# Distributed Environment

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## Discussion

A Distributed Environment is an Infrastructure Environment whose components, resources, services, or operational functions span multiple networked Nodes or locations.

The distribution can involve:

- Compute resources
- Storage resources
- Network resources
- Software components
- Services
- Data
- Processing
- Management functions
- Operational responsibilities

The participating Nodes or locations cooperate to provide the behavior of the environment.

A Distributed Environment can span multiple:

- Geographic locations
- Data centers
- Cloud regions
- Edge locations
- Network zones
- Deployment Targets
- Security Domains
- Connected, disconnected, or intermittently connected network segments

A Distributed Environment differs from a Distributed System:

- A Distributed Environment describes the infrastructure, resources, services, and operational context distributed across Nodes or locations
- A Distributed System describes coordinated system behavior allocated across multiple networked Nodes

A Distributed Environment can host one or more Centralized Systems, Distributed Systems, or combinations of both.

A Distributed Environment also differs from a Distributed Network Topology:

- A Distributed Environment describes the complete operational environment
- A Distributed Network Topology describes the arrangement and interconnection of its network Nodes

A Distributed Environment can operate under Centralized Management even though its resources and functions remain distributed.

# Definition

*infrastructure environment whose components, resources, services, or operational functions span multiple networked Nodes or locations*

# Source

- DIDO Reference Architecture, Network Topology Taxonomy
- Dido Solutions, Inc. and Jackrabbit Consulting, Inc.

# Note

A Distributed Environment does not require:

- Every Node to perform the same function
- Every Node to hold the same data
- Direct communication between every pair of Nodes
- Equal authority among Nodes
- One specific network topology
- One specific management model

The governing architecture determines:

- Node roles
- Resource allocation
- Service placement
- Data placement
- Communication paths
- Management authority
- Security boundaries
- Failure-handling behavior
- Connectivity requirements

Physical separation alone does not establish a Distributed Environment. The separated components, resources, services, or operational functions form one environment through defined relationships and coordinated operation.

The term does not prescribe cloud computing, peer-to-peer communication, consensus algorithms, distributed ledgers, containers, virtual machines, or a particular network protocol.

# Example

An Infrastructure Environment contains compute resources in two data centers, storage resources in a cloud region, and validation services at an edge location.

The resources and services cooperate as one managed environment. Crucible performs Centralized Management of the Distributed Environment while its infrastructure remains distributed across the participating locations.

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