

# Script generated by TTT

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Xerox PARC experimented in the 1970's with distributed applications (Alto workstation, Ethernet).  
book of Ken Birman (chap 27) gives a brief overview of a number of distributed systems, e.g. Amoeba, NavTech, Totem, Argus, etc.

[Mach](#)  
[Sun Network File System \(NFS\)](#)  
[Java 2 Platform Enterprise Edition \(J2EE\)](#)  
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## Sun Network File System (NFS)



network extension to Unix and other operating systems for distributed file management.

[Characteristics](#)

[NFS implementation](#)



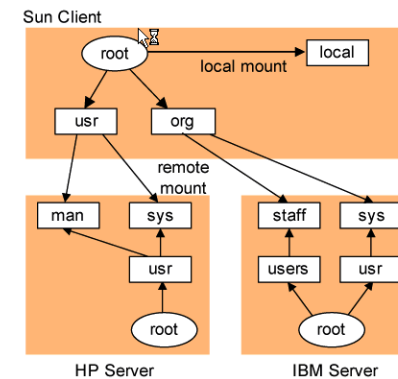
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## Characteristics



File catalogs are exported (by server subsystems) and mounted (by the client machines).



Support of a **mount service** :

file `/etc/exports` on NFS server lists names of local filesystem available for remote mounting.

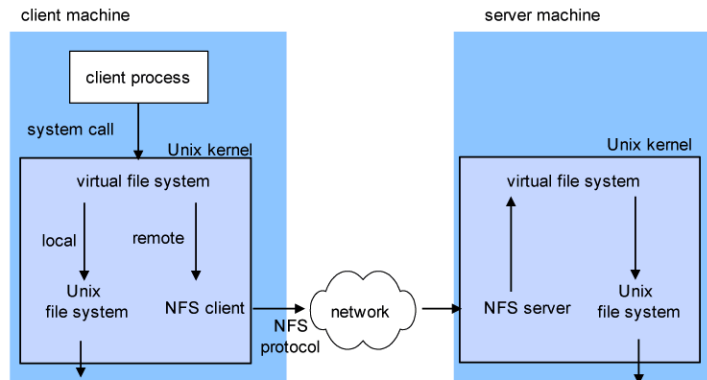
mounting request by client with: remote host, directory pathname and local name with which it is to be mounted.

**automounter** : dynamically mounting of a remote directory whenever an 'empty' mount point is referenced by a client.

NFS supports [access transparency](#).



NFS implementation is based on RPC calls between the involved operating systems. It can be configured to use UDP or TCP.



earlier version of NFS was a **stateless** file server, i.e. a server subsystem does not store state information about its clients and their past operations.

**current version** of NFS is a **stateful** file server, i.e. a server subsystem supports locking and delegation of actions to client to improve client-side caching.

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The J2EE platform (now called Java Platform, Enterprise Edition - Java EE) is essentially a distributed application server environment. It is a Java environment that provides the following:

- a runtime infrastructure for hosting applications.
- a set of Java extension APIs to build applications.

Objectives of J2EE

J2EE architecture

J2EE container

J2EE application

Java Server Pages

Example implementations

**JBoss** : Open Source  
advanced middleware for J2EE based distributed applications

IBM **WebSphere** : proprietary  
integration and application infrastructure software; provides J2EE support

J2EE is continuously extended by new technologies, e.g. integrating the support for Web Services.

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The idea of J2EE is to provide a standardized programming model for the realization of distributed applications at the organizational level.

Java-based, but with interfaces to legacy applications, for example through Corba.

component-based.

network-oriented: supporting Web Services.

J2EE consists of 2 components

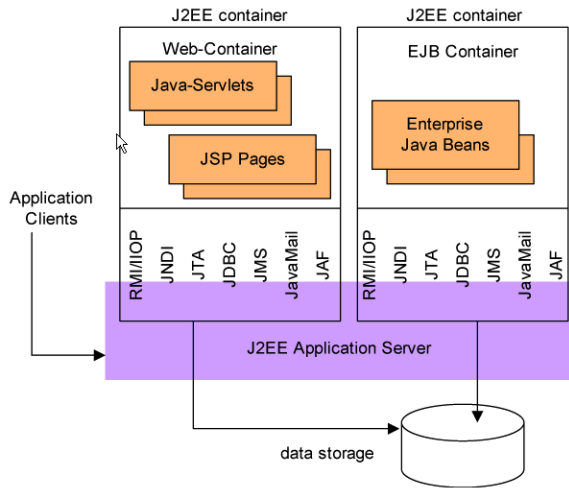
a **runtime infrastructure** for applications.

a set of **Java extension APIs** to build applications. Examples are Enterprise Java Beans (EJB), Java Servlets, JavaServer Pages (JSP), RMI via Internet-Inter-ORB Protocol (RMI-IIOP), Java Naming and Directory Interface (JNDI), Java Transaction API and Java Mail.

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A J2EE platform consists of the J2EE application server (runtime environment), one or several J2EE containers, and the data storage.



EJB is a specification of a server-side, managed component architecture. a bean offers one or more business interfaces to clients. especially suited for 3-tier architectures.



A typical J2EE platform has one or several containers. A J2EE container has two principal tasks: runtime environment for managing application components.

to provide access to J2EE APIs.

available APIs of the J2EE platform

RMI/IIOP: Remote Method Invocation (via IIOP)

JNDI: Java Naming and Directory Interface

JTA: Java Transaction API

JDBC: Java Database Connectivity Extension

JMS: Java Message Service

Java Mail

JAF: Java Beans Activation Framework.

Examples for application components: JavaServlets, JavaServer Pages, Enterprise JavaBeans.

J2EE supports the following general containers

Web container: Java Servlets, JSP pages

EJB container : Enterprise Java Bean components



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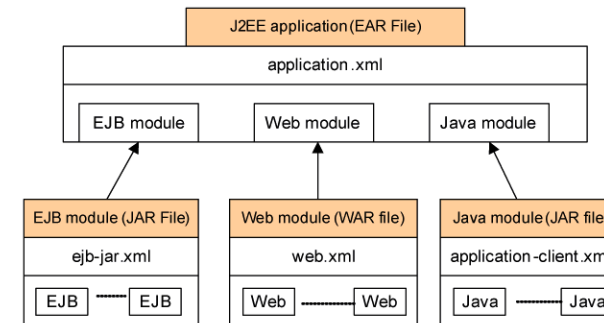
Applet container : Java applets

Application container : Standard Java applications



A J2EE application consists of several modules, each of which again contains several application components. Modules and application components are listed in an archive file:

EAR (Enterprise archive), WAR (Web archive) or JAR (Java archive)





JavaServer Pages technology uses XML-like tags and scriptlets written in the Java programming language to encapsulate the logic that generates the content for the Web page.

Comment: `<%--Comment --%>`

Declaration: `<%! int x = 0; %>`

Expression: `<%= expression %>`

Scriptlets -contain Java Code

`<% code fragments %>`

```
<% if (value.getName().length != 0) { %>
  <H2>The value is: <%= value.getName() %></H2>
<%} else {%>
  <H2>Value is empty</H2>
<%}%>
```

implicit objects available to JSP

request, response, session, out, page

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