Custom Database Development Implementation Options

February 2015

Note: *the following discussion represents a* **broad-brush overview** *of databases and general connectivity options. There are numerous products and technologies that very likely make this information* **incomplete**. *Please accept this as an introductory information provision only and* **talk to your IT/ networking person/team** *before settling on a structure suitable to your needs.*

Parts of a Database Software System

Often a database can be broken into two parts:
1. the **Data File** or **Backend**,   and…
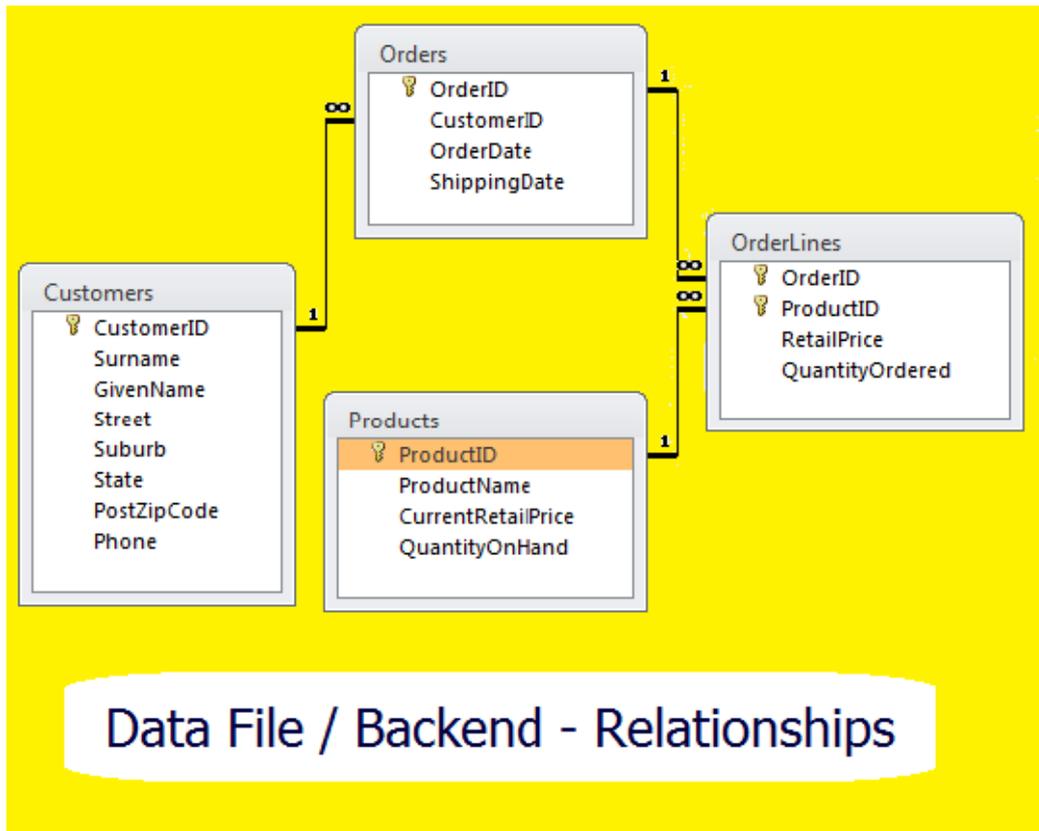2. the **User Interface (UI)** or **Frontend**.

The Data File (Backend)

The Data File is where the **data/information** applicable to the database is stored. The data is usually stored in **tables** – *somewhat like structured spreadsheets or data sheets*. The tables are then linked together with what are called relationships (*see next page*):

Data File / Backend - Tables

Data File / Backend - Relationships

The User Interface (UI) (Frontend)

The User Interface or Frontend is made up of the screens, web pages, reports, etc, that the users interact with in adding, editing, deleting and viewing data; importing and exporting; manipulating data, etc:

User Interface (UI) Frontend

demo | **Prospects / Clients List**

For Business Marketing

- Clients
- Reminders
- Login

⊟ Help
  - Detail
  - List

- Admin

	Business Name	First Name	Last Name	Marketing Source ▲	Enterprise Type ▲	Gender ▲	Client Type ▲
✎🗑↻	Busn06	First06	Last06	Magazine	Retailer	Female	New
✎🗑↻	Busn13	First13	Last13	_	_	_	_
✎🗑↻	Busn15	First15	Last15	_	_	_	_
✎🗑↻	Busn17	First17	Last17	_	_	_	_
✎🗑↻	Busn18	First18	Last18	_	_	_	_
✎🗑↻	busns19	first000	last0000	Magazine	Charity Organisation	Not Defined	CD073

Client Search
Business Name
First Name
Last Name
Marketing Sourc _ ▼
Enterprise Type
Gender _ ▼
Client Type _ ▼
🔍

User Interface – Web Frontend

demo | **Prospect / Client Details**

For Business Marketing

- Clients
- Reminders
- Login

⊟ Help
  - Detail
  - List

- Admin

Prospect or Client
Business: Busn06
Client Type: New ▲
First Name: First06
Last Name: Last06
Phone: N/A
Mobile: N/A
Email: N/A
Address
Address Type: _ ▲
Address: N/A
Suburb: Suburb2 ▲
Post Code: N/A
State: NSW ▲
Country: _ ▲
Marketing Details
Enterprise Type: Retailer ▲
Marketing Source: Magazine ▲
Gender: Female ▲
First Contact
Date: 1/01/2006
Time: 12:00 AM

Client Status:

	Status	Amount	Date
	_	0.00	1/01/1900
✎🗑	Job	200.00	1/01/2009
✎🗑	Quote	200.00	1/01/2009

Notes:
Notes

admin | logout

⚙ Parts Manufacturing Database

Home
Warehouse
Parts
Purchases
Employees
Calender
Documents
Admin Panel
Logout

Parts List
Part# [   ]
Name [M3]   [Search]
Dimensions [   ]
Results: 545 Found

Options	Part# ▼	Description ▼	Dimensions ▼
✎✖	1.1	M3 Threaded Rod	3mm x 10mm
✎✖	1.2	M3 Threaded Rod	3mm x 12mm
✎✖	1.3	M3 Threaded Rod	3mm x 15mm
✎✖	1.4	M3 Threaded Rod	3mm x 17mm
✎✖	1.5	M3 Threaded Rod	3mm x 20mm
✎✖	1.6	M3 Threaded Rod	3mm x 22mm
✎✖	1.7	M3 Threaded Rod	3mm x 25mm
✎✖	1.8	M3 Threaded	
✎✖	1.9	M3 Threaded	
✎✖	2.0	M3 Threaded	
✎✖	2.1	M3 Threaded	
✎✖	2.2	M3 Threaded	
✎✖	2.3	M3 Threaded	
✎✖	2.4	M3 Threaded	
✎✖	2.5	M3 Threaded	
✎✖	2.6	M3 Threaded	
✎✖	2.7	M3 Threaded	
✎✖	2.8	M3 Threaded	
✎✖	2.9	M3 Threaded	

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admin | logout
⚙ Parts Manufacturing Database
Warehouse▼ Calendar Documents Admin
Parts List
Part# [   ]
Name [M3] [Search]
Dimensions
Results: 545 Found

Options	Part# ▼	Description ▼	Dimensions ▼
✎✖	1.1	M3 Threaded Rod	3mm x 10mm
✎✖	1.2	M3 Threaded Rod	3mm x 12mm
✎✖	1.3	M3 Threaded Rod	3mm x 15mm
✎✖	1.4	M3 Threaded Rod	3mm x 17mm
✎✖	1.5	M3 Threaded Rod	3mm x 20mm
✎✖	1.6	M3 Threaded Rod	3mm x 22mm
✎✖	1.7	M3 Threaded Rod	3mm x 25mm
✎✖	1.8	M3 Threaded Rod	3mm x 30mm
✎✖	1.9	M3 Threaded Rod	3mm x 40mm
✎✖	2.0	M3 Threaded Rod	3mm x 45mm
✎✖	2.1	M3 Threaded Rod	3mm x 50mm

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User Interface – Tablet / Smart Phone Frontend

Options for installing a Database System

Detailed below are five options for implementing or setting up a business software system.
(*Note: this is not a definitive list, but is a fair representation of some commonly utilised options.*)

1. Loaded on an Individual Computer

All the various files that make up a computer software system might be loaded on each individual computer or laptop. This means:

- The software is <u>not</u> dependent on any network being set up and/or operating.
- If one computer breaks down another computer can be used that has the software loaded.
- The software <u>can be taken out</u> of the office on a laptop and used on the road or at a remote site.
- Multiple staff will **not** see each other's entries (data/information) – this is good if staff are required to work independently, but not good if the business needs staff to share this information.
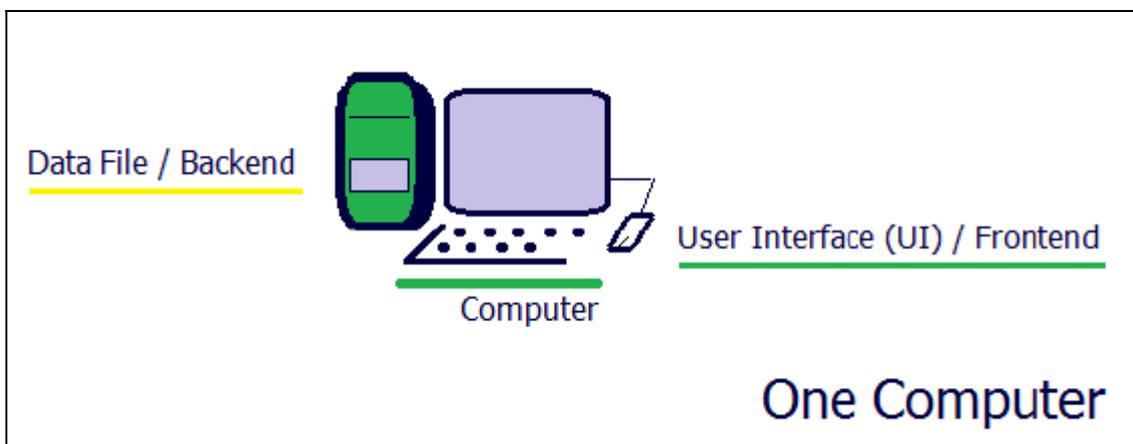

Software system operating on one computer or laptop

2. Loaded on an Internal Office Network

The data file (*database backend*) is loaded on a **network server** within the office while the screens and reports etc (*database front-end*) are loaded on each individual computer or laptop connected to this server. Data is saved across the network to the data file and drawn back across the network when someone needs to view it.

> *For instance a new client's details are typed in by one staff member and saved across the network to the data file. Another staff member can then request and draw this client's details back across the network to their computer.*
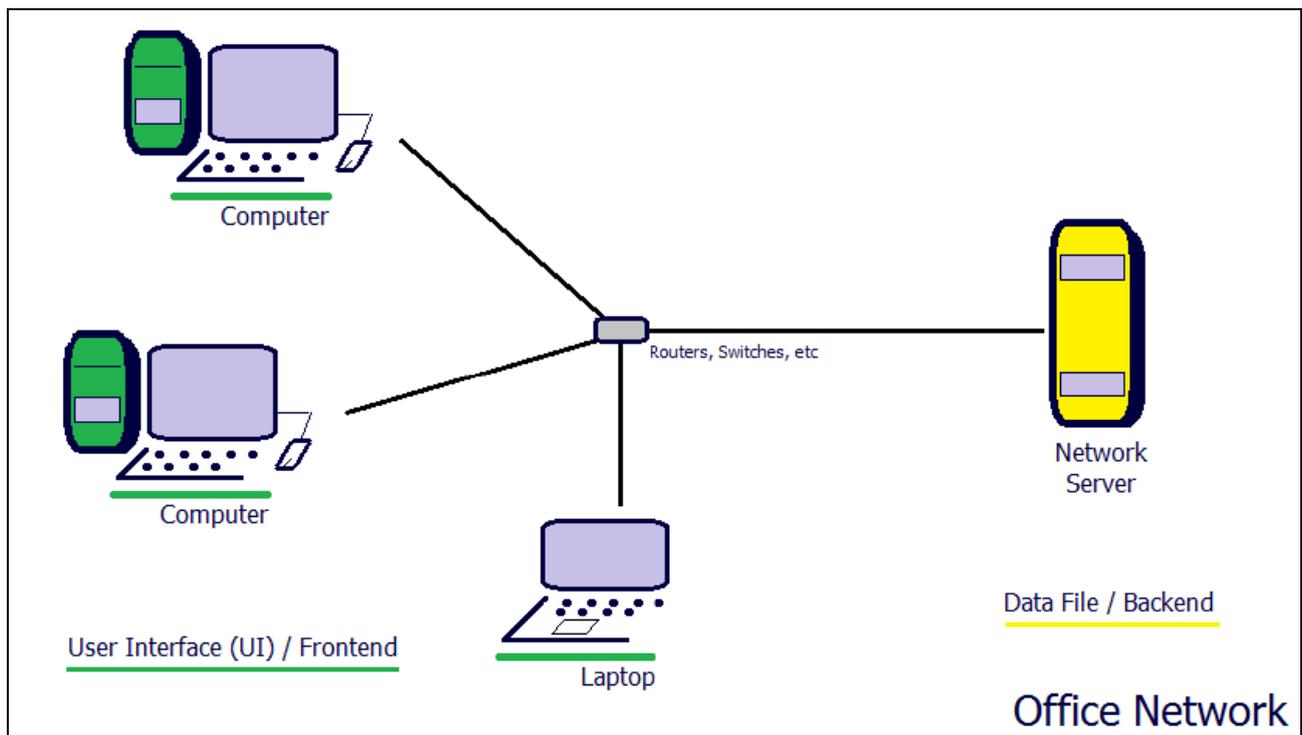

Software system operating on an internal office network

For this type of setup:

- The software needs the <u>network up and running</u> for it to be able to be used.
- The software <u>cannot</u> be taken out of the office on a laptop and used on the road or at a remote site, <u>without further network and/or connectivity setup</u>.
- Multiple staff <u>may</u> see each other's entries.

3. Linking into an Internal Office Network

When only a couple of staff might need access to the software system from **outside the office**, a connection that runs across the Internet can be set up. In some implementations this can require the staff member to have a laptop out in the field, and for a dedicated computer back in the office to be available to allow them to link into the network.
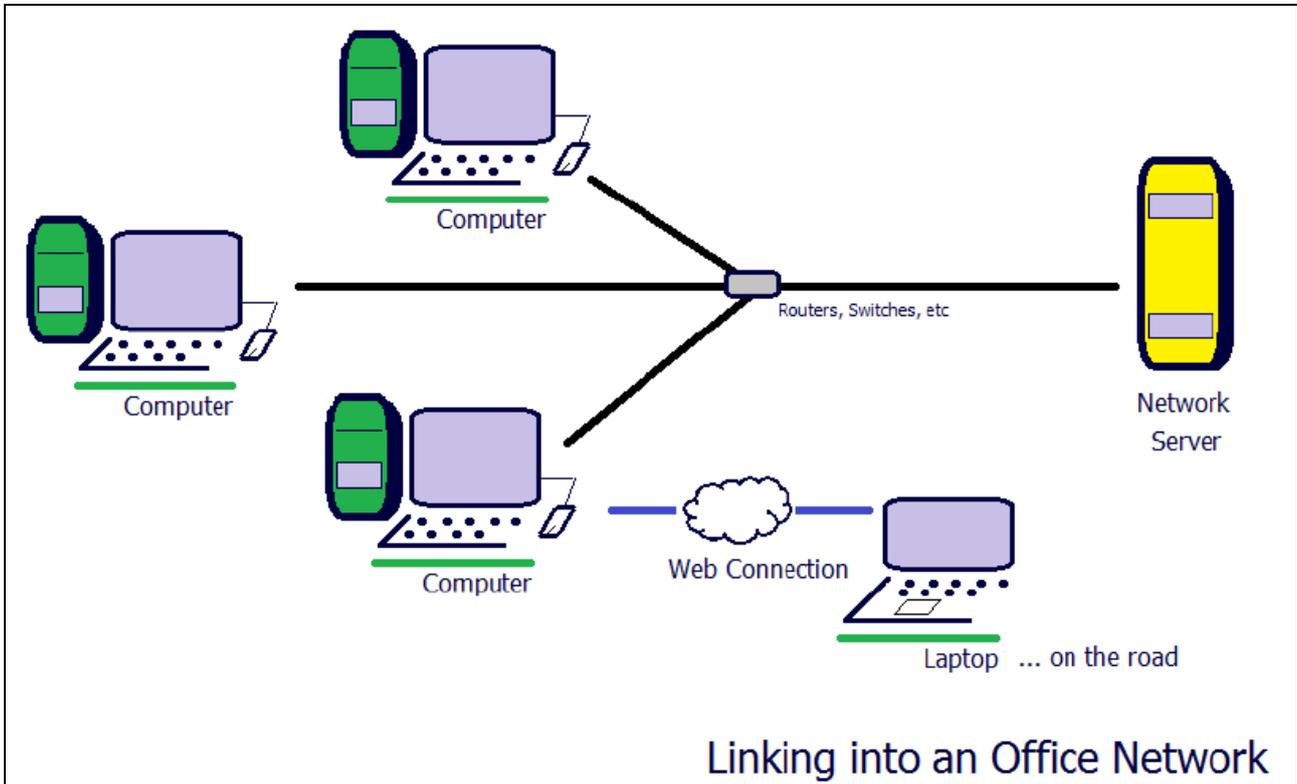
One or more users linking into an internal office network

This option allows the business to have the network setup as discussed above but also allow a couple of staff to possibly work outside the office.

Note: there are a range of alternate options in setting up this type of connection. Among these are some commercial products such as:

- **TeamViewer**: http://teamviewer.com

- **LogMeIn**: https://secure.logmein.com

4. Terminal Server

When a range of staff need to regularly access the software system from outside the office many businesses establish a **Terminal Server.** The terminal server (*hardware*) can be located in the business office or be hosted by a third party provider. With a Terminal Server, a selection of or all staff log into the server (*remote-in*) and access the software system usually via a network or Internet connection.

Access to the application would be secured by usernames and passwords. The various users would open a '*session*' on their individual computers via an icon on their desktop. Each user would then log into the software system.
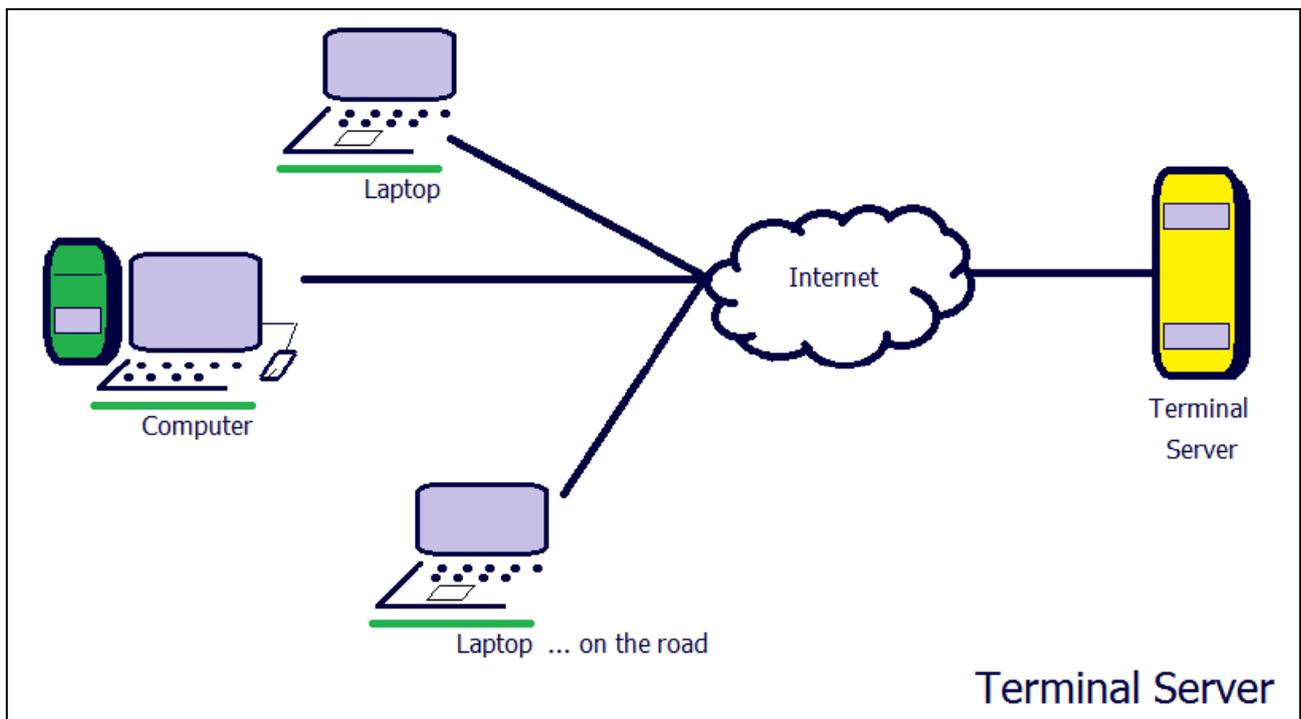
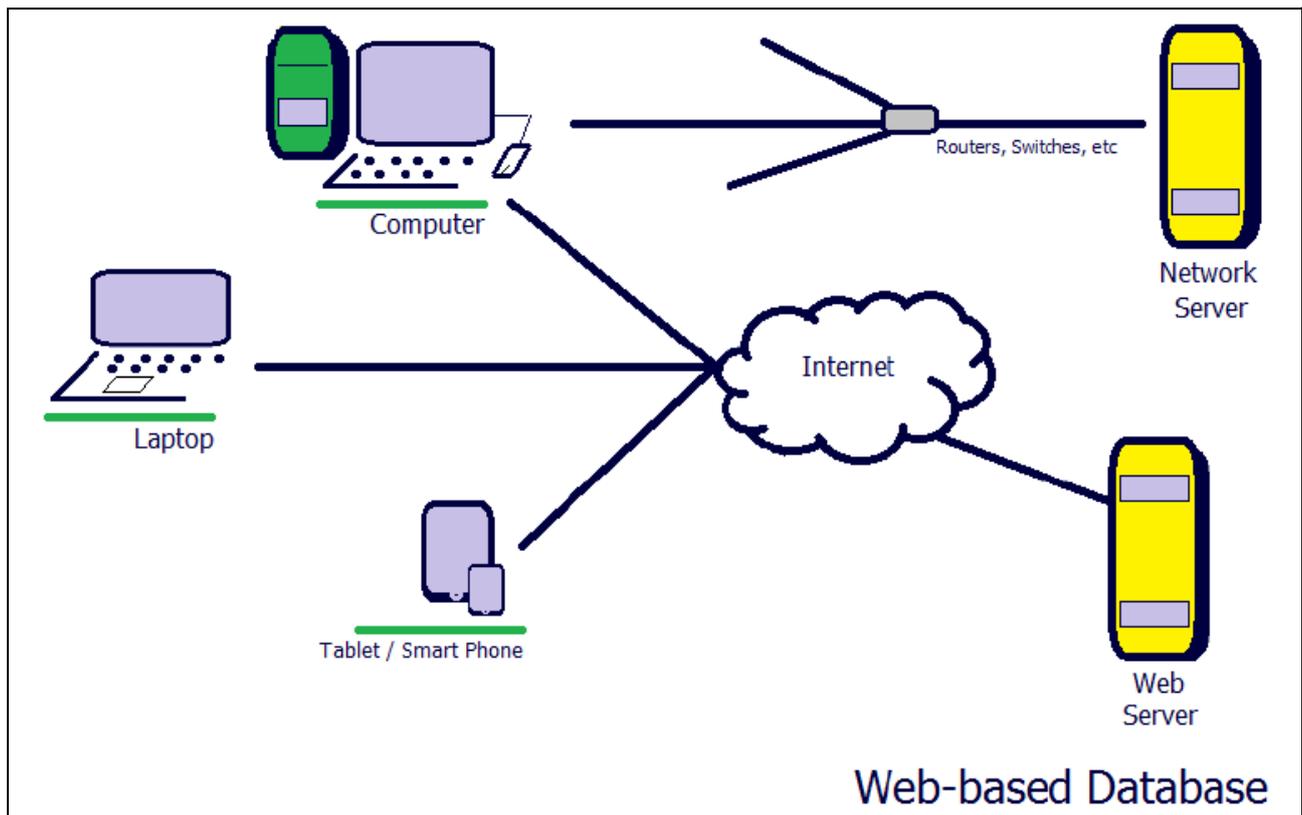Software system operating on a Terminal Server

For this type of setup:

- The software <u>can</u> be accessed by staff on the road or at a remote site.
- The software needs the <u>server and the</u> **Internet** <u>up and running</u> for it to be able to be used by those outside the office.
- Multiple staff <u>can</u> see each other's entries.
- <u>There can be</u> **significant** <u>setup costs</u> in establishing a Terminal Server – a hardware cost plus software costs <u>per user</u>.
- A software system designed to run on a network, can be transferred to a terminal server at minimal cost.

5. Web-Based System

When a business needs <u>a significant number of staff and even other users</u> (*eg: clients and/or suppliers*) to have access to part or all of the software system, a web-based system can be an appropriate implementation. A web-based system requires the business to have a **web server** (*hardware*) - again can be located in the business office or hosted by a third party provider.

Common examples of web-based software include: EBay, Amazon, an airline, a bank - where in order to access anything private and confidential, you have to log into your account.

Software system operating from a Web-Server

For this type of setup:

- The software <u>can</u> be accessed by staff on the road or at a remote site, and (*similar to a web site*) by as many other users as the business requires.
- The software needs the <u>web-server and **Internet** up and running</u> for it to be able to be used.
- Multiple staff <u>will be able</u> see each other's entries.
- <u>There are hardware and some software setup costs</u> in establishing a Web Server, though the software costs can be significantly less than that potentially required for a Terminal Server.
- A software system designed to run on an individual computer or on a network, will generally need to be re-developed to run as a web-based system. <u>There can be significant cost in redeveloping a network-based software system to run on the web</u>.
- Users would usually also require access to an office-based server for doing other tasks such as preparing and saving documents, preparing spreadsheets, etc…
- A web-based system is usually <u>optimised to handle more users at the one time</u> and is therefore more scalable over time.

Risk with Internet-based Links

The significant risk with any system that requires an Internet connection, is for that link to be unavailable – a server is down, there is limited or no phone signal, the Internet link is down…

Where a connection is mission critical, multiple connections can be put in place – eg:

- Having an Internet connection on a tablet or laptop, plus another on a phone that can be tethered to a tablet or laptop,
- Having two Internet connections with two different providers,
- Utilising phone companies with very good *guaranteed* coverage.

An alternate option - for say a sales person on the road - is for the software to work on an individual laptop and for the data to be saved on that laptop (as discussed in option: *1. Loaded on an Individual Computer*). Then when they travel to a location where they can establish a good internet connection, they connect to the office server and upload their data.

> *The disadvantage of such a setup is that the staff member may not be able to access live data while they are on-site, and other staff cannot see their new/updated data until they find a location to upload.*