Advanced Concepts in Bicep

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Data Passionist

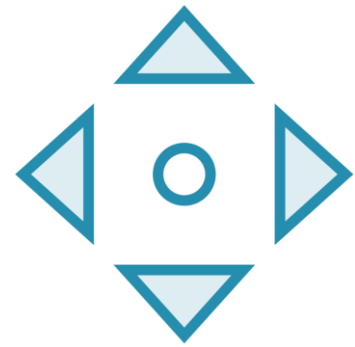@bweissman   www.solisyon.de

Overview

Parameterizing Bicep

Conditional and dependent deployments
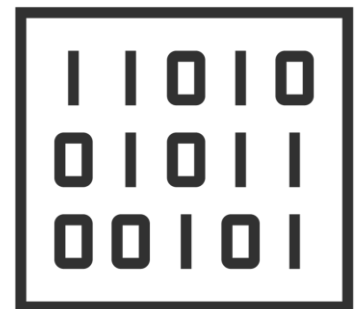
Deployment at scale

Securing Bicep

Parameters

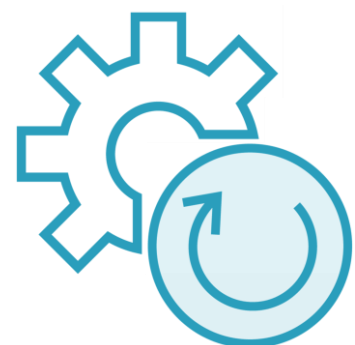**Can be changed for each deployment**

Use explicit data types

Become optional by providing a default value

Can reference scoped values (e.g. location of Resource Group) and functions

Can be restricted by ranges and value lists.

Can be secured to avoid logging.

Variables

Can not be changed for each deployment

Must have a value

Use implicit data types

Can reference scoped values (e.g. Location of Resource Group), functions as well as parameters
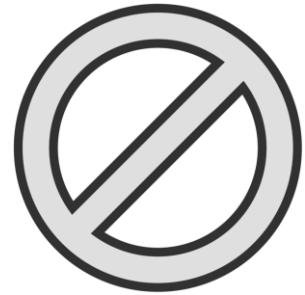
Parameters and Variables in Bicep

```
resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: 'myappsp'
  location: 'westus'
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName:  'myappsp'
  }
}
```

Parameters and Variables in Bicep

```
resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: 'myappsp'
  location: resourceGroup().location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName:  'myappsp'
  }
}
```

Parameters and Variables in Bicep

```
param location string = resourceGroup().location

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: 'myappsp'
  location: location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName:  'myappsp'
  }
}
```

Parameters and Variables in Bicep

```
param location string = resourceGroup().location

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: 'myappsp'
  location: location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName:  'myappsp'
}
}
```

Parameters and Variables in Bicep

```
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appName
  location: location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appName
  location: location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName: appName
  }
}
}
```

Parameters and Variables in Bicep

```bicep
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appName
  location: location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: 'S1'
    capacity: 1
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: 'S1'
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
}
}
```

Parameters and Variables in Bicep

```
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: 'S1'
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
}
}
```

Parameters and Variables in Bicep

```
@minValue(1)
@maxValue(3)
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: 'S1'
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```
param skuName string

@minValue(1)
@maxValue(3)
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: skuName
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```bicep
param skuName string = 'S1'

@minValue(1)
@maxValue(3)
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: skuName
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```
param skuName string = 'S1'

@minValue(1)
@maxValue(3)
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: skuName
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```bicep
@allowed([
  'S1'
  'S2'
  'S3'
])
param skuName string = 'S1'

@minValue(1)
@maxValue(3)
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: skuName
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
  }
}
```

Parameters and Variables in Bicep

```
@allowed([
  'S1'
  'S2'
  'S3'
])
param skuName string = 'S1'

@minValue(1)
@maxValue(3)
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

@secure()
param securePassword string

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: skuName
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
  }
}
```
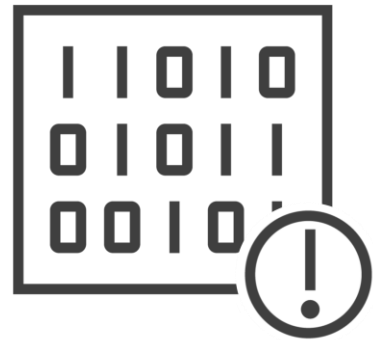
Parameters and Variables in Bicep

```
@allowed([
  'S1'
  'S2'
  'S3'
])
param skuName string = 'S1'

@minValue(1)
@maxValue(3)
param skuCapacity int = 1
param location string = resourceGroup().location
param appName string = uniqueString(resourceGroup().id)

@secure()
param securePassword string

var appServicePlanName = toLower('asp-${appName}')

resource appServicePlan 'Microsoft.Web/serverfarms@2020-06-01' = {
  name: appServicePlanName
  location: location
  sku: {
    name: skuName
    capacity: skuCapacity
  }
  tags: {
    ProjectName: appName
    SecondTag: securePassword
  }
}
```

Outputs

Use explicit data types

Reference variables, functions, parameters, or resource properties

Are stored and returned as part of the deployment
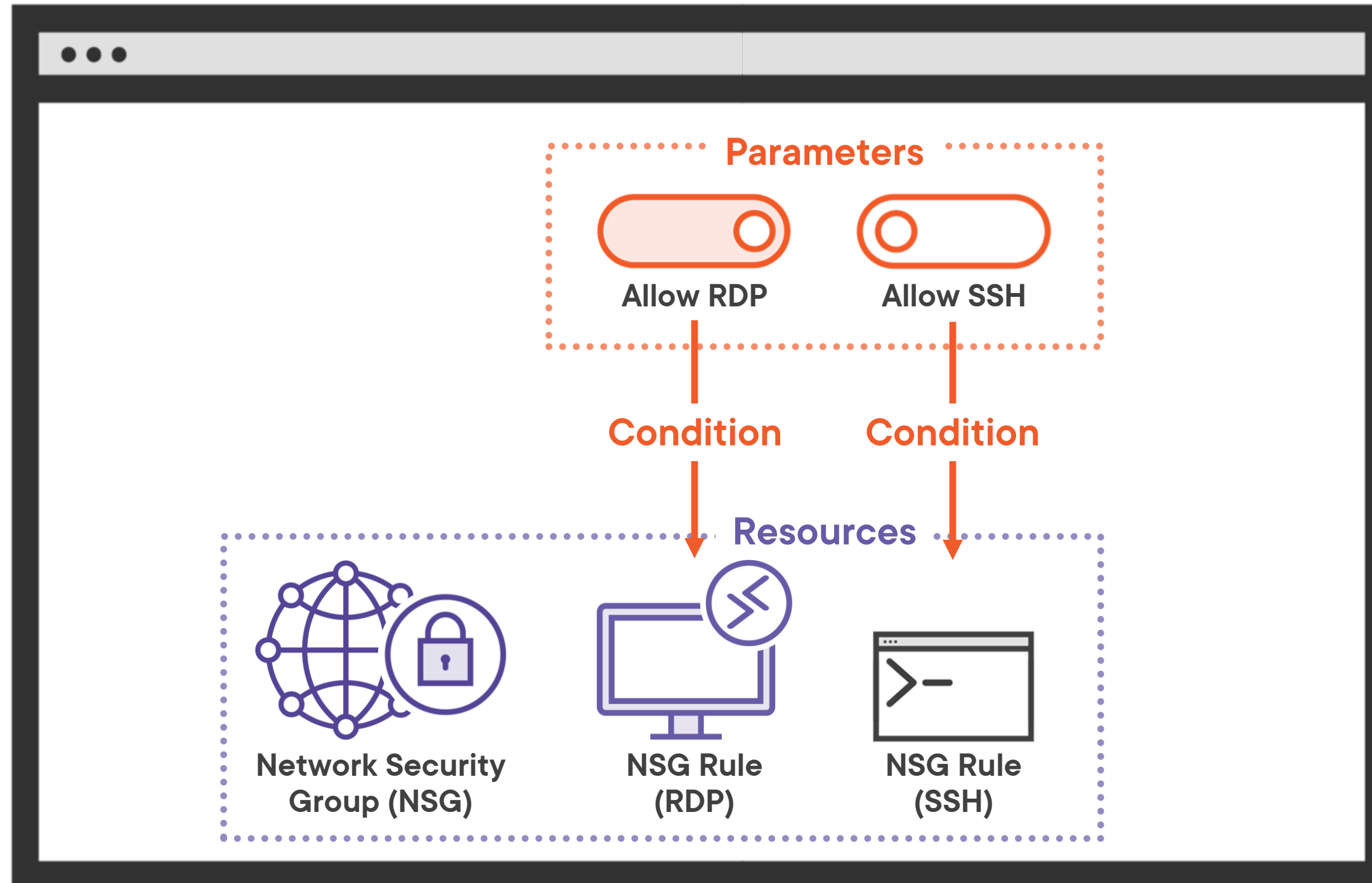
Demo

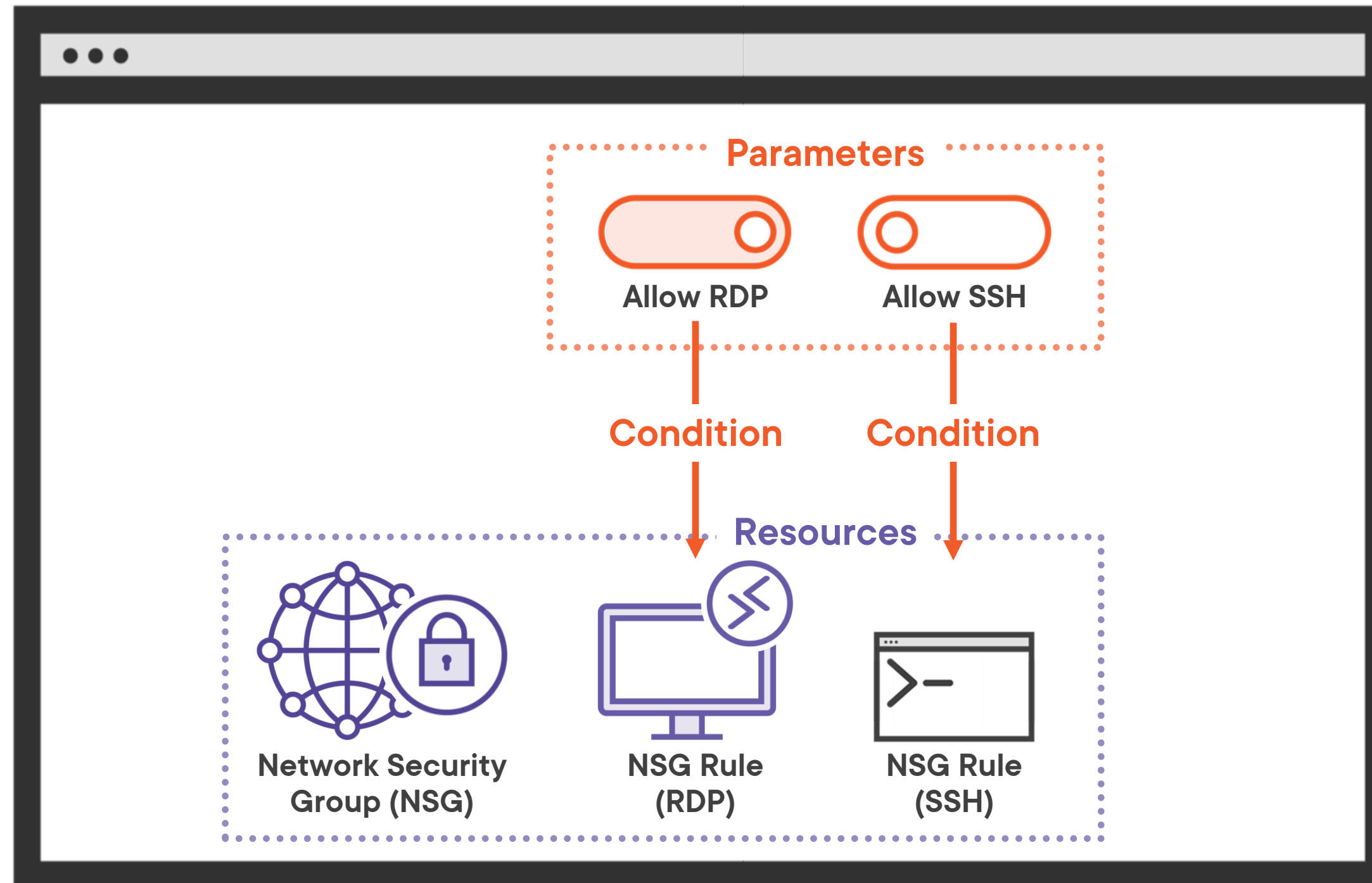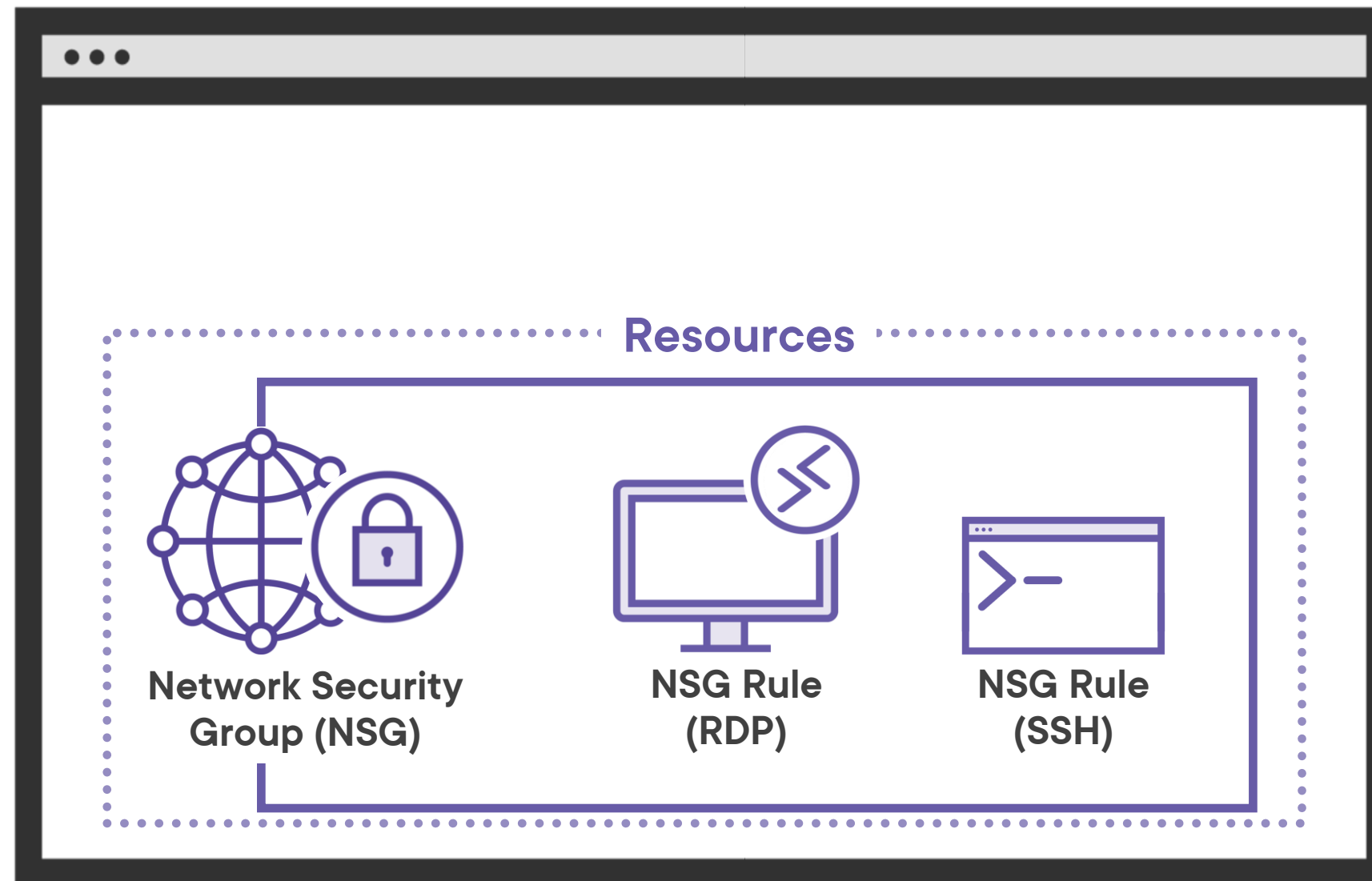Authoring and deploying a Bicep file with variables, parameters, and outputs
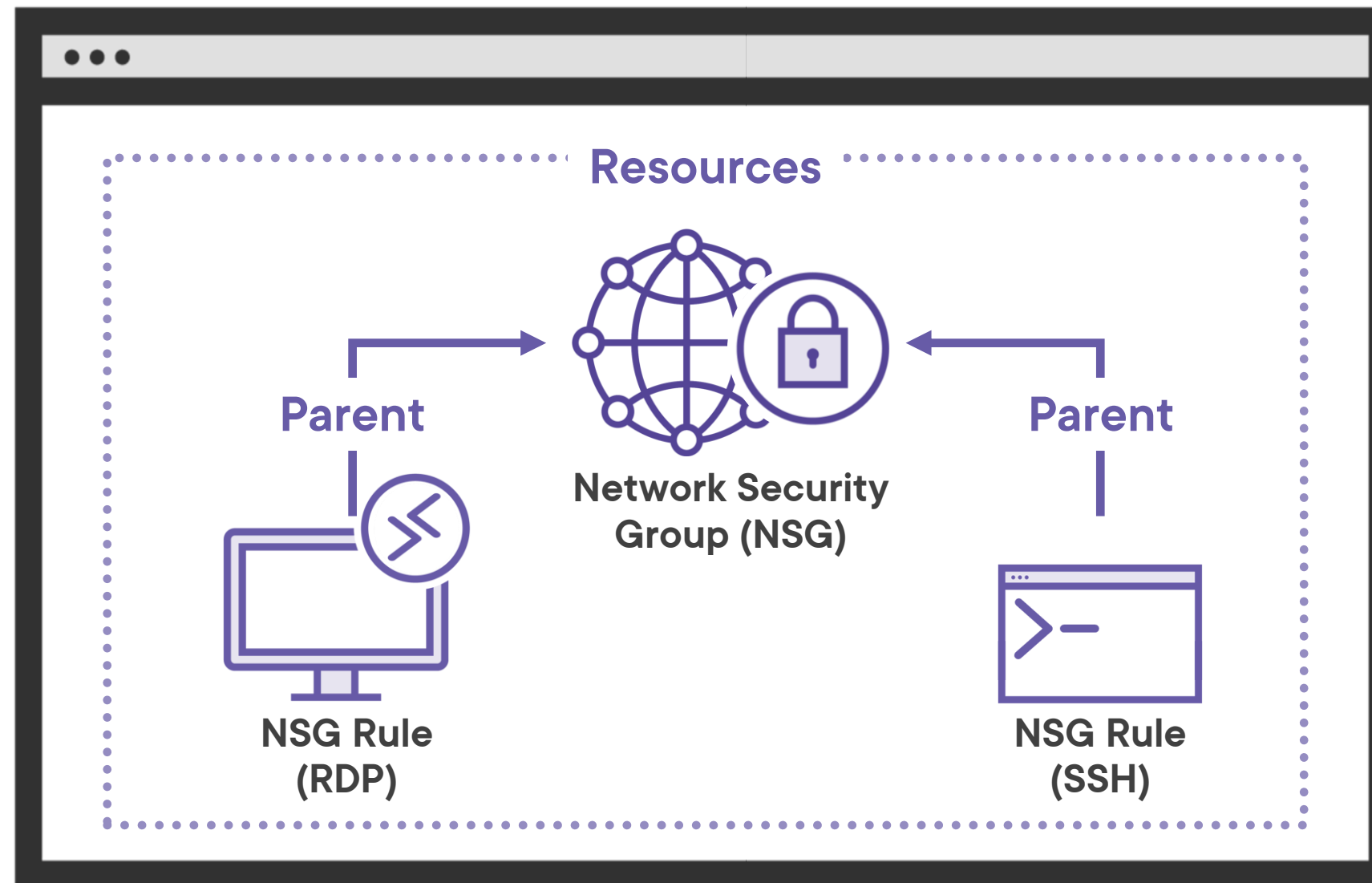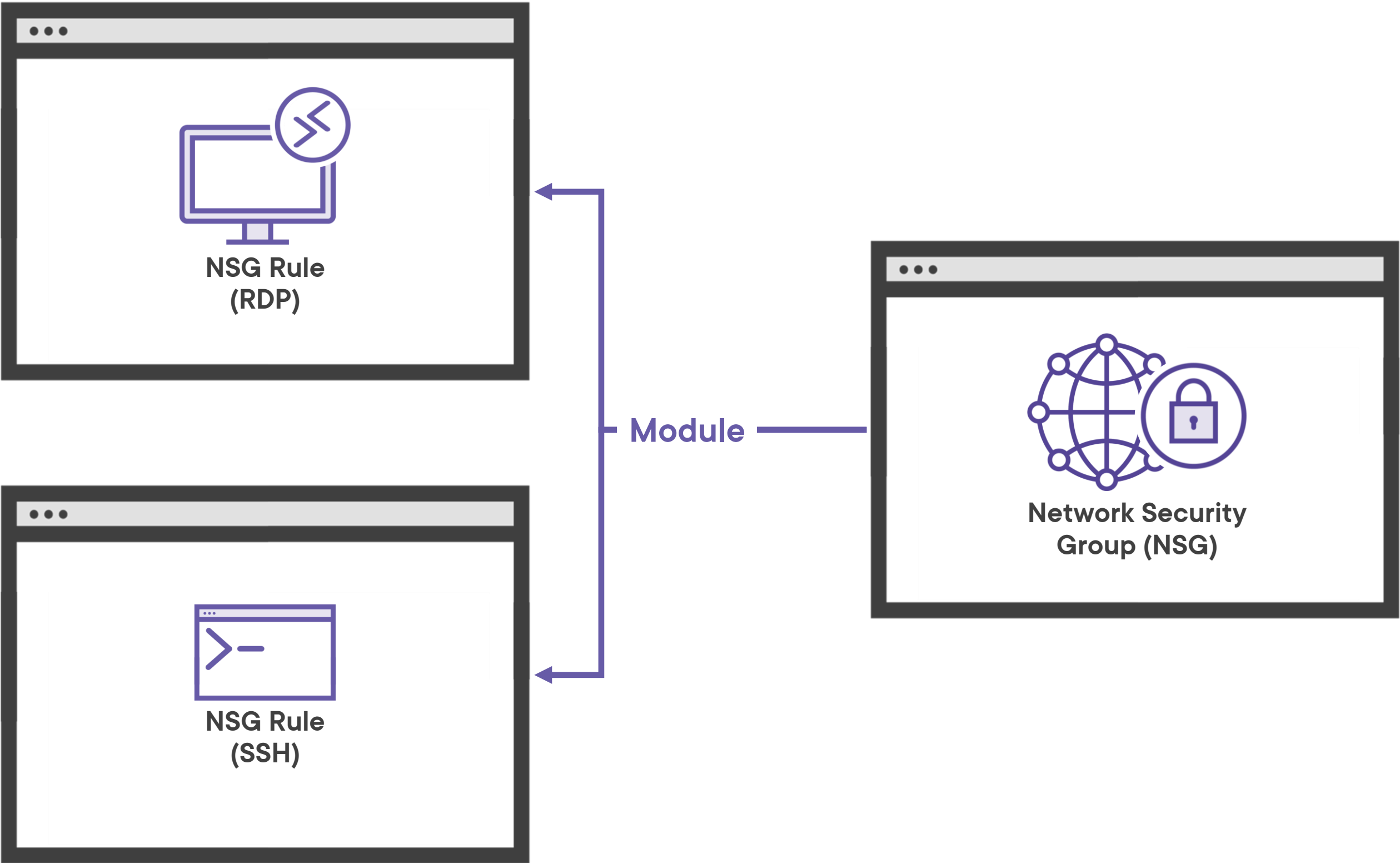
Conditional Deployment

Conditional Deployment

Child Resources

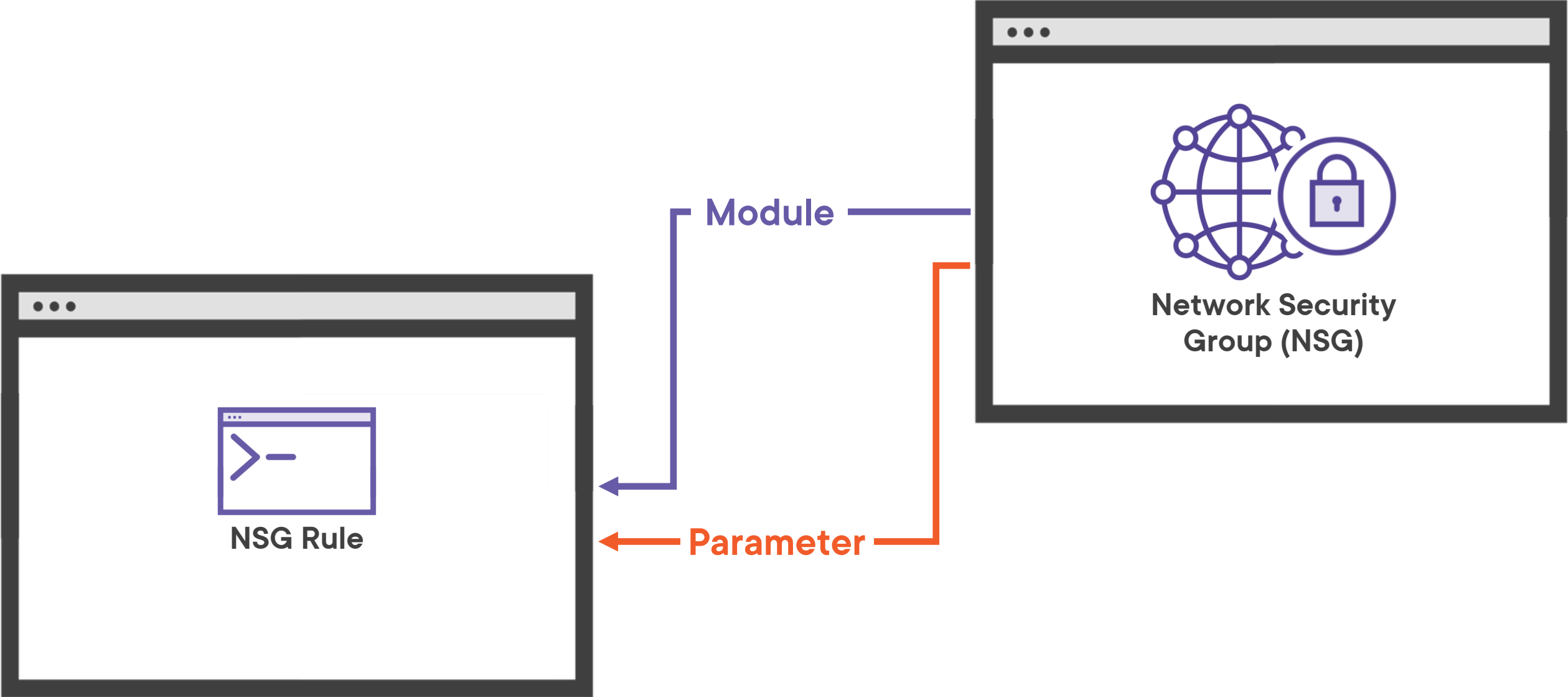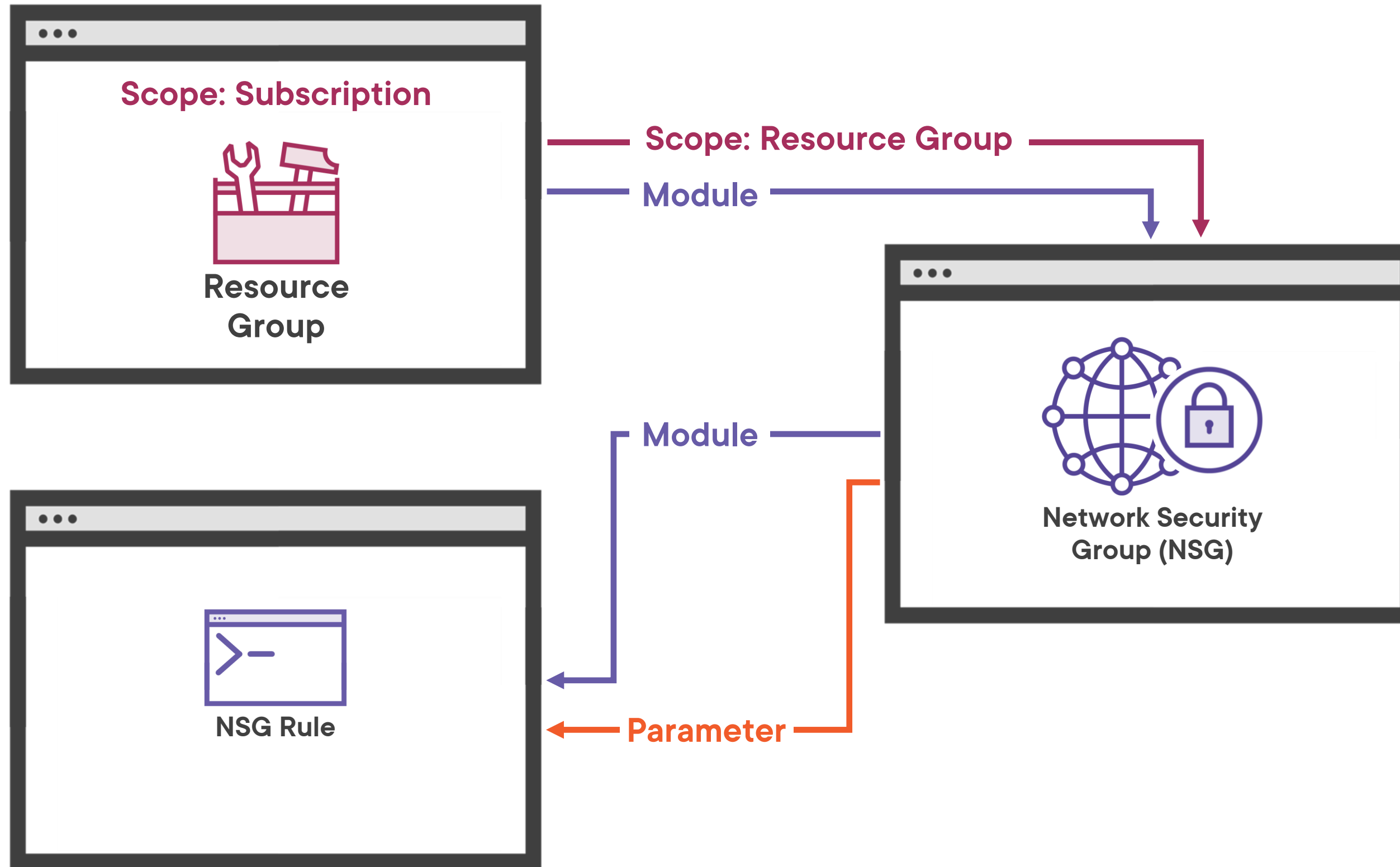# Child Resources

https://docs.microsoft.com/en-us/azure/azure-resource-manager/bicep/child-resource-name-type

Modules

Modules

Modules

Demo

Conditional deployments

Deploying dependent resources

Deployment at Scale

Deployment Tools

PowerShell

PowerShell

Azure CLI

BICEP

PowerShell

@batchSize(n)

Iterations Over

{ } | **Arrays**

{...} | **Array Elements**

| **Ranges**

```
resource <name> '<resource-type>@<api-version>' = [for <item> in <collection/range>: { <resource-properties> }]
```

https://docs.microsoft.com/en-us/azure/azure-resource-manager/bicep/loop-resources

Demo

Deployment at scale

Bicep and Key Vault

@secure()

getSecret()

reference

Enabled for template deployment

https://docs.microsoft.com/en-us/azure/azure-resource-manager/bicep/key-vault-parameter

Demo

Securing Bicep

Overview

Can be organized and structured with parameters, variables, outputs, functions, loops, conditions, and modules

Files can reference each other, even across scopes

Organizing files results in reusable code

Can be secured using key vault integration