

Nomad Basics

Core Concepts

<b>Client:</b> Executes tasks on behalf of Nomad.
<b>Server:</b> Manages the cluster state, schedules jobs, and handles client communication.
<b>Job:</b> A declaration of tasks to be run and their requirements.
<b>Task:</b> A single unit of work within a job.
<b>Allocation:</b> A mapping of a task to a specific client.
<b>Driver:</b> Responsible for executing tasks. Examples include <code>docker</code> , <code>java</code> , <code>exec</code> , <code>raw_exec</code> .

Nomad CLI Commands

<code>nomad job run &lt;jobfile.nomad&gt;</code>	Submit a job to Nomad.
<code>nomad job status &lt;job_id&gt;</code>	Check the status of a job.
<code>nomad job stop &lt;job_id&gt;</code>	Stop a running job.
<code>nomad node status</code>	Show status of all the nodes.
<code>nomad alloc status &lt;alloc_id&gt;</code>	Show status of the allocation
<code>nomad status</code>	Displays the overall Nomad cluster status.

Basic Job File Structure

```
job "example" {
  datacenters = ["dc1"]
  type = "service"

  group "web" {
    count = 3

    task "server" {
      driver = "docker"

      config {
        image = "nginx:latest"
        port_map {
          http = 80
        }
      }

      resources {
        cpu    = 500
        memory = 256
        network {
          mbits = 10
          port "http" {}
        }
      }
    }
  }
}
```

Job Specification Details

Job Block

<code>job "job_name" {}</code>	Defines the job. Must be unique within the datacenter.
<code>datacenters = ["dc1"]</code>	Specifies the datacenters where the job can run.
<code>type = "service"</code>	Job type. Can be <code>service</code> (long-running) or <code>batch</code> (finite).
<code>priority = 50</code>	Specifies job priority. Higher number means higher priority. Default is 50.
<code>update {}</code>	Controls the job update strategy.

Group Block

<code>group "group_name" {}</code>	Groups tasks together for scaling and placement.
<code>count = 3</code>	Number of task instances to run in this group.
<code>restart {}</code>	Defines restart policy for tasks in the group.
<code>ephemeral_disk {}</code>	Configures an ephemeral disk for tasks in the group.
<code>constraint {}</code>	Defines constraints for task placement.

Task Block

<code>task "task_name" {}</code>	Defines a single unit of work to be executed.
<code>driver = "docker"</code>	Specifies the task driver to use (e.g., docker, exec).
<code>config {}</code>	Driver-specific configuration (e.g., Docker image, command).
<code>resources {}</code>	Specifies resource requirements (CPU, memory, network).
<code>service {}</code>	Defines how the task should be registered as a service.
<code>template {}</code>	Configures dynamic templates using Consul or Vault data.

## Advanced Features

### Constraints

Constraints ensure that tasks are placed on suitable clients based on attributes.

Example:

```
constraint {
  attribute = "${node.class}"
  operator  = "=="
  value     = "web"
}
```

Common attributes: `node.class`, `node.datacenter`, `driver.docker`.

### Update Strategy

<code>update {}</code>	Controls how jobs are updated (rolling updates, canary deployments).
<code>max_parallel = 1</code>	Maximum number of allocations that can be updated concurrently.
<code>stagger = "10s"</code>	Delay between updating allocations.
<code>min_health_time = "30s"</code>	Minimum time an allocation must be healthy before continuing.
<code>auto_revert = true</code>	Automatically revert to the previous version if the update fails.

### Templates

Templates allow dynamic configuration based on Consul or Vault data.

Example:

```
template {
  data = <<EOH
  {{ with secret "secret/data/mydb" }}
  DATABASE_PASSWORD={{ .Data.password }}
  {{ end }}
  EOH

  destination = "secrets.env"
  perms = "0644"
}
```

## Networking and Service Discovery

### Networking

<code>network {}</code>	Configures the network resources for a task.
<code>port "http" { static = 8080 }</code>	Defines a static port mapping.
<code>port "http" {}</code>	Defines a dynamic port mapping, assigned by Nomad.
<code>mbits = 10</code>	Configures network bandwidth in megabits per second.

### Service Discovery with Consul

Nomad integrates with Consul for service discovery.

Example:

```
service {
  name = "web"
  tags = ["v1"]
  port = "http"

  check {
    type      = "http"
    path      = "/health"
    interval  = "10s"
    timeout   = "5s"
  }
}
```

This registers the task with Consul, including health checks.

### Vault Integration

Nomad can retrieve secrets from Vault for secure configuration.

Example:

```
template {
  data = <<EOH
  {{ with secret "secret/data/mydb" }}
  DATABASE_PASSWORD={{ .Data.password }}
  {{ end }}
  EOH

  destination = "secrets.env"
  perms = "0644"
}
```

Ensure that the Nomad client has appropriate Vault policies.