6.2 Deploy in a Connected Environment

Go to 6. Connected Operations

Within a Connected Environment, Crucible deploys an identified environment to an authorized Deployment Target.

Connected operation allows the deployment activity to interact with the authorized provider services, repositories, registries, and other External Systems required by the applicable deployment.

Connectivity establishes the operating condition. The Deployment Orchestration and Multi-Cloud Management requirements define the deployment capabilities.

Identify the Deployment

Crucible identifies the deployment to perform and the environment to be realized.

The deployment identifies:

- The applicable Infrastructure Baseline
- The selected Machine Images or Container Images
- The required application artifacts
- The selected Deployment Target
- The applicable Provider Implementation
- The deployment parameters
- The provider-specific parameters
- The required infrastructure resources
- The applicable security and configuration information

Each controlled input retains its identity and revision so the deployed result can be traced to the content used to create it.

Select the Deployment Target

Crucible selects an authorized Deployment Target that supports the resources and operations required by the deployment.

A connected Deployment Target can provide access to:

- Compute resources
- Storage resources
- Network resources
- Virtual-machine services
- Container services
- Platform services
- Provider-specific deployment interfaces

The selected Deployment Target can reside in a commercial cloud, private cloud, on-premises environment, or another supported infrastructure environment when the applicable requirements and Provider Implementation support that target.

Selection of a Deployment Target does not independently authorize deployment. The applicable access controls, Security Domain restrictions, and organizational approvals continue to govern the operation.

Prepare the Deployment Inputs

Crucible makes the controlled deployment inputs available to the applicable deployment operation.

The deployment inputs can include:

- An Infrastructure Baseline
- Machine Images
- Container Images
- Application artifacts
- Configuration definitions
- Network definitions
- Storage definitions
- Security configuration
- Preserved Dependencies
- Credential references
- Deployment parameters
- Provider-specific parameters

A connected deployment can obtain required inputs from authorized external repositories and services when the applicable lifecycle activity permits that access.

Crucible preserves the identity and revision of each input used by the deployment.

Resolve Provider-Specific Realization

Crucible separates provider-independent deployment intent from provider-specific realization.

The provider-independent deployment content identifies the required resources, relationships, and lifecycle operations.

The applicable Provider Implementation resolves that intent into the interfaces, resource types, identifiers, and parameters required by the selected provider.

Provider-specific information can include:

- Provider resource types
- Regions or locations
- Compute classes
- Storage classes

- Network identifiers
- Image identifiers
- Service identifiers
- Provider credentials or credential references
- Provider-specific configuration parameters

The Provider Implementation does not change the intended deployment outcome merely because the provider uses a different resource model or interface.

Perform the Deployment

Crucible performs the operations required to realize the environment on the selected Deployment Target.

The deployment can include:

1. Verify the required deployment inputs
2. Establish access to the selected Deployment Target
3. Create or configure infrastructure resources
4. Create network and storage resources
5. Instantiate Machine Images or Container Images
6. Apply the required configuration
7. Deploy application workloads
8. Apply security configuration
9. Execute required post-deployment operations
10. Record the result of each operation

The applicable Infrastructure Baseline and deployment description determine which operations Crucible performs and their required ordering.

Coordinate Deployment Operations

Crucible coordinates the individual operations that comprise the deployment.

Deployment orchestration preserves the relationships among:

- The selected Deployment Target
- The Infrastructure Baseline
- The Provider Implementation
- The deployed Images
- The deployment parameters
- The individual deployment operations
- The resources created or changed
- The resulting deployment status

Crucible records whether each deployment operation completed, failed, or could not proceed.

Deploy Across Supported Providers

Crucible can apply a consistent deployment lifecycle across supported provider environments.

Provider environments can differ in their:

- Resource models
- Interfaces
- Authentication mechanisms
- Network services
- Storage services
- Image formats
- Configuration parameters
- Operational constraints

The Provider Implementation handles provider-specific behavior while Crucible preserves the common deployment intent and lifecycle relationships.

Support for multiple providers does not require every provider to expose identical services or behavior.

Deploy to Multiple Targets

A deployment can include more than one Deployment Target when the applicable deployment definition requires a distributed environment.

Crucible preserves the identity and deployment result of each target-specific operation.

A connected multi-target deployment can include:

- Resources in multiple provider environments
- Resources in multiple geographic locations
- Resources in separate Security Domains
- Central and edge resources
- Different infrastructure types within one operational environment

Each Deployment Target remains independently identifiable even when the deployed resources collectively form one environment.

Handle Deployment Failures

When a deployment operation fails, Crucible records:

- The failed operation
- The affected Deployment Target
- The inputs supplied to the operation
- The observed failure

- The operations completed before the failure
- The resources created or changed
- The resulting deployment state

A deployment failure does not authorize substitution of an unidentified resource, unapproved provider, or uncontrolled deployment process.

Any rollback, recovery, remediation, or redeployment activity remains governed by its applicable requirement and deployment definition.

Connected Deployment Result

The connected deployment result identifies:

- The deployment identifier
- The selected Deployment Target or Targets
- The Infrastructure Baseline and revision
- The deployed Images and revisions
- The Provider Implementation and revision
- The deployment parameters
- The provider-specific parameters
- The deployment operations performed
- The status of each operation
- The resources created, changed, or removed
- The resulting deployment status
- Any failure information
- The associated Provenance
- The associated Traceability

The deployment result becomes the subject of the applicable validation, assessment, remediation, or subsequent lifecycle activity.

Requirements Addressed

Requirement	Statement
FR-DEP-001 — Deploy Infrastructure Resources	Crucible SHALL deploy Infrastructure Resources.
FR-DEP-002 — Deploy Virtual Machines	Crucible SHALL deploy Virtual Machines.
FR-DEP-003 — Deploy Kubernetes Clusters	Crucible SHALL deploy Kubernetes Clusters.
FR-DEP-004 — Deploy Containerized Workloads	Crucible SHALL deploy Containerized Workloads.
FR-DEP-005 — Deploy Platform Services	Crucible SHALL deploy Platform Services.
FR-MC-001 — Cloud Provider Abstraction	Crucible SHALL provide Cloud Provider Abstraction.
FR-MC-002 — Provider-Specific Extensions	Crucible SHALL provide provider-specific extensions through Provider Plugins.
FR-MC-003 — Deployment Portability Across Cloud Providers	Crucible SHALL provide deployment portability across Cloud Providers.
FR-MC-004 — Hybrid-Cloud Deployments	Crucible SHALL perform Hybrid-Cloud Deployments.
FR-MC-005 — Edge Deployments	Crucible SHALL perform Edge Deployments.

The linked leaf requirement pages remain the canonical sources.
