

Application Servers

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Tools → Security → Custom Zones

Application Servers

Servers that...run applications
Tend to be Windows machines

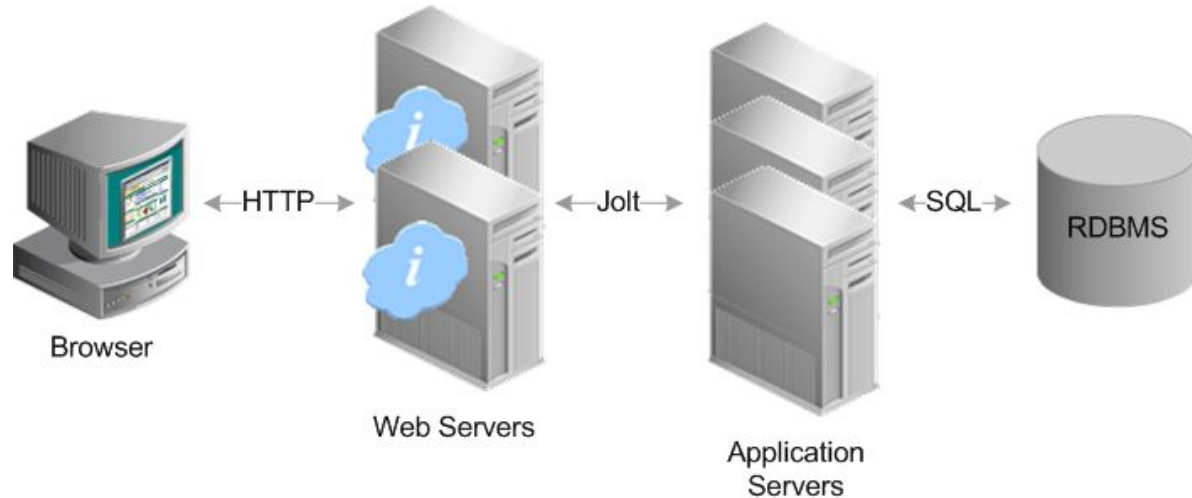
What kinds of servers are application servers?

- Database servers

- Mail servers

- Collaboration servers

- etc.



Application Servers

Only used for application processing:

- An Outlook server will **not** be used to host Active Directory Domain Services and process logins

Optimized for supported client/server application:

- Compiled for target machine

Accessible by multiple clients:

- Users connect via a local client or indirectly through another server app

Application Logic (Code)

Localized

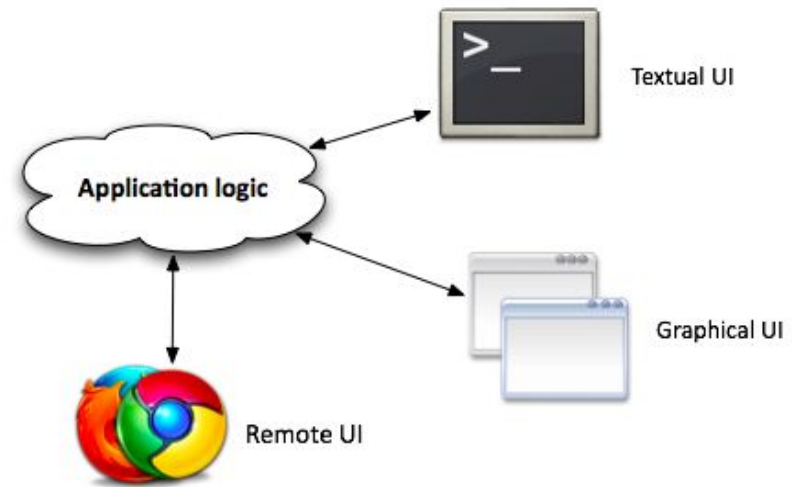
All exists on local (client) machine
Nothing server-based

Distributed

Logic can exist on client, application server(s)

Centralized

All logic housed in application server



Benefits of Centralized (or why we use Application Servers)

Improved security

- Can't really hack client application
- All data access centrally controlled

Assuming that a flaw isn't exploited server-side...

Improved data integrity

- Easy backup of user data
- Application can be fixed for all users *centrally*
 - Don't need to distribute patches to clients



Database Servers

Database != Database Server

Database is separate from the database management system (DBMS)

SQL Server is the DBMS for Windows
(MySQL/MariaDB is what we used in Linux)

Databases can be **detached** and moved to other database servers
Technically, can attach any object that communicates via Open Database Connectivity (ODBC)
E.g., Excel spreadsheets, Access databases (ew), Word documents, etc.



MS SQL Server

Relational database management system

Tables, schemas, etc.

What's a non-relational database?

Comes in several flavors

Standard

→ “Best” for general business applications

Enterprise

→ Resource management, data encryption

Express

→ “The free version”

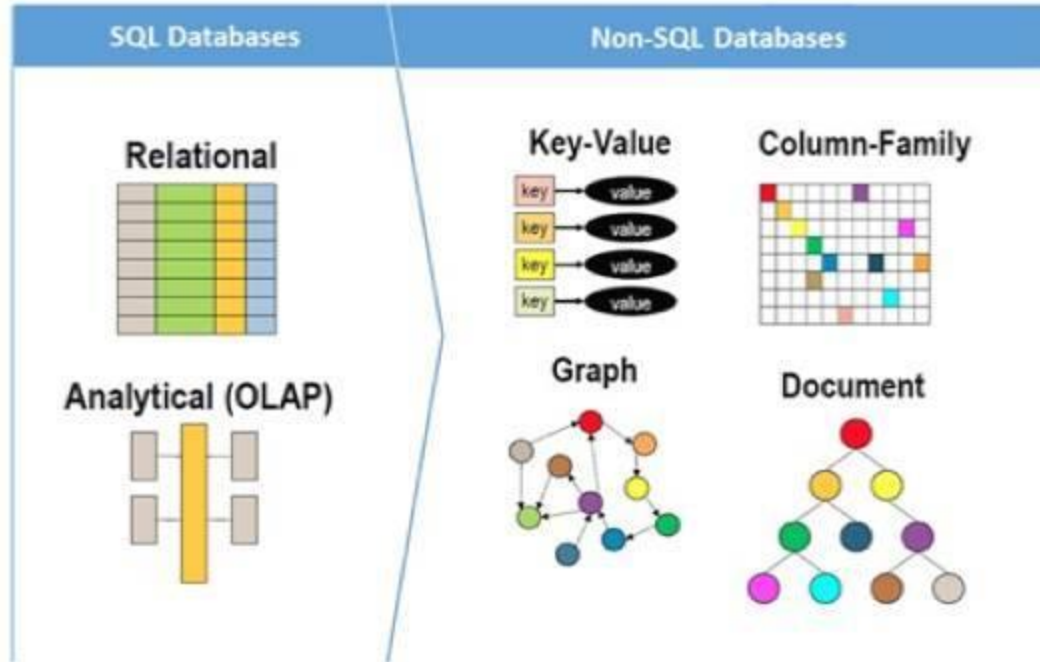
Compact

→ Embedded applications

...



noSQL: “Not Only SQL”



Three Types of Database Applications

Localized

Client/server

N-tier

Localized

Uses a 'local' installation of SQL server

Or, Access on steroids

Uses shared memory for connection (no NIC)

Not really useful for us if we're running a server environment



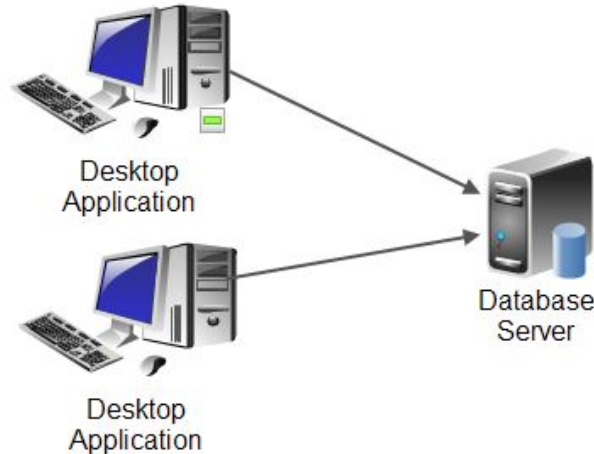
Client/Server

Single-tier DB application

Communicate **directly** with database

Local application front-end communicating with SQL Server

Even an Excel import of SQL data counts as single-tier



N-Tier

Multiple levels (n-levels) of communication

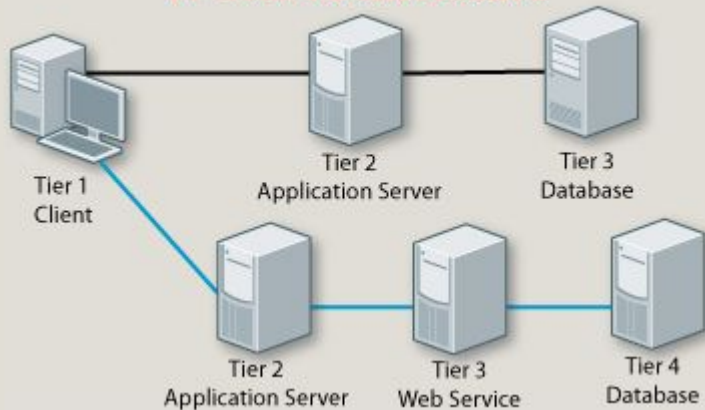
Sharepoint server farm

Database server

Website server

(Two-tier)

N-Tier Architecture



Two Tier Farm



All SharePoint 2010 Web and
Application Server Roles



All SharePoint 2010 Databases

Two Tier Farm Install
Recommended for up to
10,000 users

Benefits of n-tier?

Change database without application logic
(E.g., rewriting web server code)

Change front end (website) without messing with the database

Scalability

- Data distributed

- Application logic distributed



SQL Server Demo

- 1) Install SQL Server
- 2) Install something that uses SQL Server
- 3) ???
- 4) Profit!



Exchange Server

Quite possible to use IIS with an SMTP module
...but what fun is that

Exchange is our email application server
Supports several protocols
SMTP, POP3, etc.

But, only enable those protocols that your clients use!
Reduce attack surface
Also, make life easier on yourself (less to manage)

Protocols

Simple Mail Transport Protocol (SMTP)

Most widely used email *transmission*

Port 25

Post Office Protocol v3 (POP3)

Downloads email, Port 110

Internet Message Access Protocol (IMAP)

Leaves on server, Port 143

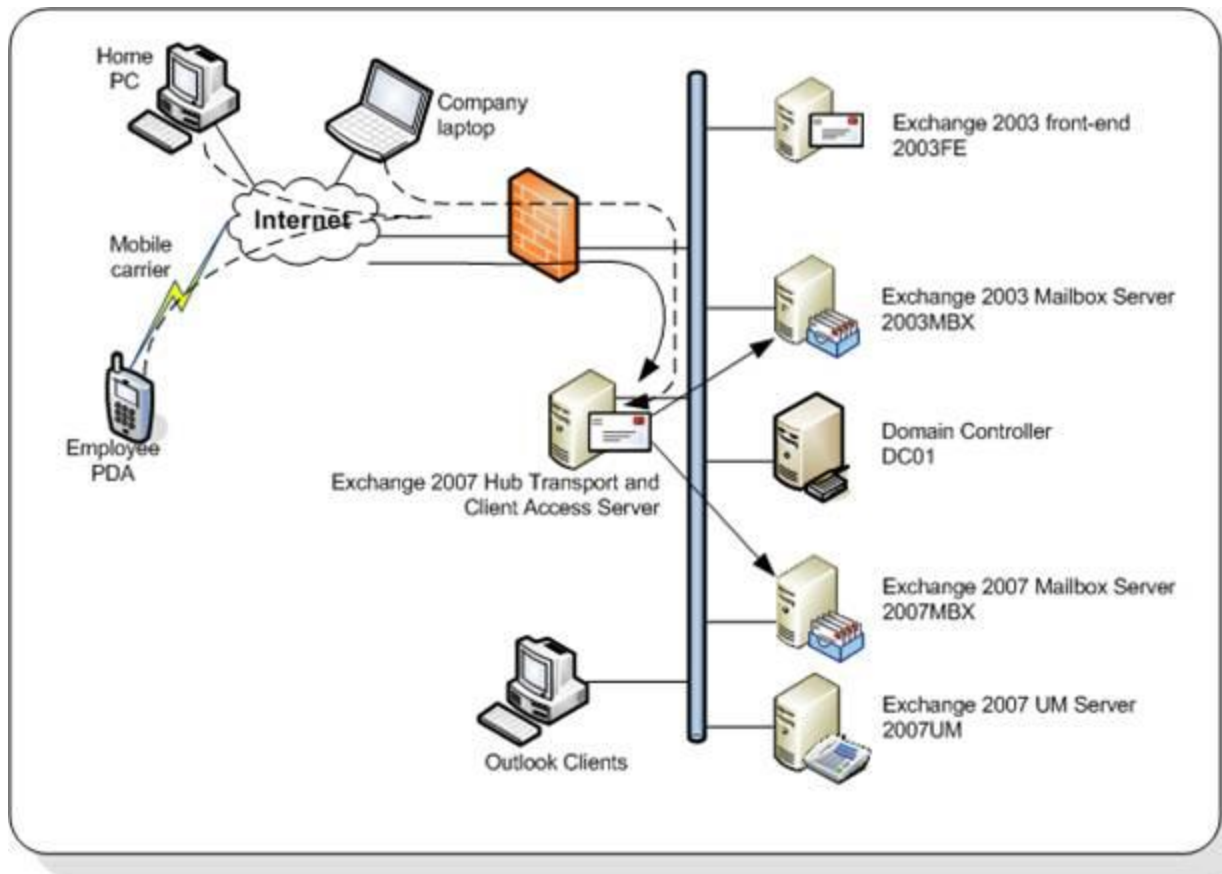
Generally recommended

Messaging Application Programming Interface (MAPI)

Communicate between Exchange server and Outlook (dynamic ports)

Exchange Server Roles

Hub transport	Move email around organization (at least 1 required)
Client access	Provides inboxes to clients (at least 1 required)
Unified messaging	Voicemail, fax, email into Exchange (<i>optional</i>)
Mailbox	Contains actual user mailboxes and data Multiple servers / database availability groups (DAGs)
Edge transport	Connects to outside world Should not be a part of AD domain
Management tools	Management consoles on various roles





Storage Architecture

Stored in databases

- Mailbox databases

- Public folder databases

- Can be part of DAG (database availability group)

 - Again, fault tolerance

 - Multiple DBs online

 - Access to nearest/quickest DB

Transaction logs

- Stored as *.EDB files

 - Store on RAID or SAN



Mailbox Server 1



Database 1 (Active)



Database 2 (Passive)



Database 3 (Passive)



Mailbox Server 2



Database 1 (Passive)



Database 2 (Active)



Database 3 (Passive)



Mailbox Server 3



Database 1 (Passive)



Database 2 (Passive)



Database 3 (Active)

Mailbox Management

Mail recipients

Outlook / Other clients

Distribution lists

Group mailboxes

Conferences rooms

Equipment

...

Recipient:

Create account

(AD)

Create account mailbox

(Exchange Management Console)



Mailbox Management

AD's underlying schema updated once Exchange is installed
Allow AD ↔ Exchange information exchange

Collaboration Server

SharePoint is probably the biggest name in the game (industry-wise)

Alternatives: Confluence (Atlassian), Google Drive, etc.,

What is it?

- Collection of services

- Multi-tier application

 - Needs SQL Server

 - Needs IIS Server



SharePoint

Often described as a content management system (CMS)

Not just blogs, wikis, etc.

But, is much more

- External database/data source access

- Calendaring functions

- Discussion forums

- File sharing

- Search

- MS Office integration

- Business workflow automation

- ...

How is it used?

Intranet provisioning

Intranet (internal) wikis, web pages, web services

Project management

Task assignments, calendars, etc.

Document sharing

Not only hosting, but data analysis (e.g., Excel workbooks)

Collaboration

Forums, tasks, document libraries, etc.

<https://www.youtube.com/watch?v=s12Jb5Z2xaE>

<https://www.youtube.com/watch?v=-0ofQsAwF2I>

Monitoring Servers

Most server provide a service to the *user*

A monitoring server serves the *network*

Monitors other servers/network and triggers alerts

Can also respond automatically

Example:

Monitoring server monitors available services

Service fails / doesn't respond

Monitoring server triggers reboot on failing server

Notifies administrator



Monitoring Servers

System Center Virtual Machine Manager (SCVMM)

- Used with Hyper-V to monitor virtualization environment

- Automatic provisioning/reprovisioning

- (Move a VM from one server to another)

System Center Operations Manager (SCOM)

- Monitors distributed services

- Notifies upon occurrence

System Center Data Protection Manager (DPM)

- Centralized backup solution (in background)

- Monitors for backup issues

Threat Management

Detect/prevent security attacks (Forefront servers -- discontinued and rebranded in 2015)

- Integrate with Exchange, SharePoint, etc.

HTTPS inspection

- Look for malware in SSL encrypted packets

Email security

- Scan email messages

Threat Management

Network inspection system (NIS)

- Scans network traffic for issues

Web malware detection

- Scans normal HTTP traffic for malware

VPN

- Create secure remote access connections