



**ORACLE®**

## **WebLogic Server Foundation Topology, Configuration and Administration**

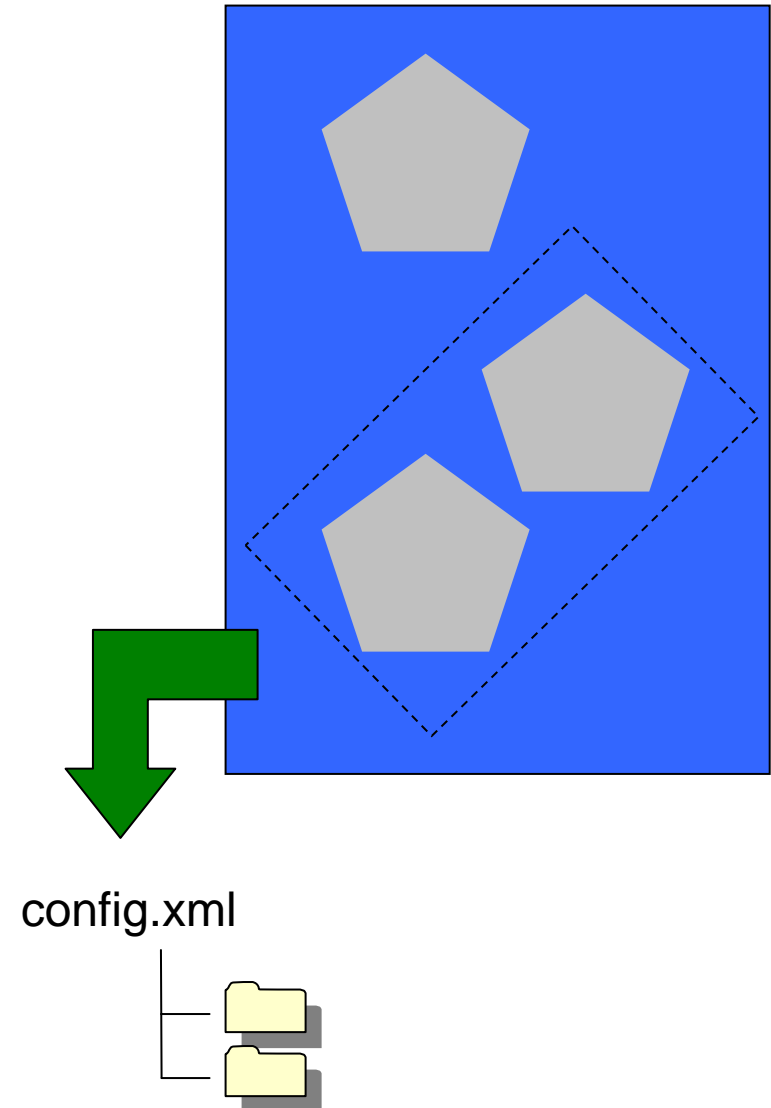
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# Agenda

- Topology
  - Domain
  - Server
  - Admin Server
  - Managed Server
  - Cluster
  - Node Manager
  - Machine
- Configuration Files
- Administration Tools
- Sample Configuration Schemes

# Domain

- What is it?
  - a logically related group of WebLogic Server instances that you manage from a single set of configuration artifacts.
- What's in a domain?
  - Servers
  - Clusters of servers
- Rules:
  - All WebLogic Server instances within the same domain must be at the same major and minor version.
  - Servers within a domain can be at different Maintenance Pack levels as long as the Administration Server is at the same Maintenance Pack Level or higher than its Managed Servers.

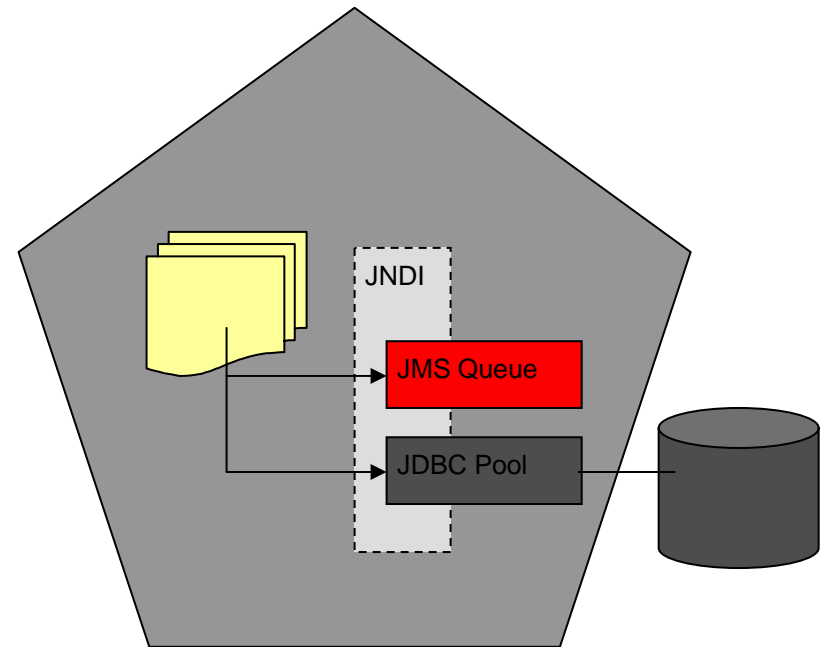


# Why Use Domains

- A domain is an administration feature that:
  - Is transparent to applications
  - Can be configured and administered, for technical or business reasons, even after the applications are developed or are in production
- Oracle WebLogic Server domains can be used to separate:
  - Development, test, and production applications
  - Administration and operational responsibilities
  - Organizational or business divisions

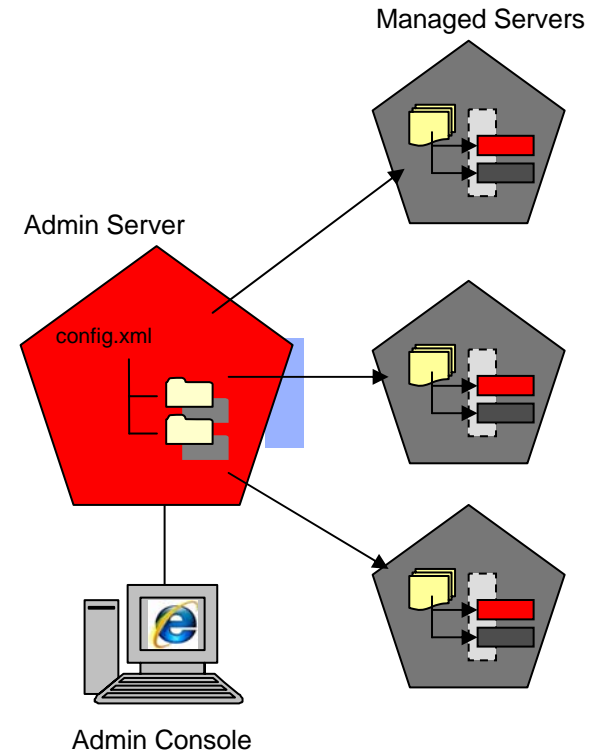
# Server

- A server is an instance of `weblogic.Server` executing in a Java Virtual Machine (JVM).
- A server:
  - Runs on a designated Oracle WebLogic Server machine
  - Has a dedicated amount of RAM
  - Is multithreaded
- A configured instance to host applications and resources
- Two types of servers:
  - Administration Server
  - Managed Server



# Administration Server

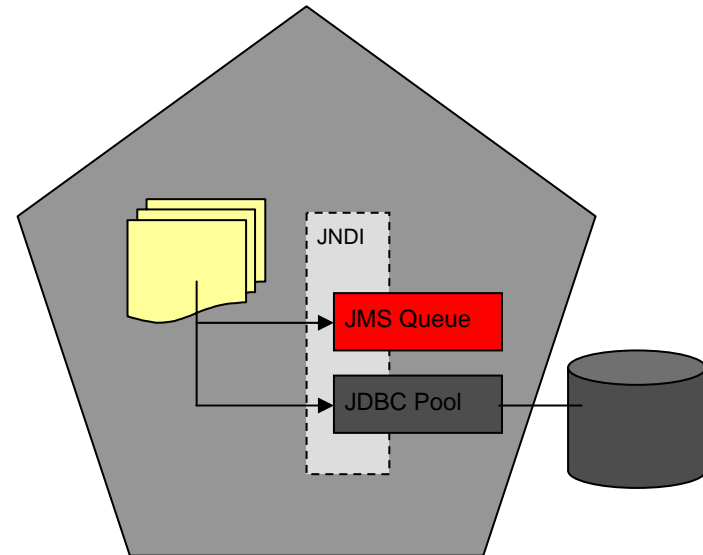
- What is it?
  - Central configuration controller for the entire domain
- What else does it do?
  - Hosts the Administration Console
  - Enables you to start and stop servers from a central location
  - Enables you to migrate servers and services within the domain
  - Enables you to deploy applications within the domain
- Guidelines:
  - There must be exactly one\* Administration Server in domain
  - An Administration Server controls only one domain.
  - For production use, we recommend not hosting application logic or resources on the Administration Server



***\*The Administration Server does not need to run at all times, but is required for making configuration and deployment changes to a running domain.***

# Managed Server

- What is it?
  - A running instance that hosts applications and resources needed by those applications - The real work horses in a WebLogic domain
  - Each Managed Server is independent of all other Managed Servers in the domain (unless they are in a cluster, defined later)
  - You can have as many Managed Servers in a domain as you need
  - Individual Managed Servers are typically added for capacity and application isolation



# Administration Server to Managed Server Interaction

- The Administration Server stores the master copy of the domain configuration, including the configuration for all managed servers in the domain
- Each Managed Server stores a local copy of its configuration.
- When a Managed Server starts, it connects to the Administration Server to synchronize the configuration
- When configuration is changed, the Administration Server sends changed configuration to Managed Servers

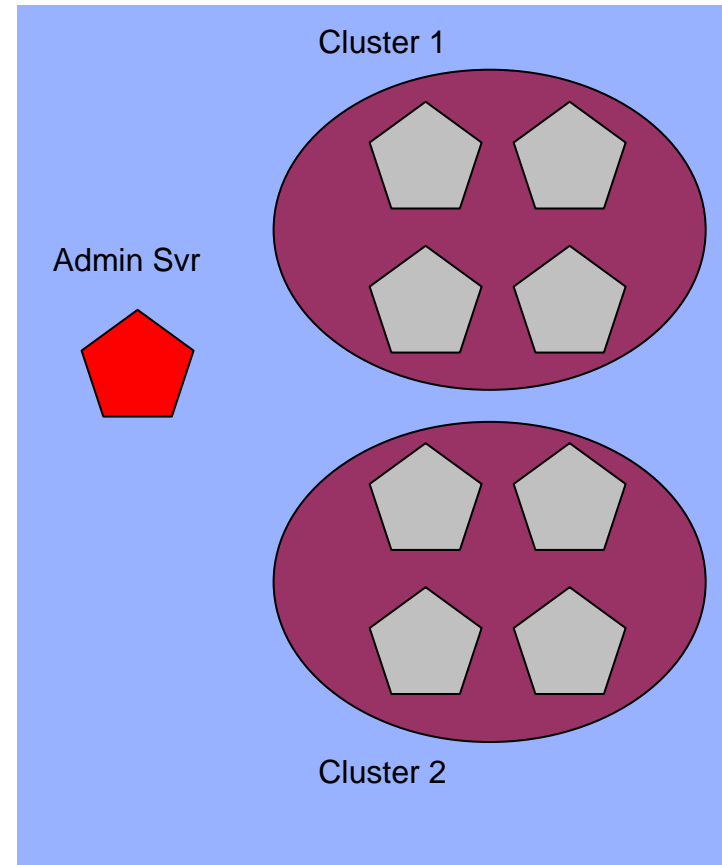


# Machine

- A definition that identifies a particular, physical piece of hardware.
- A machine definition is used to associate a computer with the Managed Servers it hosts.
- Used by Node Manager in restarting a failed Managed Server
- Used by a clustered Managed Server in selecting the best location for storing replicated session data

# Cluster

- A cluster is a group of Managed Servers running simultaneously and working together to provide increased scalability and reliability
  - Scalability: through parallelism
  - Reliability/Availability: through replication and redundancy
- A cluster appears as a single instance to most clients.
- Clusters enable some advanced features, such as Whole Server Migration, Service Migration, and clustered JMS destinations.

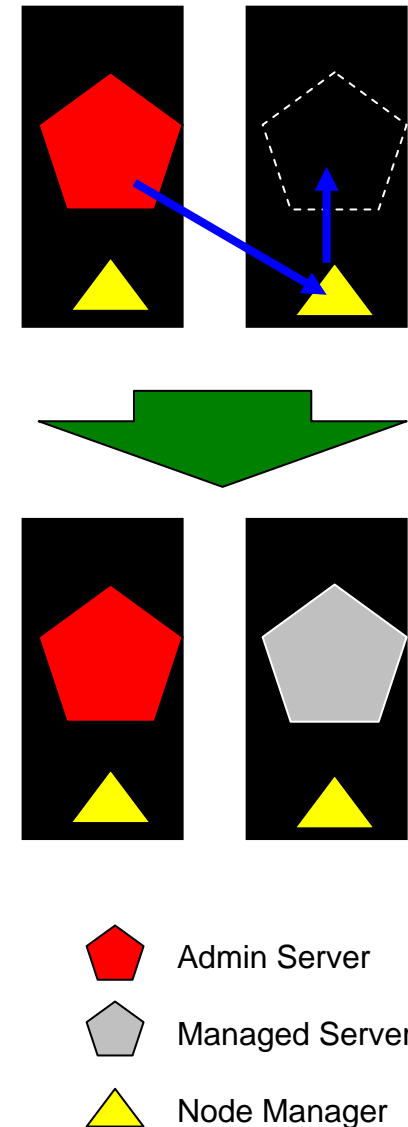


# Cluster Guidelines

- All servers in a cluster must also be in the same domain.
- All servers within a cluster must be at the same Maintenance Pack level.
- Clustered servers can be on the same or different machines.
- You can have multiple clusters in a domain.

# Node Manager

- Utility/process running on a physical server that enables you to start, stop, suspend, and restart WebLogic Server instances remotely
- Must run on each physical server that hosts WebLogic Server instances that you want to control with Node Manager
- Not associated with a domain. Can start any server instance that resides on the same physical server.
- Optional, but required to start/stop servers using the Administration Console
- Required for Whole Server Migration and for some configurations of Automatic Service Migration
- Has the following versions:
  - Java-based
  - Script-based



# Service Configuration

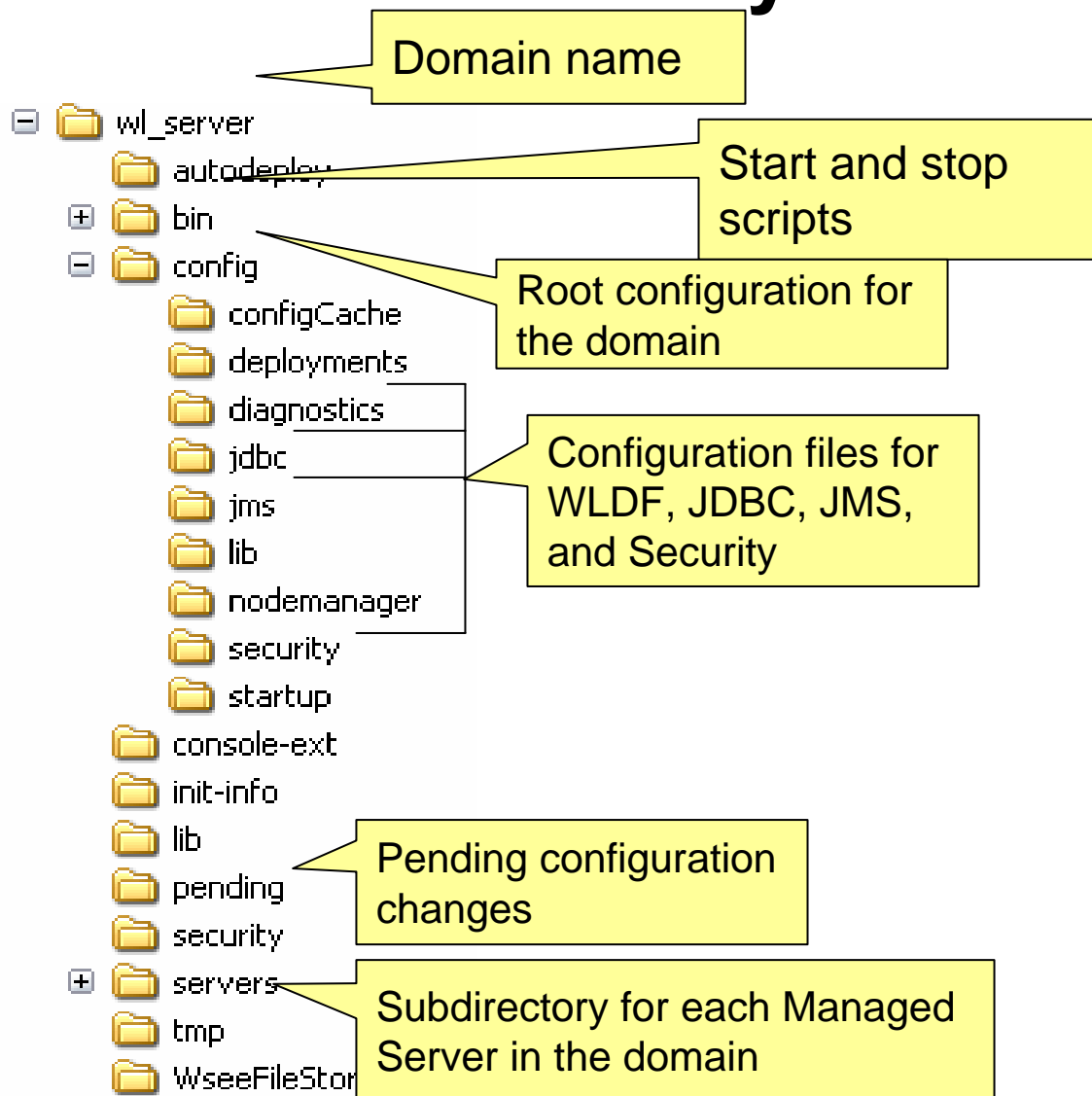


- Besides topology elements, you also configure the services in a domain that applications rely on:
  - JMS, JDBC, Diagnostics, etc.
- General notion:
  - Configure the service in the domain
  - Target to specific servers or clusters
  - An instance of the resource is created on each server specified

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# Domain Directory



# Configuration Files

## config.xml

```
<domain (schema locations)>
  <name>wl_server</name>
  <security-configuration></security-configuration>
  <jta></jta>
  <server>
    <name>examplesServer</name>
  </server>
  <app-deployment></app-deployment>
  <jms-server></jms-server>
  <jms-system-resource></jms-system-resource>
  <jdbc-system-resource>
    <name>examples-demo</name>
    <target>examplesServer,managedServer-0</target>
    <descriptor-file-name>jdbc/examples-demo-jdbc.xml</descriptor-file-name>
  </jdbc-system-resource>
</domain>
```

- config.xml – central configuration file for a domain
- includes the configuration of each server instance, cluster, resource, and service in the domain.
- references additional XML files that are stored in subdirectories of the domain/config directory: JMS, JDBC, WLDF, and Security
- All files are based on schemas

## references to other files

### examples-demo-jdbc.xml

```
<jdbc-data-source>
  <name>examples-demo</name>
  <jdbc-driver-params></jdbc-driver-params>
  <jdbc-driver-params></jdbc-driver-params>
  <jdbc-data-source-params></jdbc-data-source-params>
</jdbc-data-source>
```



# Two-Phase Configuration Changes

- Changes activated in batches:
  - Reliability, consistency:
    - Make (related) changes as a group
    - Validate before making the change
    - Activate or Roll back as a single unit( all changes on all servers)
- General process:
  - Get an edit lock
  - make changes
    - changes are stored in the pending directory
  - activate your changes (with implicit validation through the Admin Console or WLST)
    - changes are distributed to servers in the domain
    - Two phases: prepare and commit
    - Prepared on all servers; any failures will cause total rollback

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# Administration Tools

- Configuration Wizard
  - GUI/scriptable tool to create and extend WebLogic domains
  - Template based
- Administration Console
  - Browser-based tool for configuring and monitoring domains, deploying applications, and controlling servers
- WebLogic Scripting Tool (WLST)
  - Script or command line tool to do the same thing as the Administration Console and Configuration Wizard
  - *Note that we will cover details on WLST in a separate document*
- weblogic.Admin
  - Deprecated command line tool for configuring a domain
  - Recommend using WLST instead
- weblogic.Deployer
  - Command line tool for deploying applications

# Administration Console

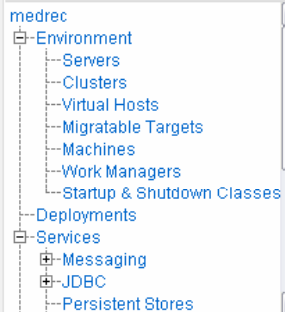
- Graphical interface to configure, manage, monitor a domain
- One Administration Console for each domain
- The Administration Server in the domain hosts the Admin Console application
- Open the Admin Console with the following URL:
  - `http://host:port/console`
  - Typically in dev: `http://localhost:7001/console`
  - Sample domains use `weblogic/weblogic` as the user name and password
- In WLS 10.3, the Admin Console application deploys lazily – on first use
- More info:  
<http://e-docs.bea.com/wls/docs100/intro/console.html>

### Change Center

#### View changes and restarts

Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.

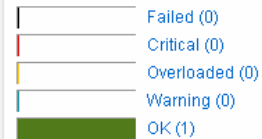
### Domain Structure



### How do I...

### System Status

#### Health of Running Servers



### Home Page

#### Information and Resources

##### Helpful Tools

- > Configure applications
- > Recent Task Status
- > Set your console preferences

##### General Information

- > Common Administration Task Descriptions
- > Read the documentation
- > Ask a question on BEA eSupport
- > BEA Guardian Overview

#### Domain Configurations

##### Domain

- ▣ Domain

##### Environment

- ▣ Servers
- ▣ Clusters
- ▣ Virtual Hosts
- ▣ Migratable Targets
- ▣ Machines
- ▣ Work Managers
- ▣ Startup And Shutdown Classes

##### Services

- ▣ Messaging
  - > JMS Servers
  - > Store-and-Forward Agents
  - > JMS Modules
  - > Path Services
  - > Bridges
- ▣ JDBC
  - > Data Sources
  - > Multi Data Sources
  - > Data Source Factories
- ▣ Persistent Stores
- ▣ XML Registries
- ▣ XML Entity Caches
- ▣ Foreign JNDI Providers
- ▣ Work Contexts
- ▣ JCOM
- ▣ Mail Sessions
- ▣ FileT3
- ▣ JTA

##### Interoperability

- ▣ WTC Servers
- ▣ Jolt Connection Pools

##### Diagnostics

- ▣ Log Files
- ▣ Diagnostic Modules
- ▣ Diagnostic Images
- ▣ Archives
- ▣ Context
- ▣ SNMP

##### Your Deployed Resources

- ▣ Deployments

##### Your Application's Security Settings

- ▣ Security Realms

# WebLogic Scripting Tool (WLST)

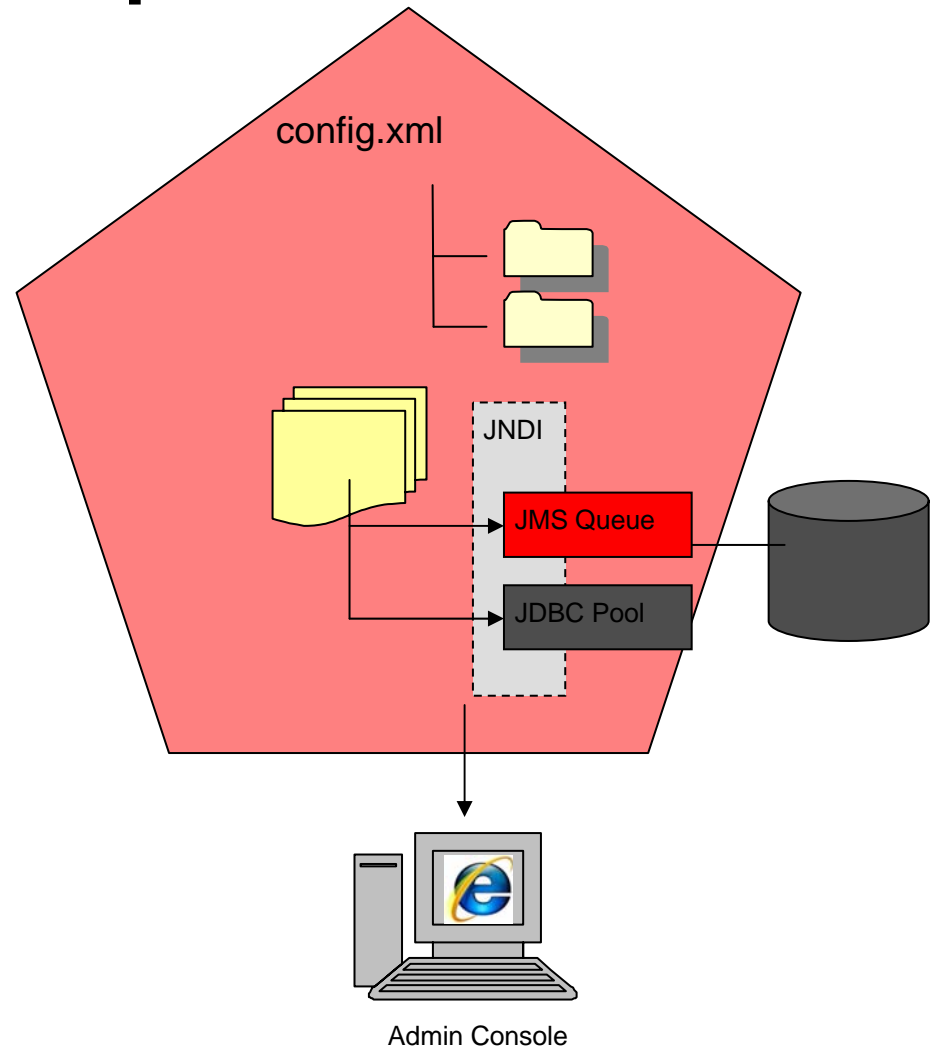
- Scripting tool for administering a domain (create, configure, manage, monitor, deploy applications)
- Based on Jython, which is a pure Java implementation of Python
- Great for automating repetitive tasks
- Heavy use by customers and within BEA
- “Record” feature in Admin console: record actions to a WLST script
  
- Two modes:
  - Offline: analogous to the Configuration Wizard
  - Online: analogous to the Administration Console
  
- More info:  
[http://e-docs.bea.com/wls/docs100/config\\_scripting/index.html](http://e-docs.bea.com/wls/docs100/config_scripting/index.html)

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# Single Server/Development Configuration

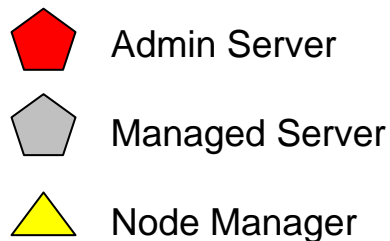
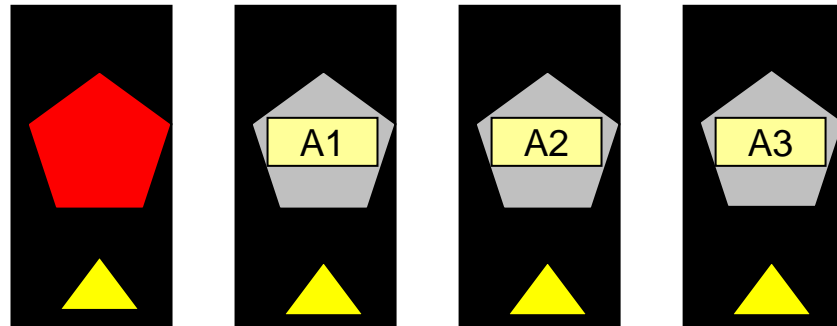
- Single server acts as the Administration Server and as a host for applications
- Not recommended for production, but standard for development





# Configuring for Application Isolation

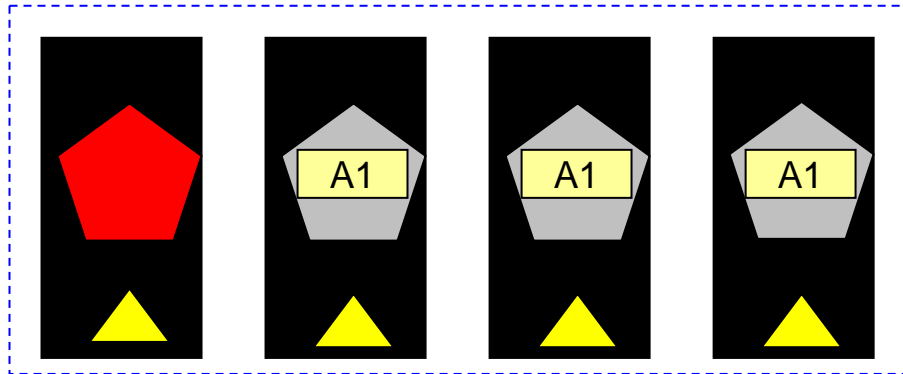
- Deploy applications to their own servers
- Admin server on its own server (highly recommended)
- Each managed server on its own physical server



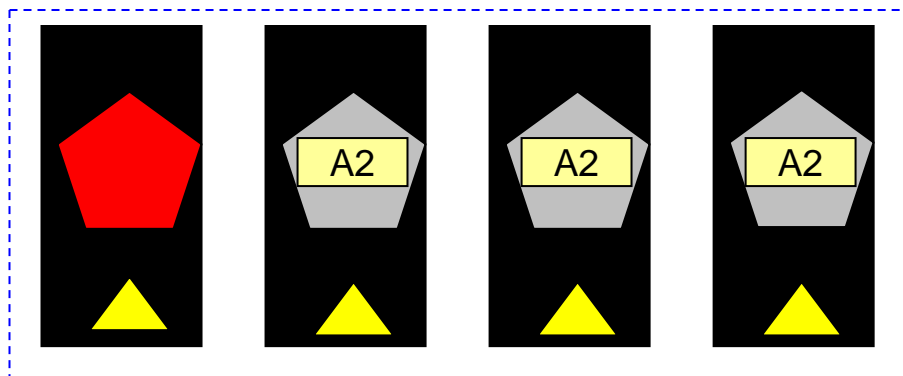
# Configuring for Extreme Application Isolation

- Each application gets its own **domain**
- Admin server on its own server (highly recommended)
- Each managed server on its own physical server

Domain 1

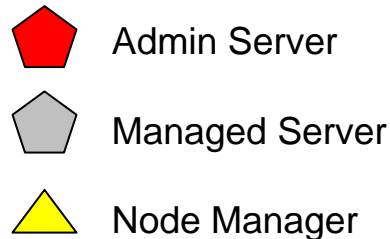
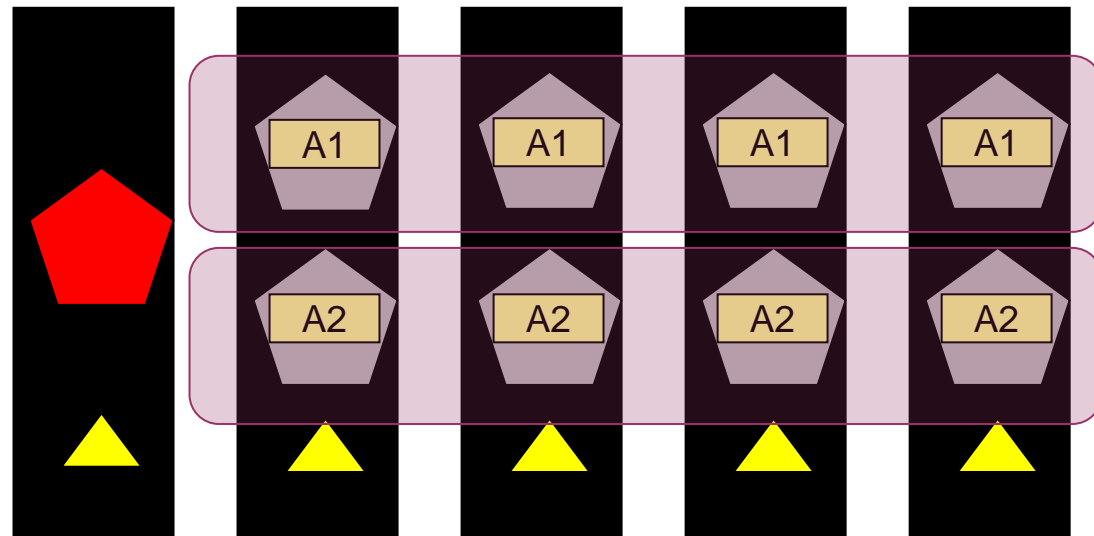


Domain 2



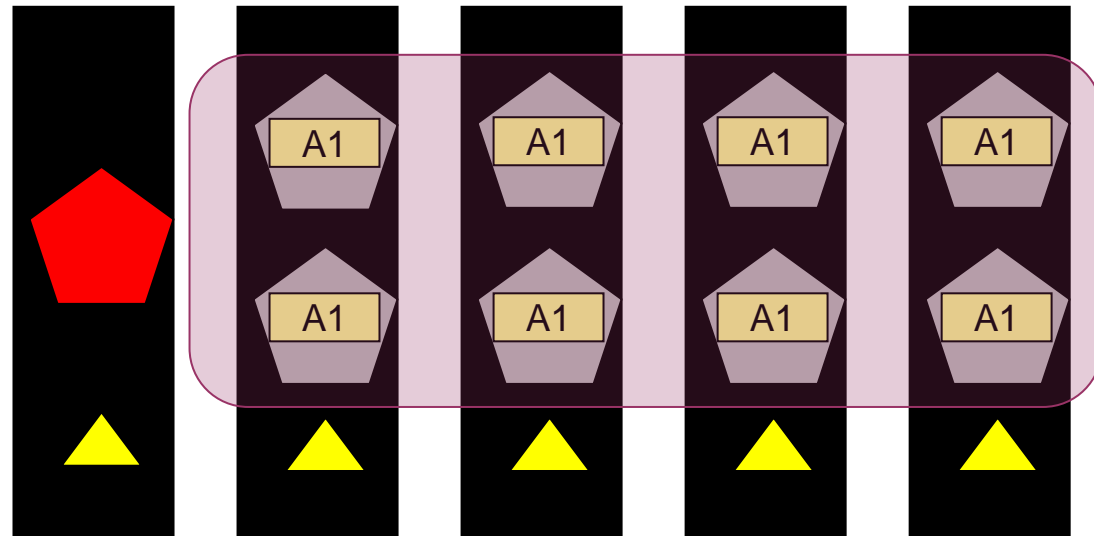
# Configuring for High Availability

- Clustered servers for HA and scalability
- All managed servers in the same cluster are on different machines, although machines are frequently shared



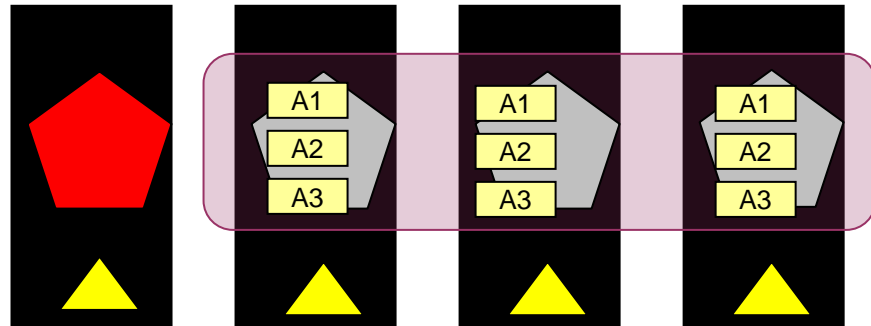
# Configuring for Perf and Utilization

- Multiple Managed Servers per machine
- All Managed Servers in one cluster
- Cluster replication scheme considers location in determining secondary Managed Servers



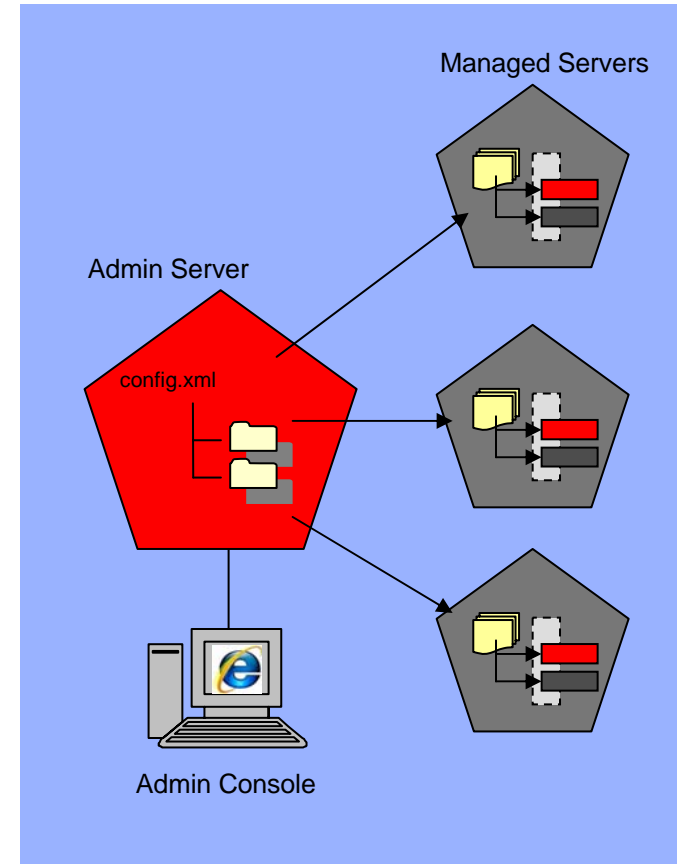
# Simplified Administration

- Multiple applications deployed to a single cluster
- Admin server on its own server (highly recommended)
- Single domain to manage



# Summary

- WebLogic Server configuration is segmented by domain
  - Each domain represents a configuration entity and uses one set of configuration artifacts
  - Each domain has one Administration Server, and can have multiple managed servers and clusters
- Node Manager is a per-machine process used to start and stop WebLogic Server instances
- There are a number of administration tools available for configuring and managing a WebLogic domain:
  - Config Wizard, Admin Console, WLST, weblogic.Deployer



# Demonstration

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*Oracle WebLogic Foundation*

Q & A