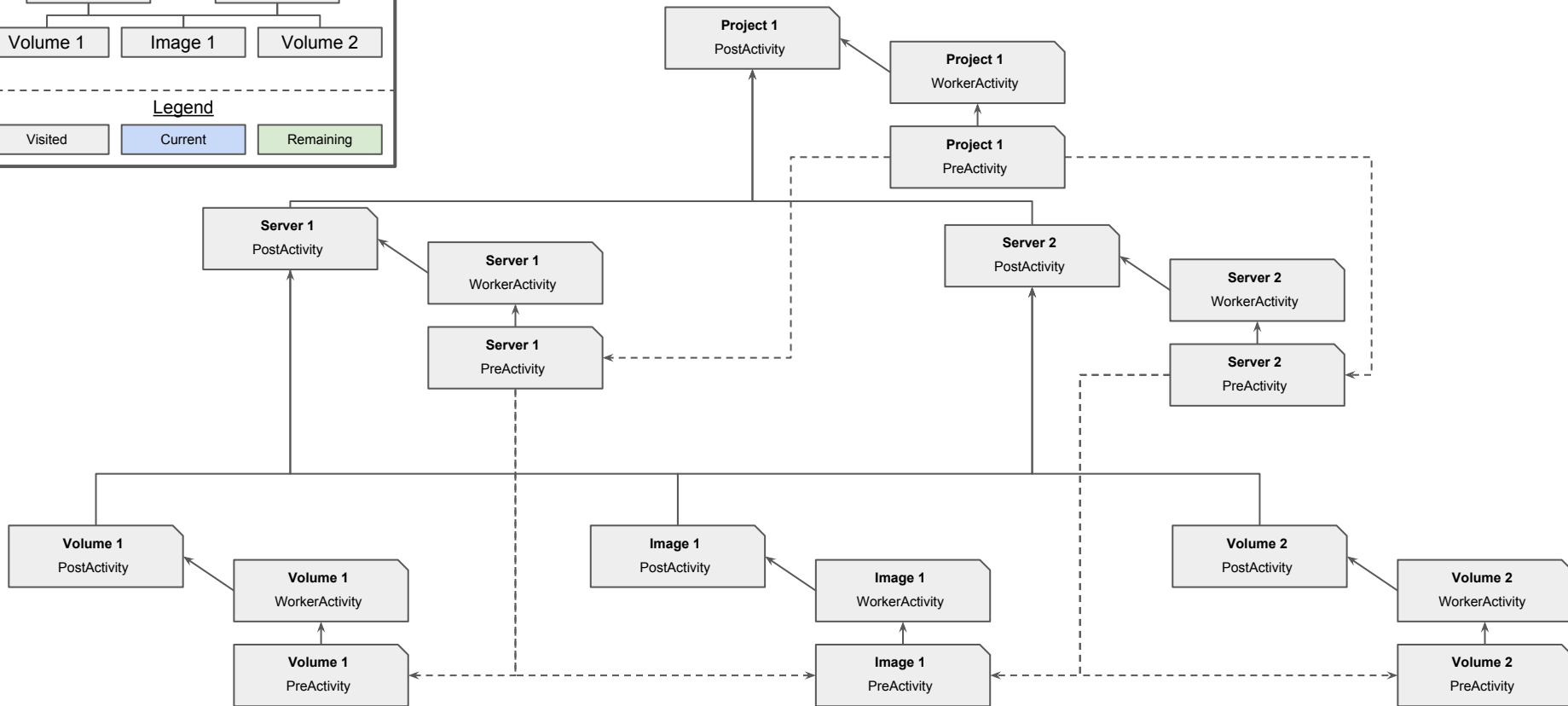
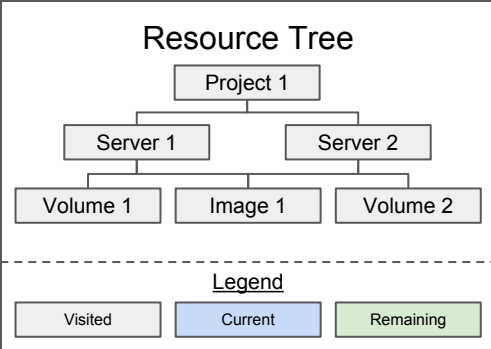
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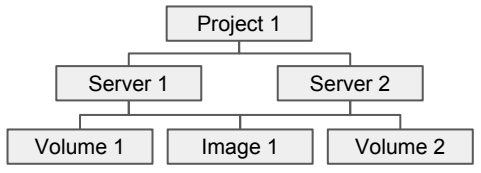
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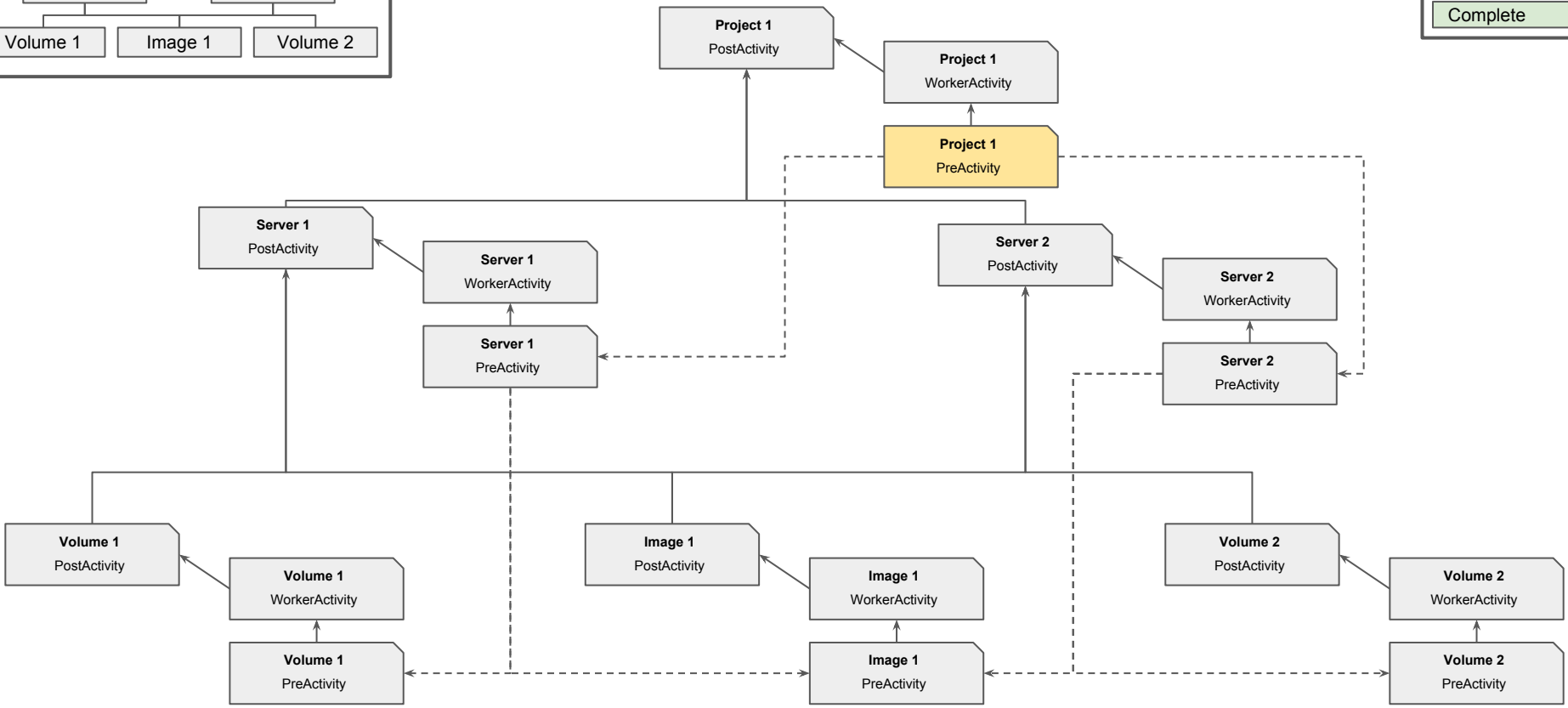
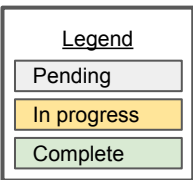
Task Flow Execution

Example of a naïve, completely parallel run of the constructed task flow

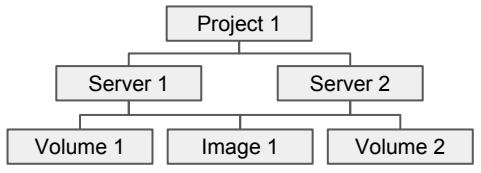
Resource Tree



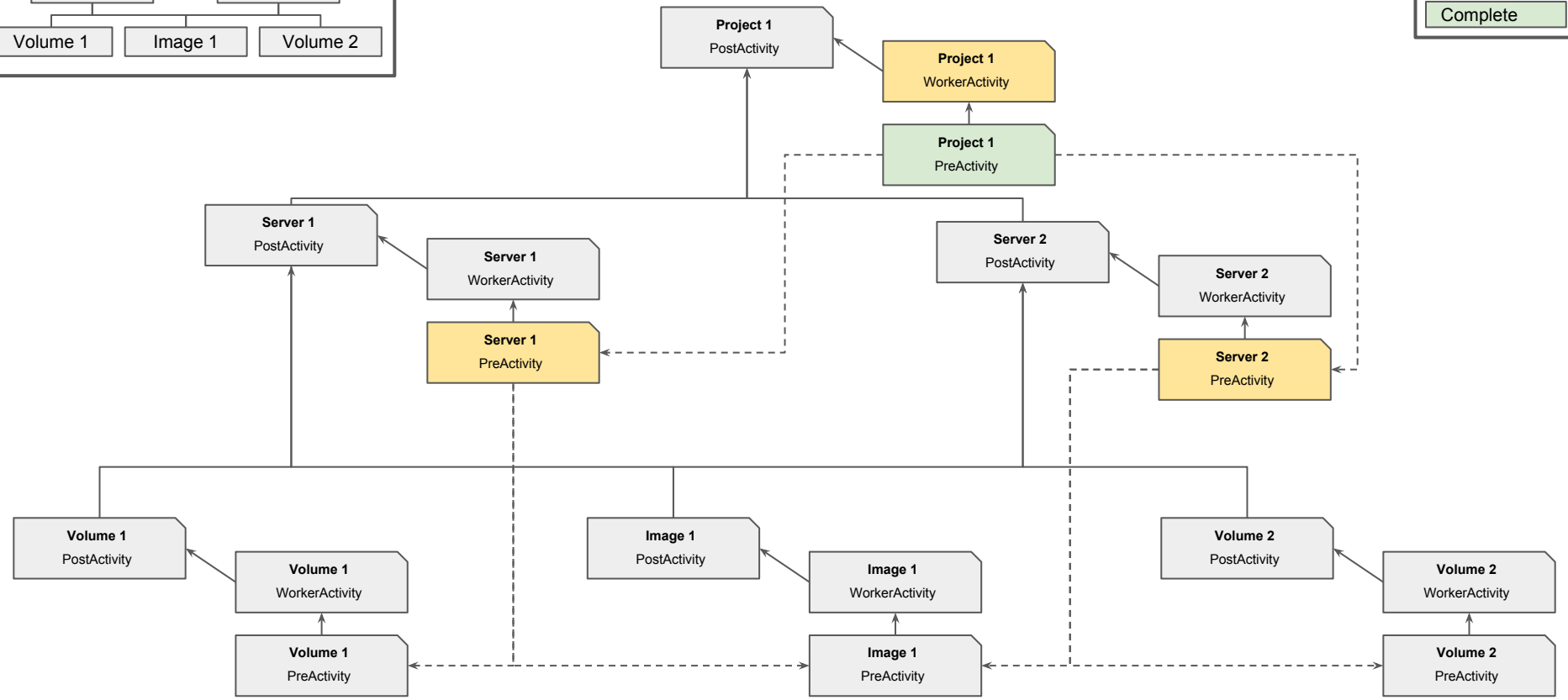
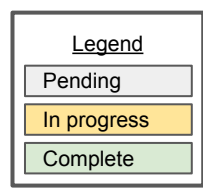
Executing Activity Tasks



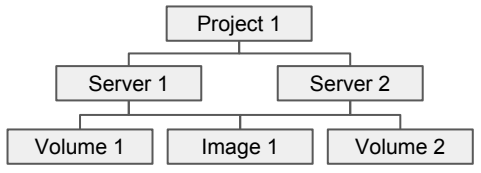
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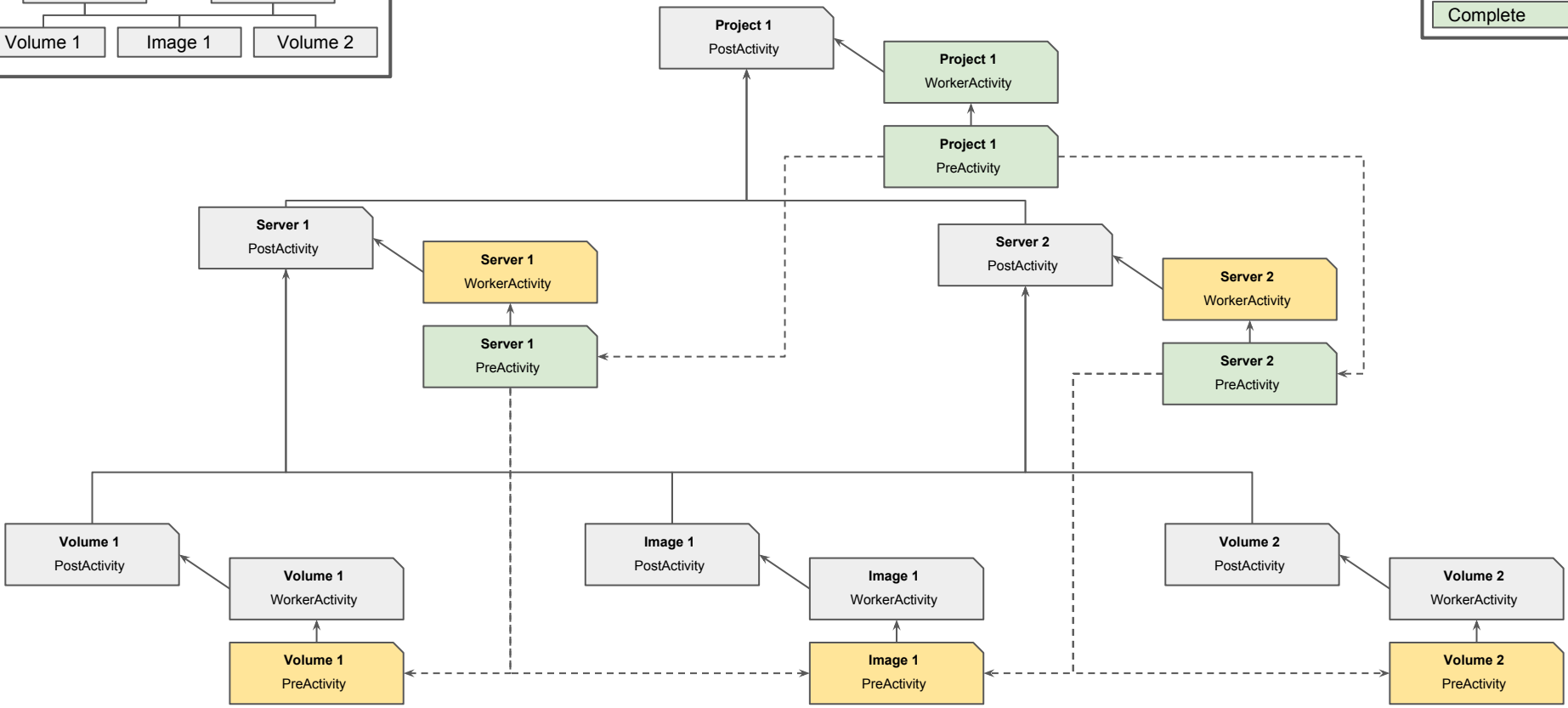
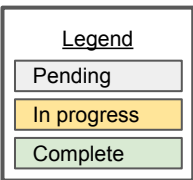
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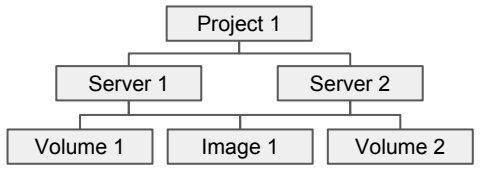
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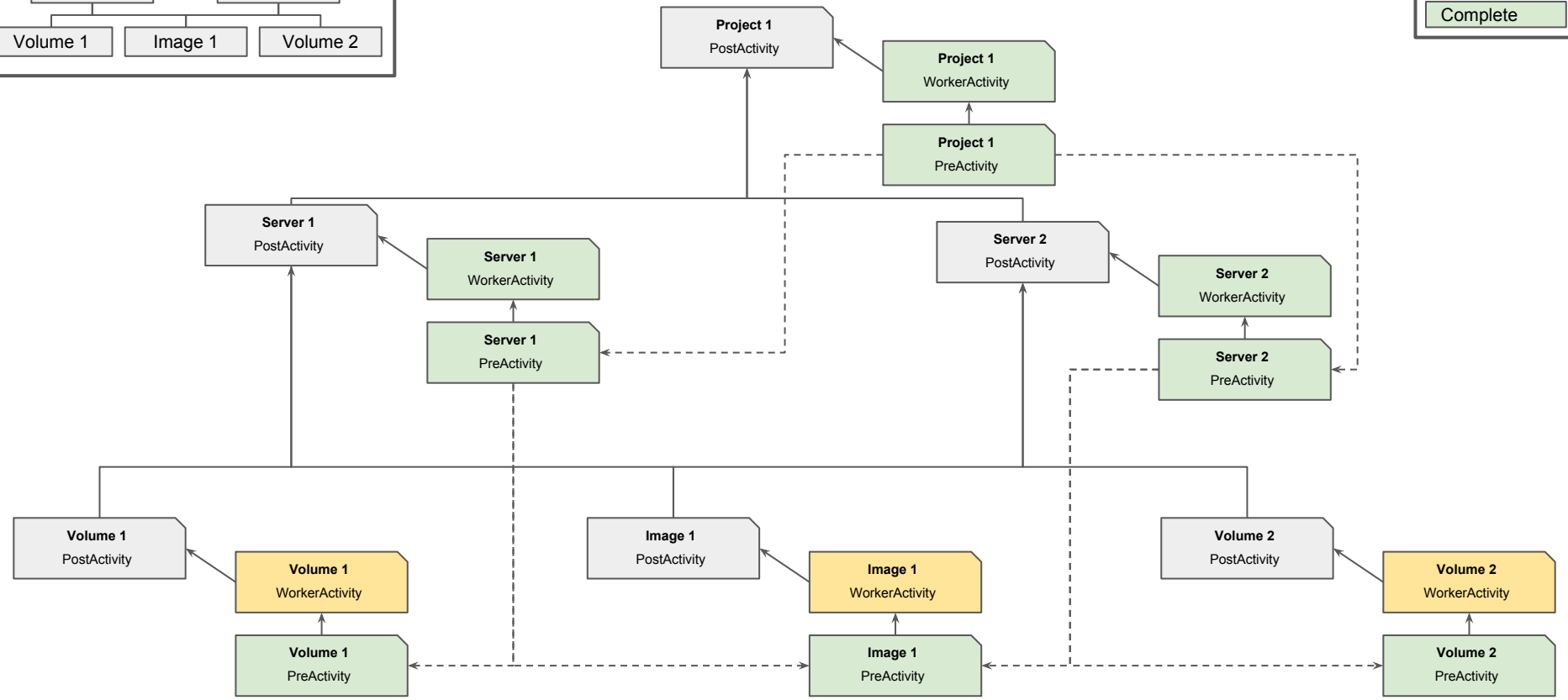
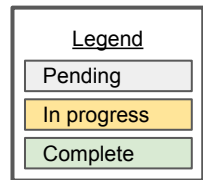
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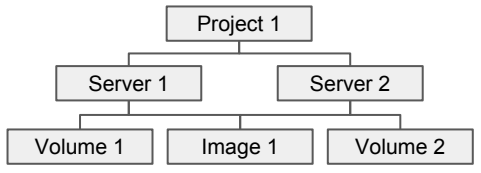
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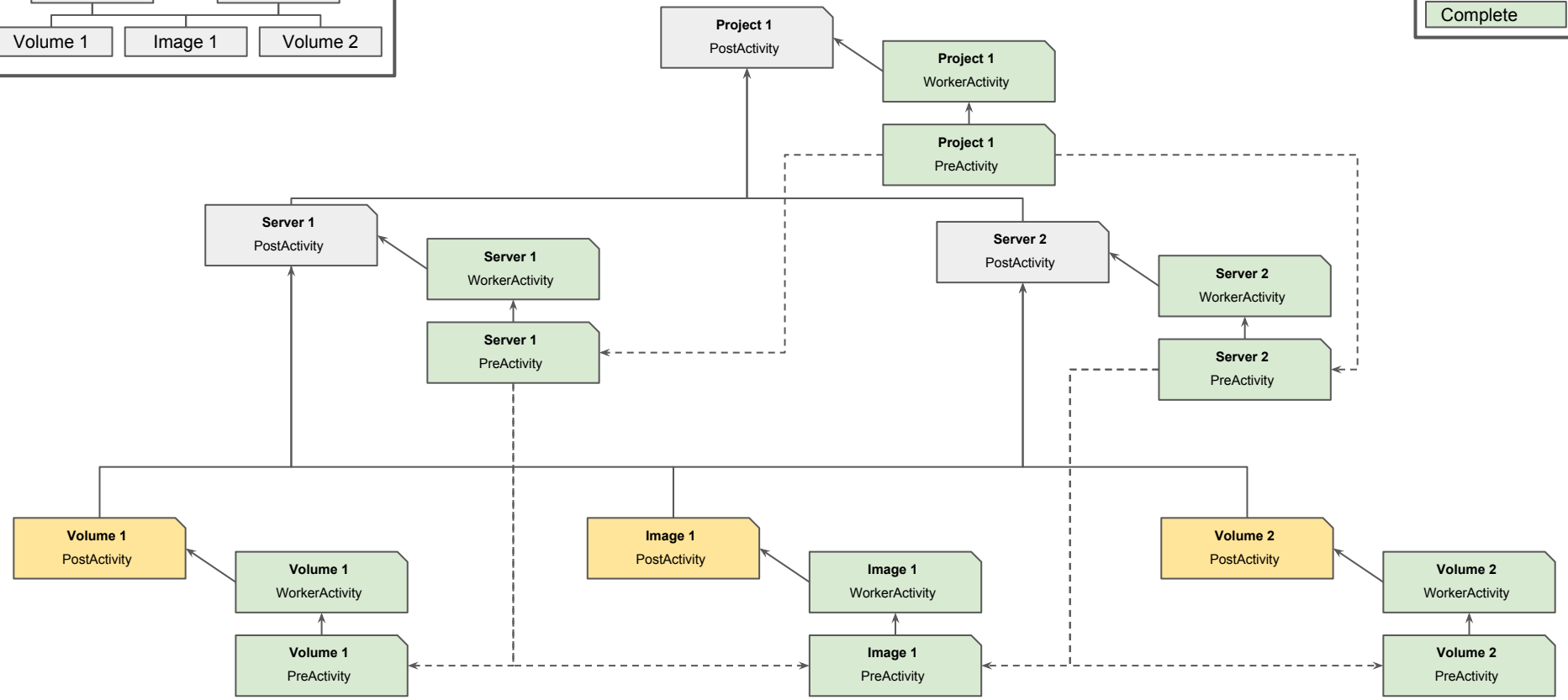
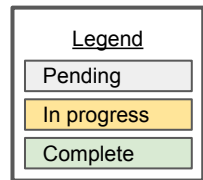
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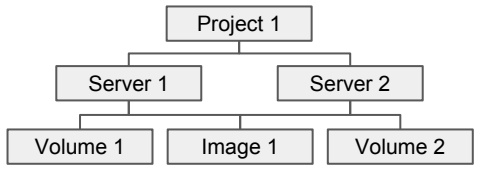
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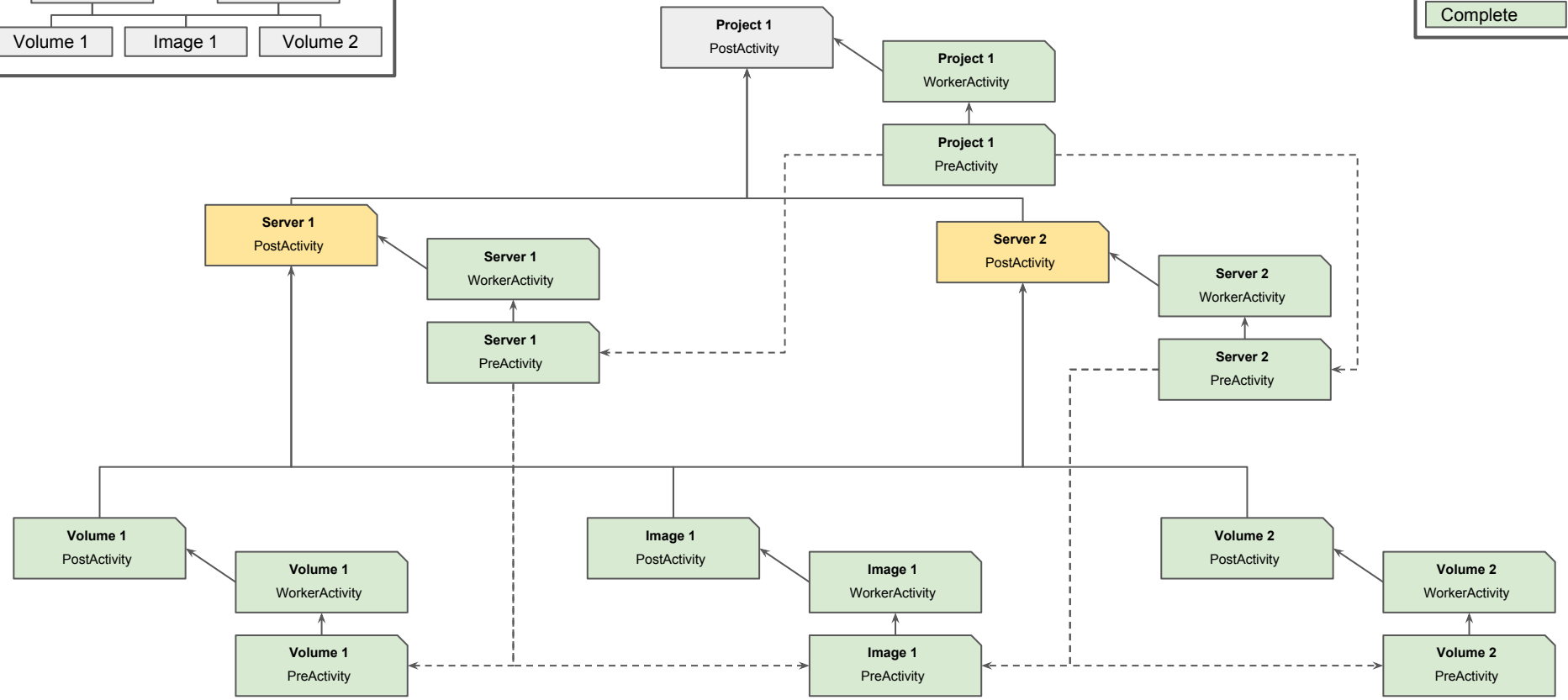
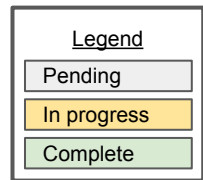
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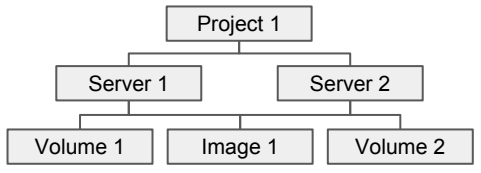
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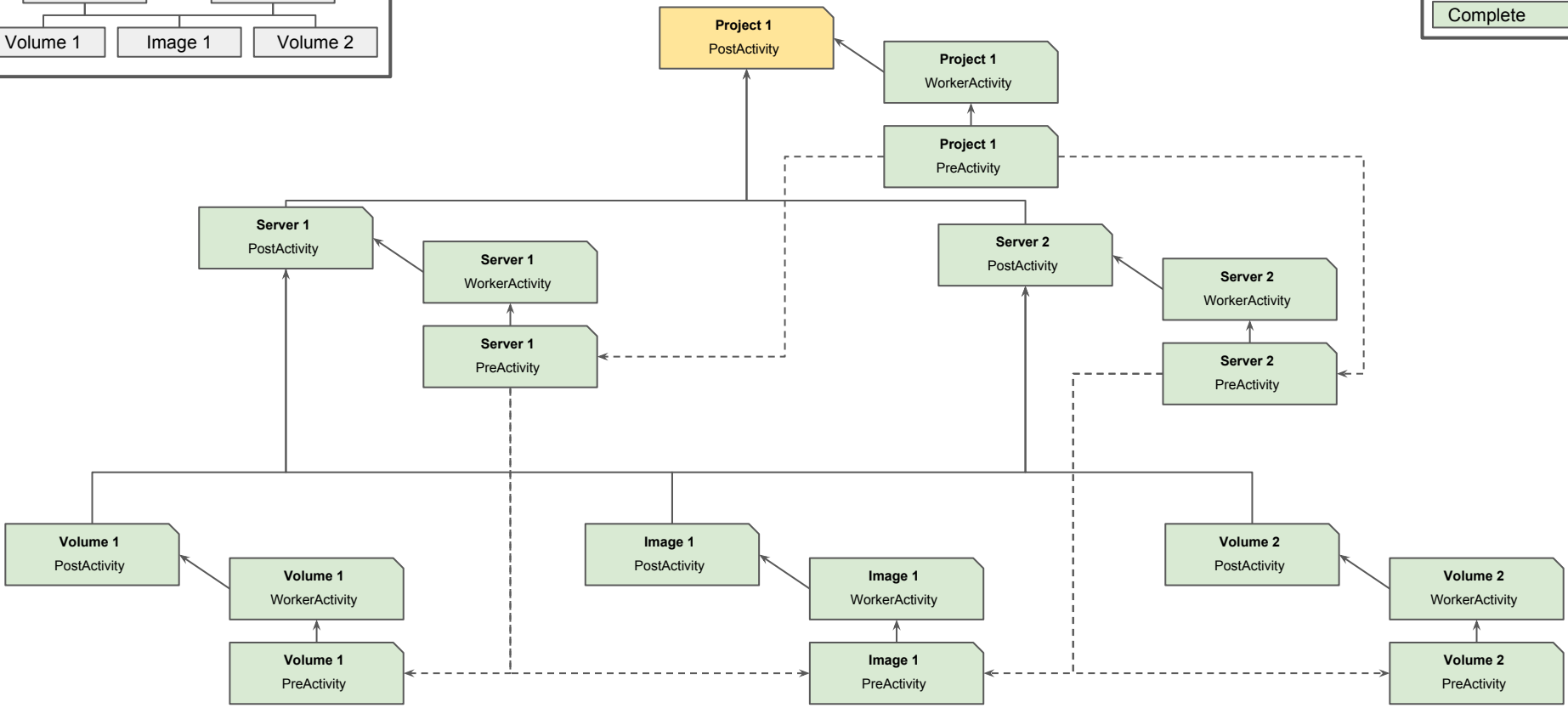
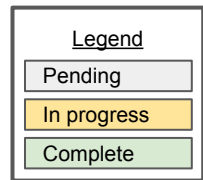
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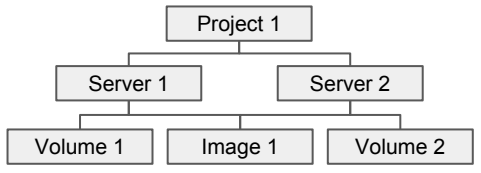
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Executing Activity Tasks



Resource Tree



Executing Activity Tasks

