

# Intranets

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## Intranets

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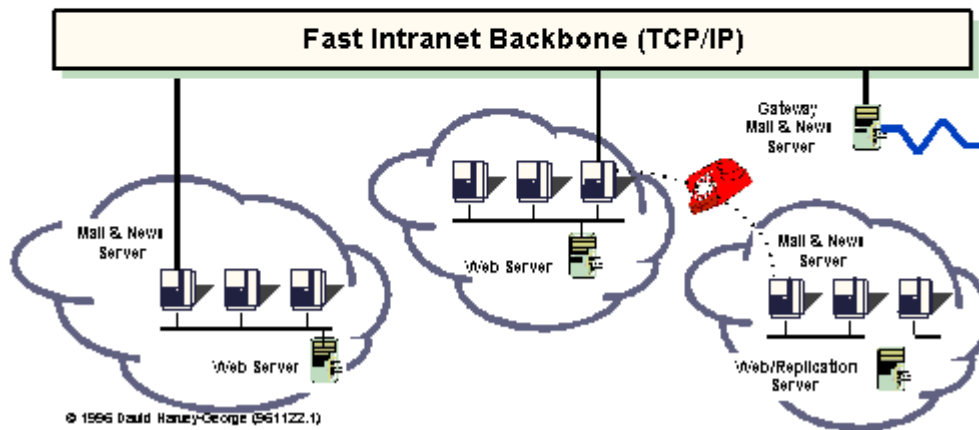
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## Intranets

### *What is an Intranet?*

## What is an Intranet?

- **TCP/IP Services used within the LAN environment**
  - Replace/augment other groupware products, e.g. Lotus Notes
- **Important Intranet Services**
  - World Wide Web, Electronic Mail, News, also WAIS and Gopher



Intranets, running over standard TCP/IP networks, enable companies to employ the same types of servers and browsers used for the Internet for internal applications distributed over the corporate LAN. By using TCP/IP Intranets are accessible to every member within an organisation, regardless of their choice of hardware platform.

Intranet servers offer real business functionality such as publishing information, processing data and database applications, and enable collaboration among employees, vendors, and customers. Across all industry sectors, Intranets are reshaping company-wide communication, collaboration, productivity, and innovation, with a consequent saving of time and money.

## Why Intranets?

### Why Intranets?

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- **Freedom of Choice**
  - Uses open and widespread *internet* protocols
  - Wide range of applications
- **Security**
  - SSL, S-HTTP, S/Mime, PGP
- **Ease of Use**
  - Most services can be accessed from single 'browser'
  - Same as for Internet use
  - Web's open architecture supports legacy documents
- **Cost Effectiveness**
  - Low cost or free server software is readily available
  - Cost per user is also low

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Intranets provide the following benefits:

**Freedom of choice:** TCP/IP based client/server technology is based on open standards and therefore doesn't lock companies into limited, costly choices. In fact, TCP/IP based solutions exist for nearly all leading operating systems and hardware platforms and using tools such as Web gateways can leverage legacy database systems.

**Security:** Protecting information, even within a private corporate network, is critical. Technology such as S-HTTP, Secure MIME and Secure Sockets Layer (SSL) technology encrypts information so that it is transferred securely. SSL is the leading de facto security standard for web-related products.

**Ease of use:** Existing Internet users will be instantly familiar with Intranet technology. A single front-end, such as Netscape Navigator can be used to access a range of services including the Web, News and Email. The integration of Java and ActiveX technology within browsers brings the kind of flexibility previously reserved to advanced workgroup products such as Notes. The Web's open architecture and hyperlinking enables a range of existing 'legacy' document formats to be published using a departmental server.

**Cost-effectiveness:** Intranet applications are surprisingly inexpensive in initial purchase, training, and deployment. The intranet's platform independence eliminates the need to distribute client software or create different versions of the same applications.

***IP Related Issues***

## IP Related Issues

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- **Non Internet IP Networks (e.g. Intranet)**
  - **May use a private addressing scheme**
  - **Will need a proxy server to relay requests to Internet**
- **Proxy Host must have a valid Internet address**
- **See RFC 1942 for Private Addressing Scheme**
  - **Codifies but does not solve the problem of non-standard addresses**



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TCP/IP is used on many non-Internet connected networks. Usually these were never expected to be connected and an appropriate IP address class for the network was selected at random. With the recent explosion in interest in the Internet many organisations are considering a connection but because IP addresses must be globally unique they are faced with the problem of completely changing the addressing scheme used on the network.

A proxy server can be used to relay connections from the 'internal' to the 'external' network performing appropriate address translation on the way. All that is required is that a single machine, the one hosting the proxy server, has a recognised Internet address on the external interface.

Routing may still be affected where the address class used internal belongs to another organisation already connected to the Internet. For example, by chance the IP address belonging to Microsoft may have been used. Clients on the internal network may route all packets destined for this address class to local machines rather than through the proxy server, or the proxy server itself may route the packets back onto the internal network. RFC 1942 recognises the practise of using 'private' addresses and codifies the problem by setting aside certain IP addresses. (Class A net 10, Class B nets 172.16 - 172.31 and Class C nets 192.168.0 - 192.168.255). This is useful because these addresses will never be used by networks on the Internet, however it should be noted that there area some deficiencies in this scheme. Two organisations or departments may have both used the same address class from this scheme, they may then need to merge their networks (after a take-over, perhaps) they will then need to reconfigure certain hosts.

***Building an Intranet***

## Building an Intranet

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- **Install TCP/IP stack on User Workstations**
  - e.g. **WWWG, Win95, NT, Unix, 3rd party**
  - **Web Browser**
- **Install a Web Server**
  - **Optionally 1 per department/workstation**
  - **Netscape, IIS/FrontPage, Cern, NCSA/Apache**
- **Connectivity with existing information resources**
  - **Web CGI scripts, Lotus Notes, Legacy Documents**
  - **Java Front Ends**
  - **Search Engines (WAIS, Glimpse)**
- **Install other Services**
  - **News, Email etc.**
  - **Establish local mailing lists and newsgroups**
- **User Training and Tools**



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Users that wish to participate in the organisations Intranet must have access to a workstation or PC running a TCP/IP stack. The usual way of accessing the information available is through a Web browser. Netscape's Navigator and Microsoft Internet Explorer both support Web and Email/News applications. Otherwise individual clients can be installed for each service, for example Eudora for Email and WinVN for News.

Many Intranet applications will require a Web server to be installed. There can either be a central server for the whole organisations or each department or user may choose to install a separate server. This can have security, administrative and performance advantages. A wide range of server solutions are available to run on platforms ranging from Windows through to high power Unix system. Netscape have specialised in providing cross platform solutions, although the latest servers require high performance (32MB+ RAM) NT or Unix systems.

Once installed existing documentation may be converted to the native Web format or made available directly through the use of special 'helper applications' or viewers. Scripting solutions exist to convert documents on-the-fly, with the advantage that they can be maintained in a single format. Of note is Domino, which can make Lotus Notes document databases available over the Web. Web enabled search engines allow users to perform keyword searches on the available documents. Java applets may be written to provide specialised front ends to information sources.

An Intranet is more than just the Web, both Email and News may be used locally to improve groupwide and interdepartmental collaboration.

## Intranets

Users will require training in use of the Intranet and specialist tools need to be installed to enable the effective conversion or creation of documents for this environment. Of interest are the Microsoft Internet Assistants. These allow HTML version of Word, PowerPoint, Excel and Access files to be created at the click of a button.

## ***Intranet Communication Models***

# Intranet Communication Models

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- **One to Many**
  - **Information dissemination**
    - **Reports, Technical Updates, Product Literature, Phone Lists**
    - **Advantages: Saves on distribution costs, timely updates**
    - **Enabling Technology: Web, mailing lists**
- **One to One**
  - **Customer Feedback and Database Access**
  - **Advantages: Reduce phone lag, fewer telephone support staff**
  - **Enabling Technology: Web forms, CGI scripts, Email**
- **Many to Many**
  - **Collaboration**
  - **Advantages: Groupwide collaboration, dissemination of ideas**
  - **Enabling Technology: mailing list, newsgroups, Java based applets**

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Even though the range of applications that can be developed to meet industry-specific or general needs is virtually limitless, intranet applications generally fit into one of three categories:

Communication occurs on a **one-to-many** basis between teams, departments, or entire corporations by posting of information on web pages, reducing bulky, easily outdated paper-based documents. This use of an intranet brings an immediate payback to organisations, eliminating the costs of producing, printing, and shipping corporate information.

Applications enable **two-way** interactions, such as logging help desk requests. Whether an employee needs to develop a report, analyse data, or learn about the company's customers, using web technology linked to legacy data can be an intuitive and efficient alternative to the frustrations of 'phone lag' or paper pushing.

Collaboration represents **many-to-many** interactions. This category includes newsgroups and mailing lists that facilitate direct exchanges of information between members, with posted information available to others, resulting in a corporate "knowledge base." People subscribe and can view a screen with subject lines, authors, and news article numbers. Each of these items is the beginning of a "thread" that starts when someone sends out an article or email; then readers can trace these threads deeper as they wish.

## ***Intranet Applications***

# Intranet Applications

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- **Sales and Marketing**
  - Delivery up-to-date information to geographically remote staff
  - Specifications, Pricing Charts, Competitor Sites, Presentations
- **Product Development**
  - Collaboration between team members
  - Project Management, Designs, Documentation, Bug Reporting
- **Customer Service and Support**
  - Feedback from Customer
  - Enter and track problem reports, search knowledge base, track orders
- **Human Resources**
  - Corporate Policy, Phone Lists, Organisation Charts, Job Postings
- **Financial Applications**
  - Financial Statistics, Purchasing

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Intranet applications improve communication and productivity across all areas of an enterprise. Companies are currently deploying intranets to solve communication needs in departments such as sales and marketing, product development, and others in the following ways.

A fundamental challenge of sales and marketing departments is delivering up-to-date reference information to an geographically distributed group of people. An Intranet can give immediate access to the following types of information: product specs, pricing charts, new leads, competitive information (this can link to competitor sites), sales presentations

Product development teams need up-to-date information to perform their jobs effectively. Product development applications often centre on project management, with team members updating project schedules and sharing information about the progress of development or customer feedback. The types of information made accessible through intranet applications include: Product specifications and designs, schedules, team member lists and responsibilities, competitor product information. Local documentation, bug reports.

The goal of customer service and support groups is to provide the best quality service in a cost-effective and efficient way. Intranet applications enable team members to share up-to-date status reports on problems so that all team members can respond to customer calls; permit fault reporting by customers, permit customers and support staff to search knowledge base, track order processing.

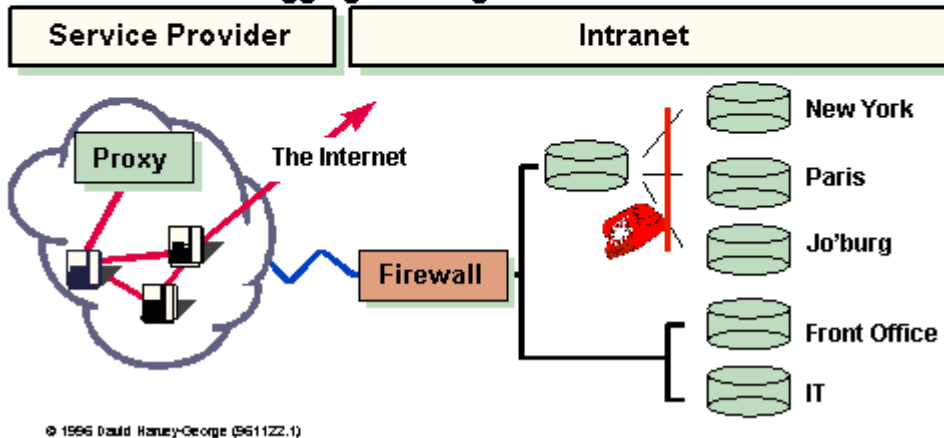
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Numerous other corporate departments, such as legal or MIS groups, currently using paper-based forms or policies can reap the benefits of making transaction applications available through intranets.

**Replication**

## Replication

- One Server per Department
- Reduces data flow between Business Units
  - Replication, hierarchical caching
- Allows finer logging & tuning



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Store and forward services such as Email and News naturally support replication. To reduce network traffic all that may be necessary is to place additional servers of the appropriate type close to the users.

A major consumer of network bandwidth is the World Wide Web, where subnetworks are interconnected by slow links unacceptable delays may be introduced when accessing a central server. The Web is often used to deliver more than just simple text documents. Often documents are a rich mix of text, graphics, audio and video based data. Network traffic may be reduced by the strategic placement of **proxy** servers.

A proxy server is a HTTP server whose primary role is to fetch documents from other HTTP (Web) servers on behalf of clients. A single proxy server situated on a bastion host can be used to relay connections from the internal to the external network and can greatly reduce traffic to popular sites using caching. Proxies can also be deployed in a hierarchy extending from Internet Service Provider back to individual departments within an Intranet. Efficient replication of resources within large organisations with many thousands of network users is particularly important to reduce both server and network load. The Intranet server access log files will also be smaller, making them easier to process.

Proxy servers may be deployed between separate 'internets' (e.g. on routers between LAN segments) to enforce certain security or access policies between individual departments which may still require some degree of access to network resources. They can also log requests made

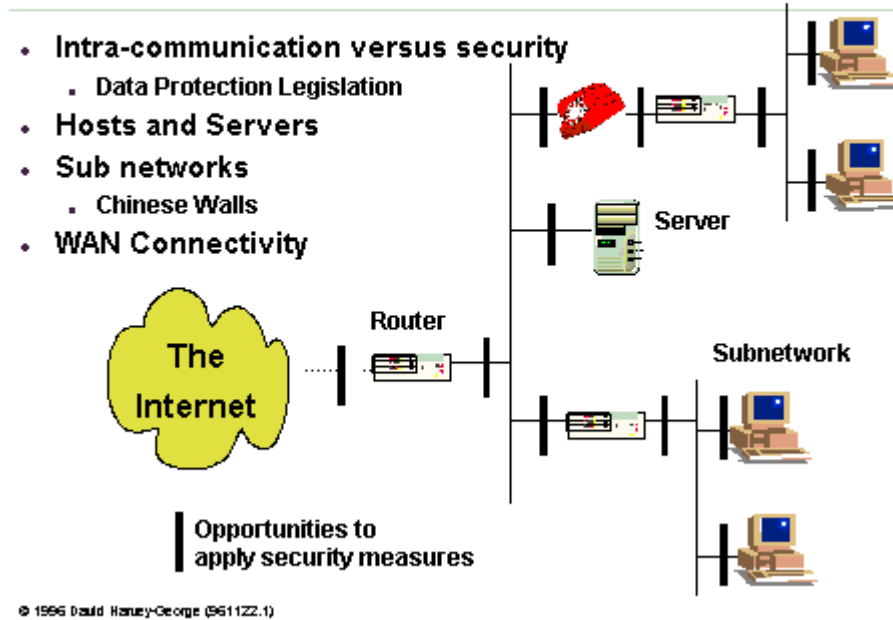
## Intranets

by users and track attempted violations of the access policy.

Replication in the proxy server is supported through a local document cache. Version control and document expiration information is kept and determines whether a document has changed on its home site prior to fulfilling the end user request. The size of the document cache can be tailored to suit local resource availability.

**Security in the Intranet**

## Security in the Intranet



With all this high quality data available security on the Intranet, both external and internal, becomes even more imperative.

A large corporate network is typically composed of a number of individual LAN segments. That is, pieces of cable (Ethernet, Token Ring) linked via routers. The network may use a single IP address class subnetted over each LAN segment or a number of separate IP address classes. In both cases each network interface presents possibilities for applying security measures. This can range from host security, through server access control right up to advanced firewalling techniques.

Host and subnetwork security is important to guard against break-ins from those users with a legitimate right to use the network. This is especially important for securing personal information (a requirement of most countries data protection acts) and for building 'Chinese walls' between different departments. It will also act as an additional safeguard where hackers have compromised part of the network security.

A single LAN segment can be subnetted, that is, two logically separate networks can be constructed over a single piece of cable. Although network traffic not secure from snooping it does force hosts in each network to communicate via a router. Security measures, such as logging and access control can be applied at this point. This can be useful where different departments must share the same network segment.

**Key Points**

## Key Points

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- **What is the Intranet?**
  - TCP/IP Services used within the LAN environment
  - World Wide Web, Electronic Mail, News
- **Why Intranets?**
  - Freedom of Choice, Ease of Use, Cost Effectiveness
- **Building an Intranet**
  - TCP/IP stacks, Servers, information resources
- **Intranet Communication Models**
  - One to Many, One to One, Many to Many
- **Intranet Applications**
  - Sales and Marketing, Product Development, Customer Service
- **Security in the Intranet**
  - High Quality information available on the network
  - Data Protection, Espionage, Access Control

