

1.1 Purpose

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The purpose of [Crucible](#) is to provide a general-purpose, reusable, and centrally maintained foundation for constructing, hardening, assessing, transferring, deploying, and maintaining software and [Infrastructure Environments](#).

Rather than requiring each product to create and sustain its own infrastructure automation, image-building, compliance, dependency, transfer, and deployment capabilities, Crucible provides a common approach that projects can configure and extend for their own requirements. This allows project teams to direct more of their funding, time, and specialized expertise toward the mission-specific functionality that gives each system its value.

Every software-intensive system depends on substantial supporting capabilities before its mission-specific functionality can operate reliably. Projects must determine how to construct and harden software, build operating environments, manage dependencies, assess compliance, generate [Evidence](#), deploy infrastructure, transfer artifacts, and maintain the resulting capability throughout its [Operational Lifecycle](#).

These activities are necessary, but they are rarely the reason the system exists. Even so, projects can spend many person-years creating them and must continue funding their maintenance as technologies, providers, security requirements, and compliance obligations change.

Organizations that support multiple products often repeat this work across separate project teams. Each team can select different tools, conventions, interfaces, Evidence formats, deployment methods, and operating procedures. This fragmentation makes software and automation difficult to reuse, increases the number of technologies the organization must maintain, and requires personnel to learn a different operational model each time they move between projects.

A common Crucible foundation allows corrections, security enhancements, provider updates, compliance changes, and operational lessons to benefit multiple products. Shared concepts, interfaces, tools, [Baselines](#), and operational practices also improve personnel mobility by allowing engineers, operators, security personnel, and compliance personnel to apply knowledge gained on one product to another.

Crucible fulfills this purpose through a controlled and reproducible lifecycle. Projects describe intended results through [Declarative Descriptions](#), compose reusable Baselines, construct [Machine Images](#), define infrastructure through [Infrastructure as Code \(IaC\)](#), capture dependencies, perform [Compliance Assessments](#), generate supporting Evidence, and preserve the information required to reproduce and verify the resulting environment.

Crucible separates provider-independent intent from provider-specific implementation through [Provider Abstraction](#), defined provider contracts, and replaceable provider plugins. This separation supports [Portability](#) across cloud, on-premises, hybrid, [Connected Environments](#), [Disconnected Environments](#), and [Air-Gapped Environments](#).

Throughout the Operational Lifecycle, Crucible preserves version-pinned inputs, dependency records, integrity values, build outputs, [Compliance Findings](#), [Provenance](#), [Traceability](#), and Evidence. This information supports [Reproducibility](#), [Auditability](#), operational confidence, and legal and regulatory defensibility.

Crucible supports the creation of [Software Factories](#) that can satisfy the technical and evidentiary objectives associated with an [Accredited Software Factory](#). Crucible does not grant [Accreditation](#), [Operational Approval](#), or an [Authority to Operate \(ATO\)](#). The responsible governance, assessment, and authorizing authorities make those determinations using the governing criteria, assessment results, and supporting Evidence produced or preserved through Crucible.

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