Open Source Software

Course Duration: 12 hours

Contents…

- What is Proprietary and Open Source Software?
- Examples of Software
- MS Office vs. Open Office

What is Proprietary Software?

- This is a fancy word for software you have to pay for. The Proprietor (creator or maker) also has other restrictions on the software. These restrictions include: using, copying, or changing the program.

What is Open Source Software?

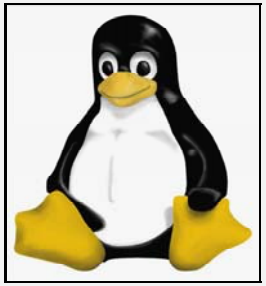
- In general, open source refers to any program whose source code (what makes it work) is made available for use or modification as users or other developers see fit. Open source software is usually developed as a public collaboration and made freely available.

Free Software?

- Yes OpenSource Software is free:
  - To Download
  - To copy and give away
  - To use on as many computers as you want
  - To use on most Operating Systems like Windows and Mac

Program Examples

- A Comparison of Proprietary and Open Source Programs

Type of Program	Proprietary	Open Source
Operating Systems	 Microsoft Windows XP	 Linux
Productivity Suite	 Microsoft Office	 Openoffice.org
Email	 Microsoft Outlook	 Thunderbird
Sound Editing	 Pro Tools	 Audacity

Software in detail…

Microsoft Office vs. OpenOffice.org

Microsoft Office vs. Open Office

- Open Office's looks similar to Office 2003.
- You can open Microsoft Documents with Open Office.
- Open Office does not have all the features of Microsoft Office.
- OpenOffice.org is Free.
- Microsoft Office is Not Free.

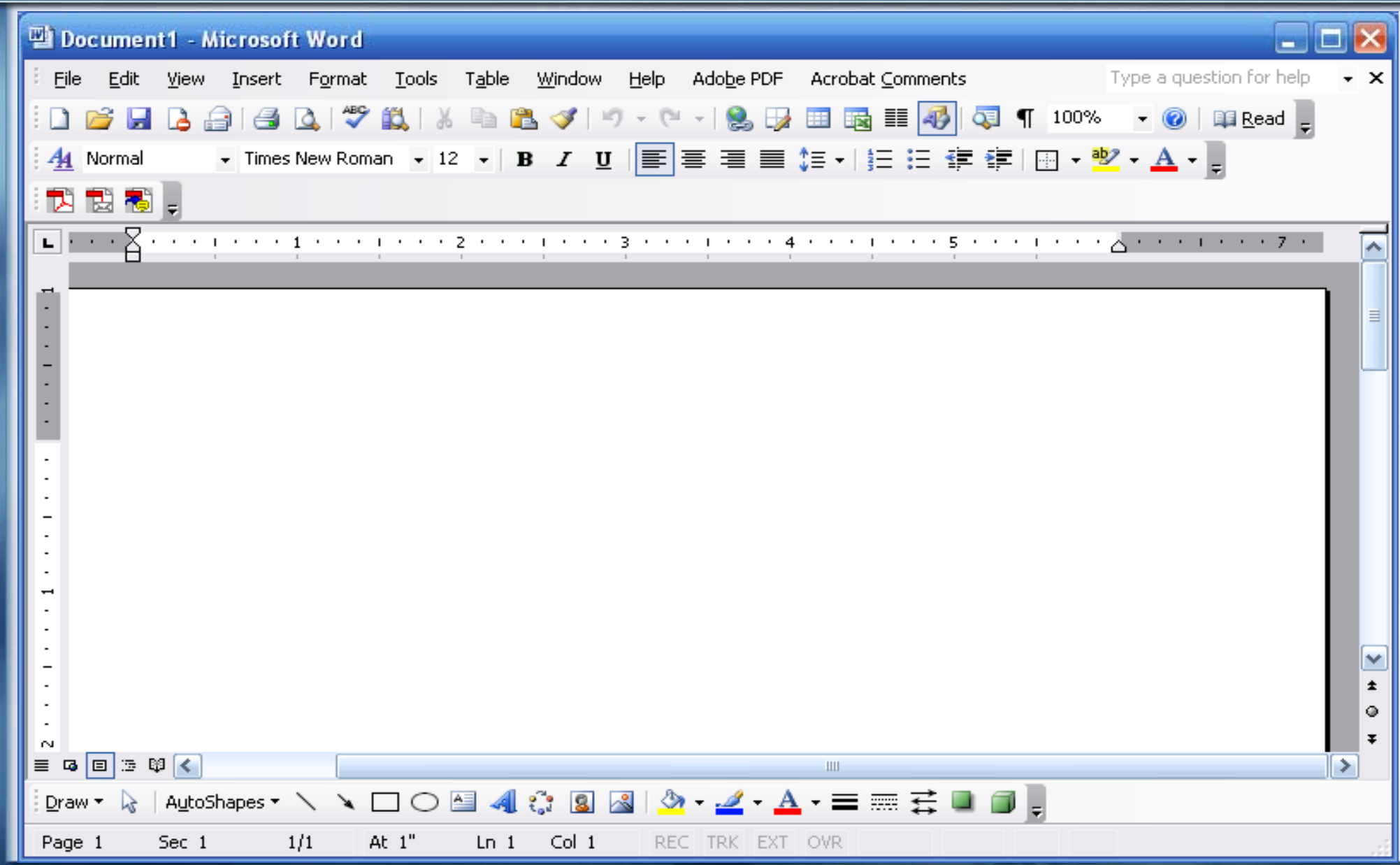
Compare The Suites (Programs)

- Microsoft
  - Word
  - Excel
  - PowerPoint
  - Access
- OpenOffice
  - Writer
  - Calc
  - Impress
  - Base

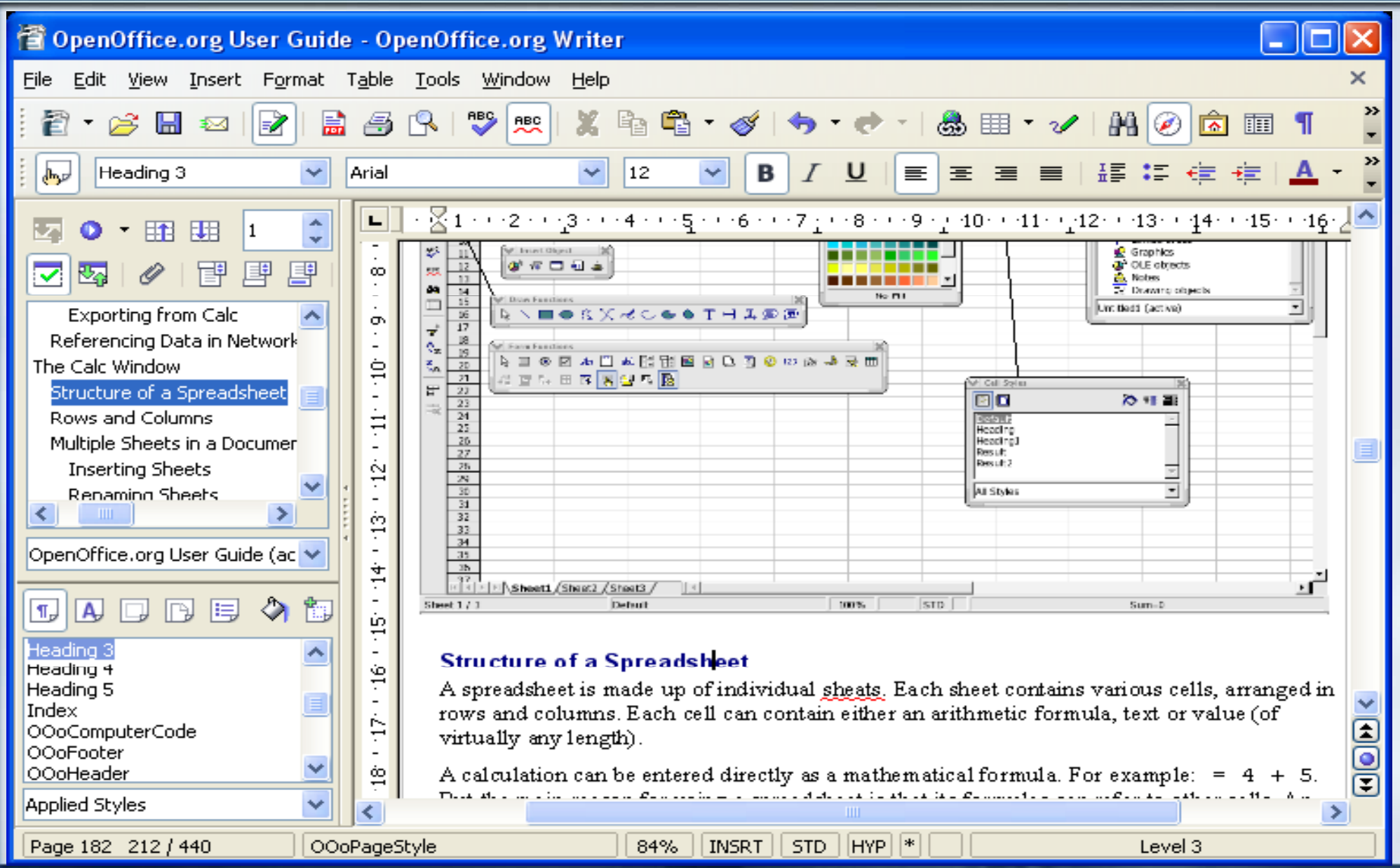
Word Processing

- Word and Writer are:
  - Typing Programs
  - Make Resumes, Reports, Newsletters, Tables, etc.

Word Screenshot



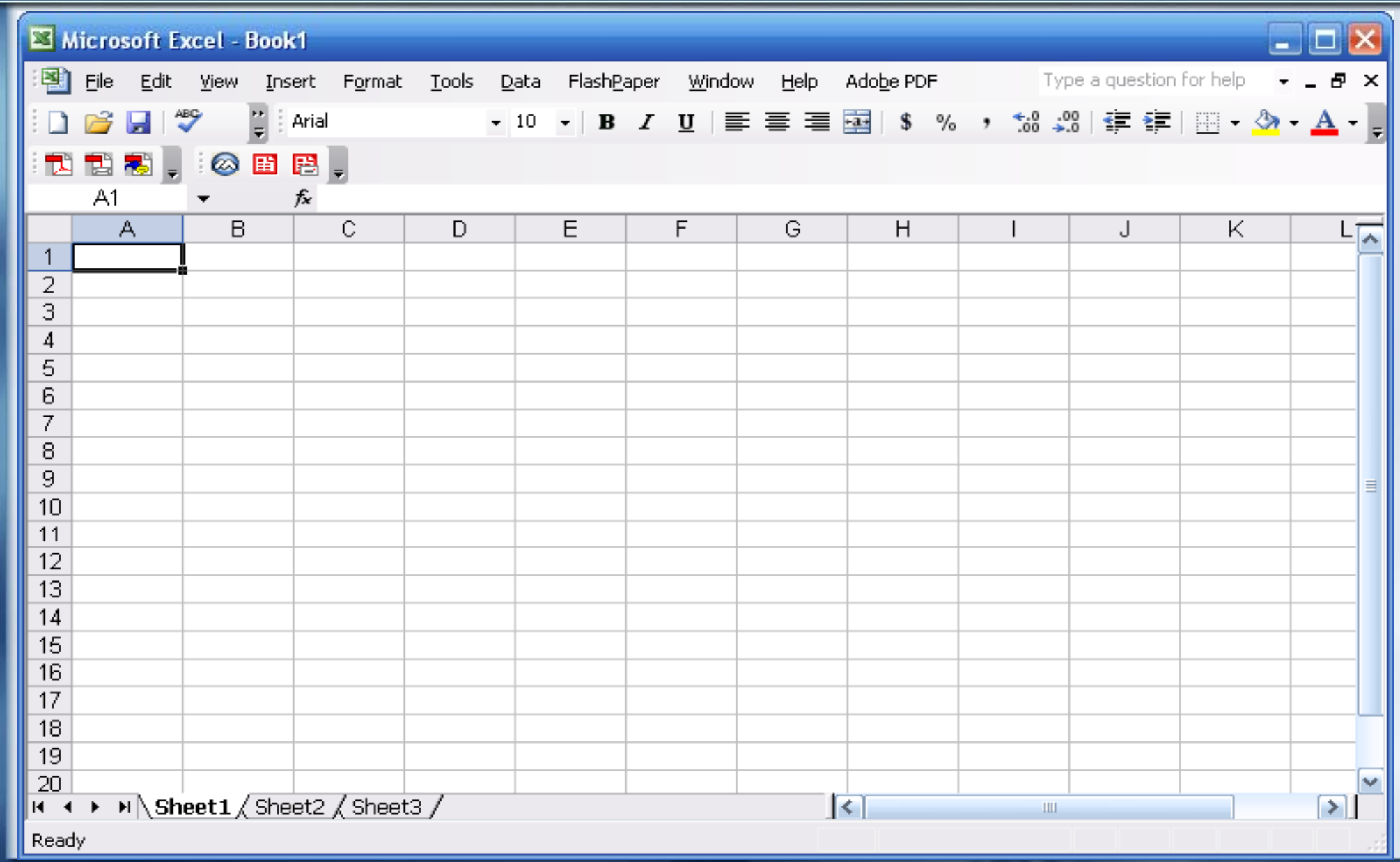
Writer Screenshot



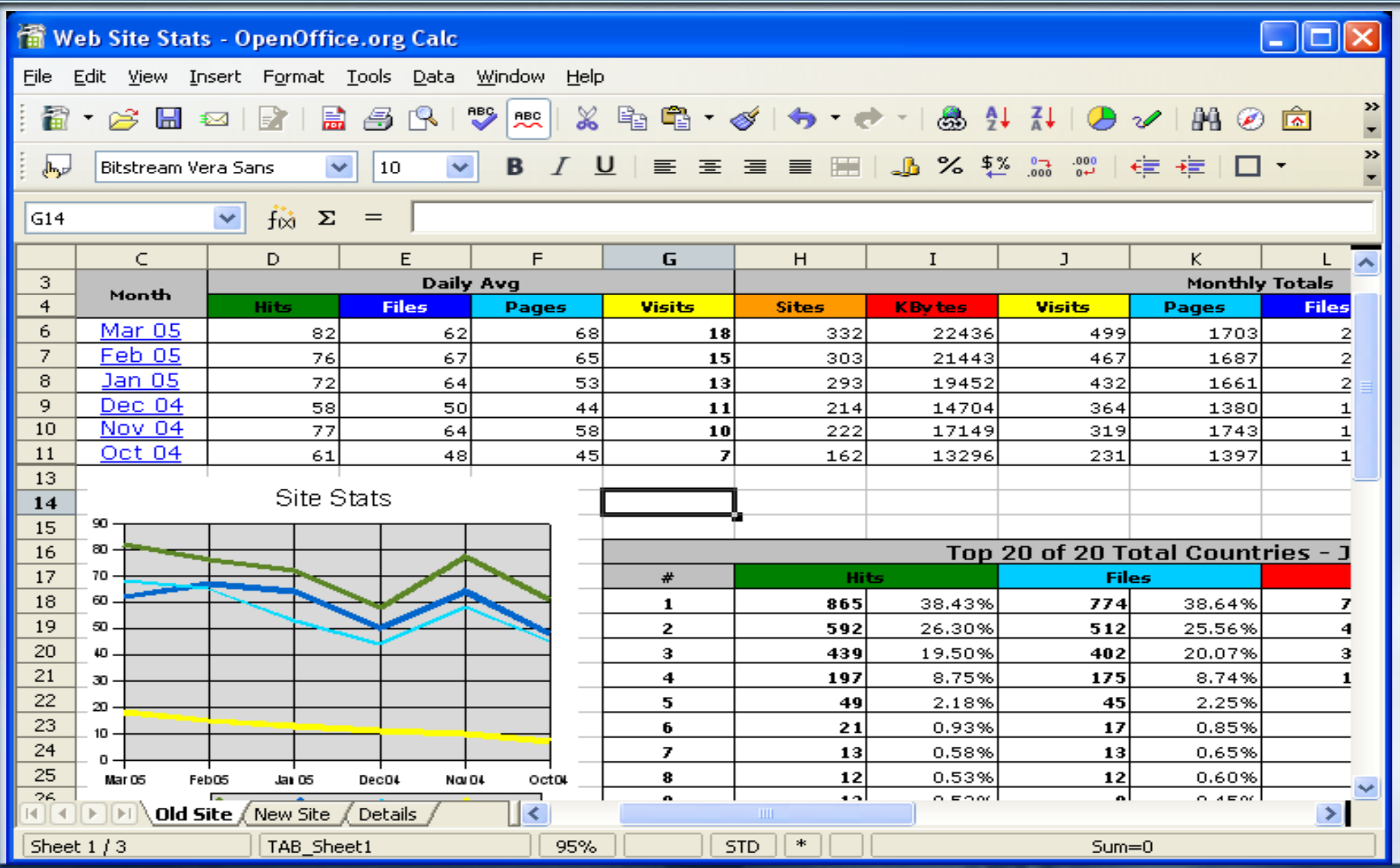
Spreadsheet

- Excel and Calc are:
  - Spreadsheet programs which organize information on a rectangular grid of, often financial information.

Excel Screenshot



Calc Screenshot



Month	Daily Avg Hits	Files	Pages	Visits	Monthly Totals Sites	KBytes	Visits	Pages	Files
Mar 05	82	62	68	18	332	22436	499	1703	2
Feb 05	76	67	65	15	303	21443	467	1687	2
Jan 05	72	64	53	13	293	19452	432	1661	2
Dec 04	58	50	44	11	214	14704	364	1380	1
Nov 04	77	64	58	10	222	17149	319	1743	1
Oct 04	61	48	45	7	162	13296	231	1397	1

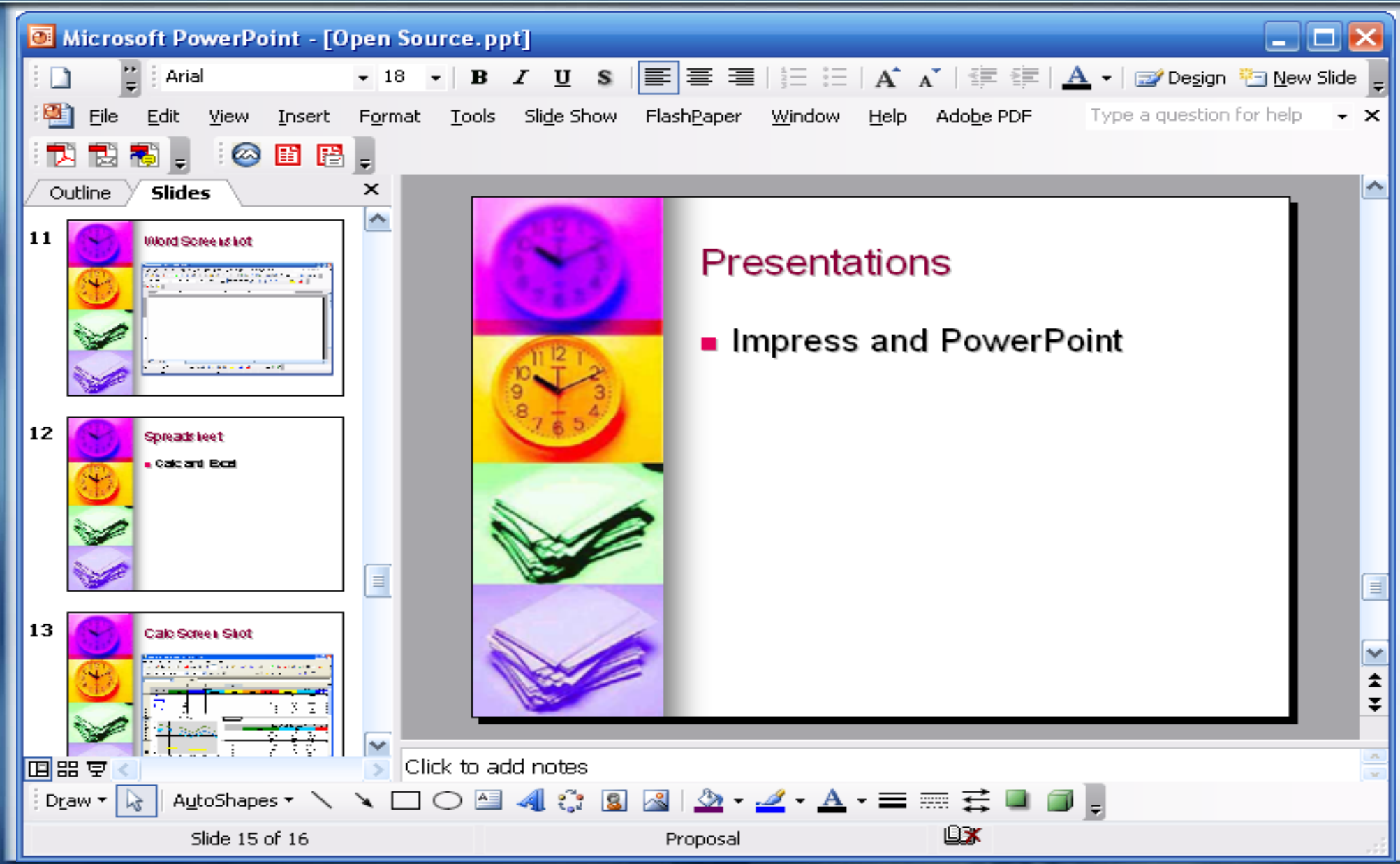
Top 20 of 20 Total Countries - J

#	Hits		Files		
1	865	38.43%	774	38.64%	7
2	592	26.30%	512	25.56%	4
3	439	19.50%	402	20.07%	3
4	197	8.75%	175	8.74%	1
5	49	2.18%	45	2.25%	
6	21	0.93%	17	0.85%	
7	13	0.58%	13	0.65%	
8	12	0.53%	12	0.60%	

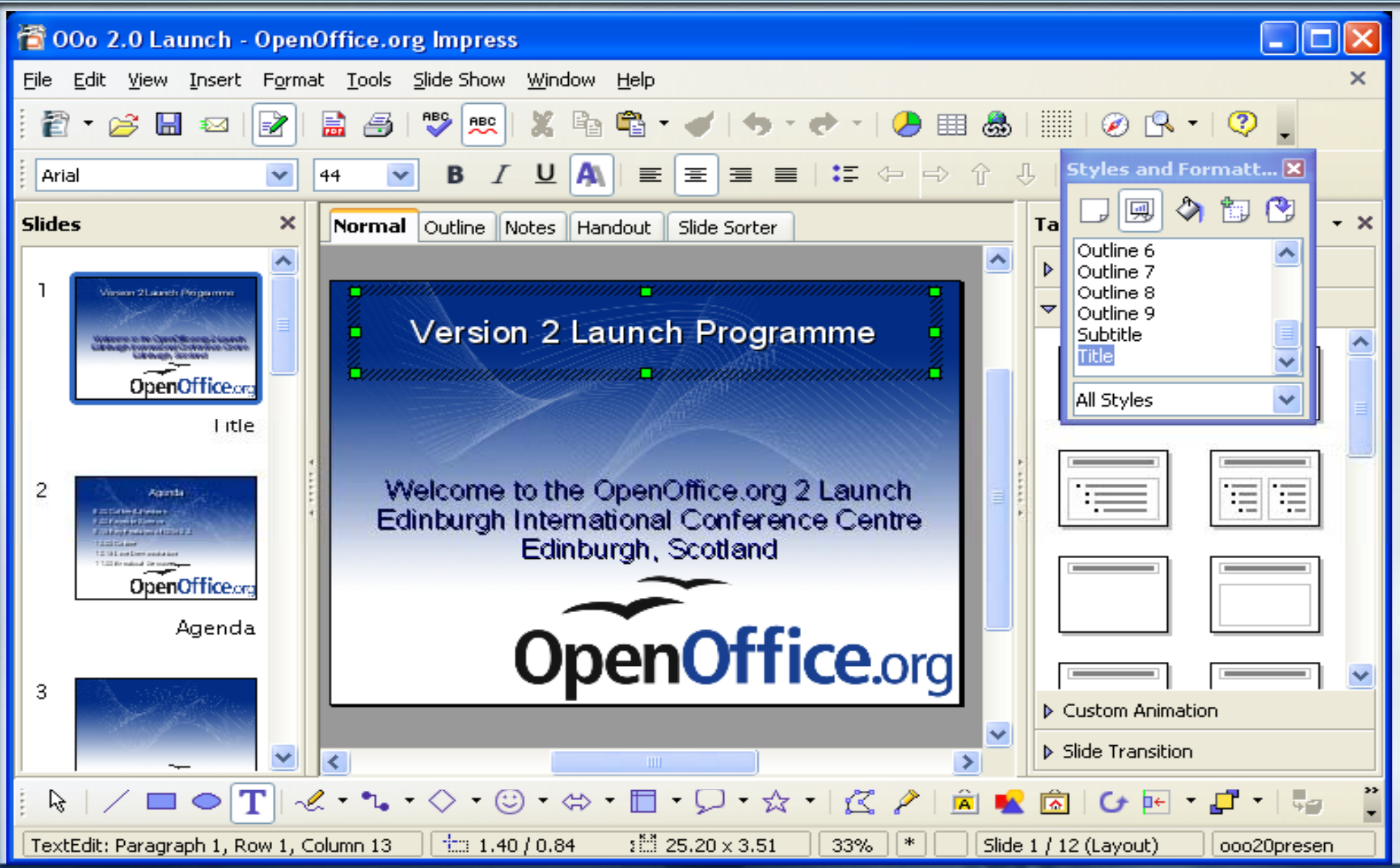
Presentations

- PowerPoint and Impress are:
  - Presentation programs used to create Slideshows.

PowerPoint Screenshot



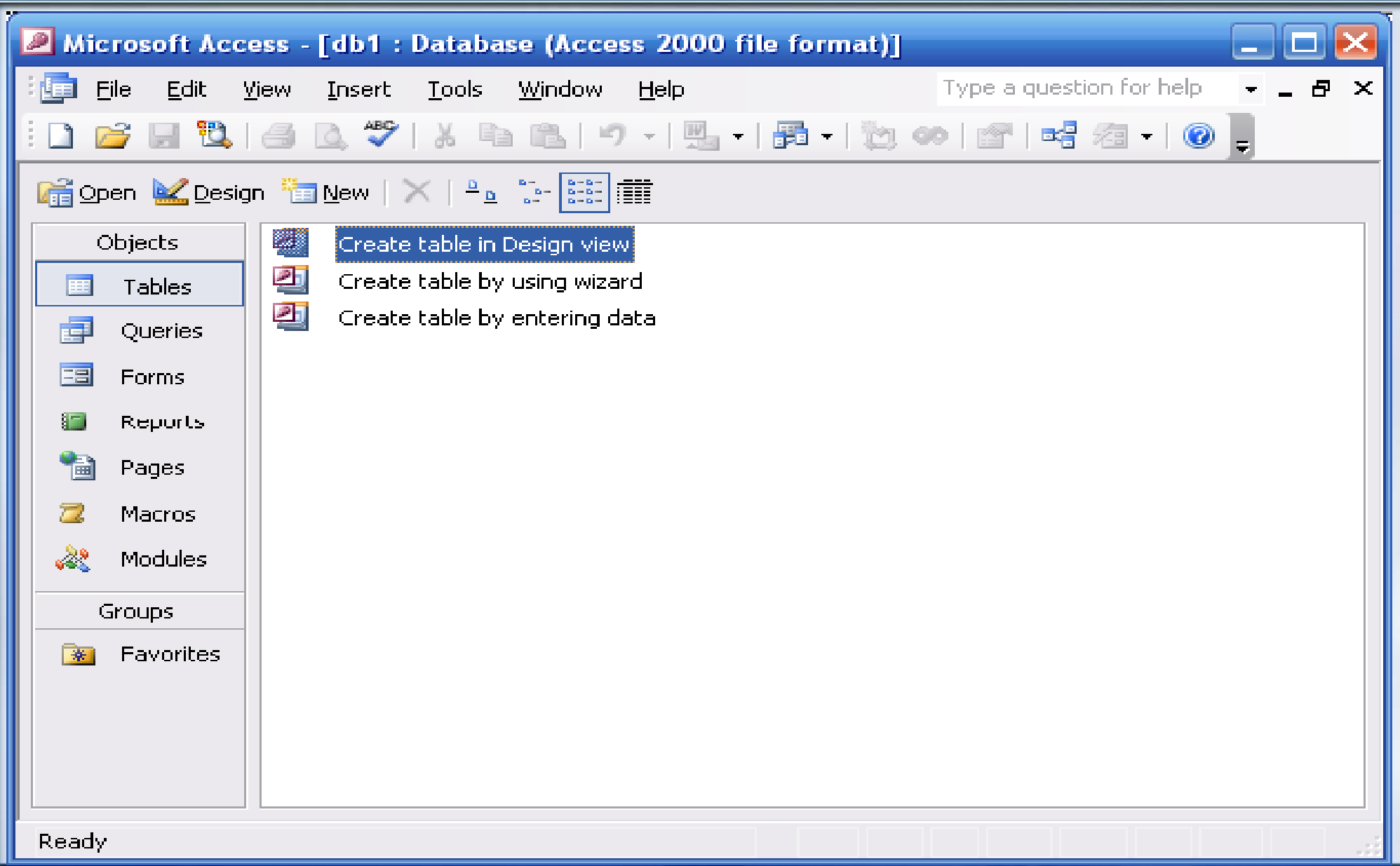
Impress Screenshot



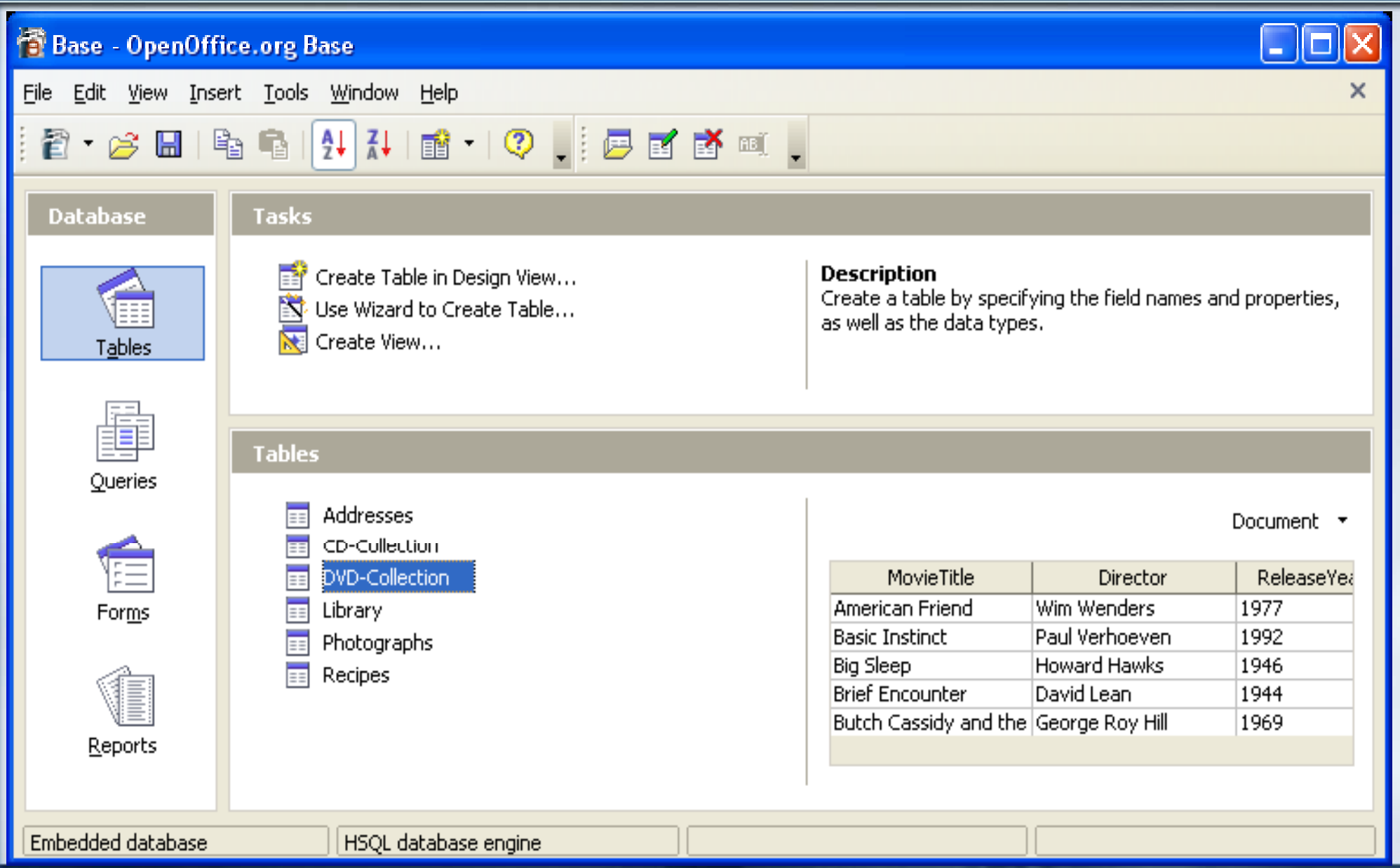
Database

- Access and Base are:
  - Programs used to store information.
  - Queries (searches) are used to find information you ask for and hides the rest.

Access Screenshot



Base Screenshot



How Do I Download and Install OpenOffice?

- You can find a link to OpenOffice and many other programs at:
  - www.novacharter.com/opensource
  - www.sourceforge.net/

Questions

Above the Clouds

View of Cloud Computing

Outline

- What is it?
- Why now?
- Cloud killer apps
- Economics for users
- Economics for providers
- Challenges and opportunities
- Implications

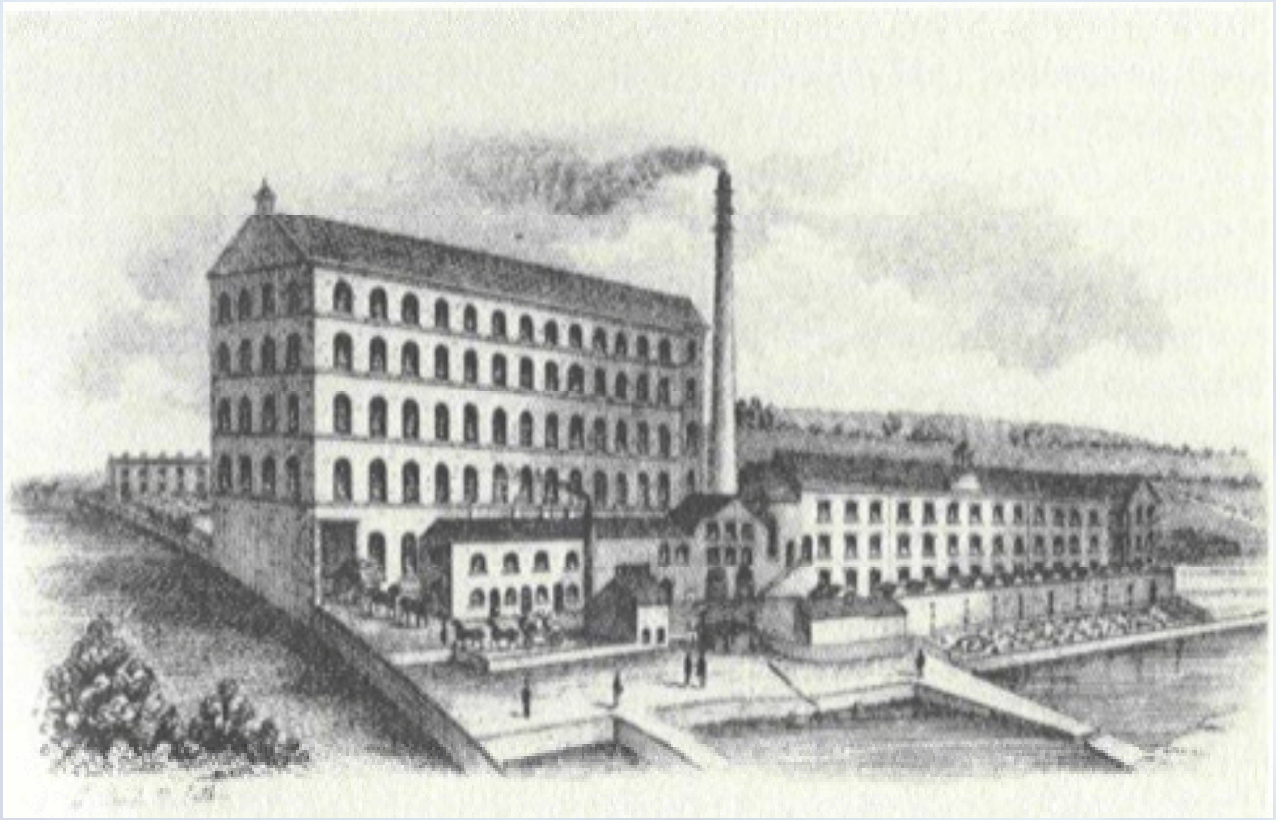
What is Cloud Computing?

- Old idea: Software as a Service (SaaS)
  - Def: delivering applications over the Internet
- Recently: "[Hardware, Infrastrucuture, Platform] as a service"
  - Poorly defined so we avoid *all* "X as a service"
- Utility Computing: pay-as-you-go computing
  - Illusion of infinite resources
  - No up-front cost
  - Fine-grained billing (e.g. hourly)

Cloud Computing – a definition…

A standardised IT capability, (services, software or infrastructure) delivered via Internet technologies in a pay-per-use, self-service way

…and an analogy for the vision…



Why Now?

- Experience with very large datacenters
  - Unprecedented economies of scale
- Other factors
  - Pervasive broadband Internet
  - Fast x86 virtualization
  - Pay-as-you-go billing model
  - Standard software stack

Cloud Computing – What it means for IT

A standardised IT capability, (services, software or infrastructure) delivered via Internet technologies in a pay-per-use, self-service way.

What resources as a service?

Typical 'Cloud Computing Resources'

New Resources

What is the level of sharing?

Level of Sharing

Public Cloud @ Global Provider

Cloud Service Market

Virtual Private Cloud @ Dedicated Provider

Cloud and Integration Service Market

Private Cloud @ In-house Data Centre

Tool Market

The Cloud is a lot like the iPhone…

Rapid Evolution

iPhone apps, iPhone OS releases, iTunes features

Cloud Features – providers, integrators, tools, products services

…but like the iPhone its also over-hyped!

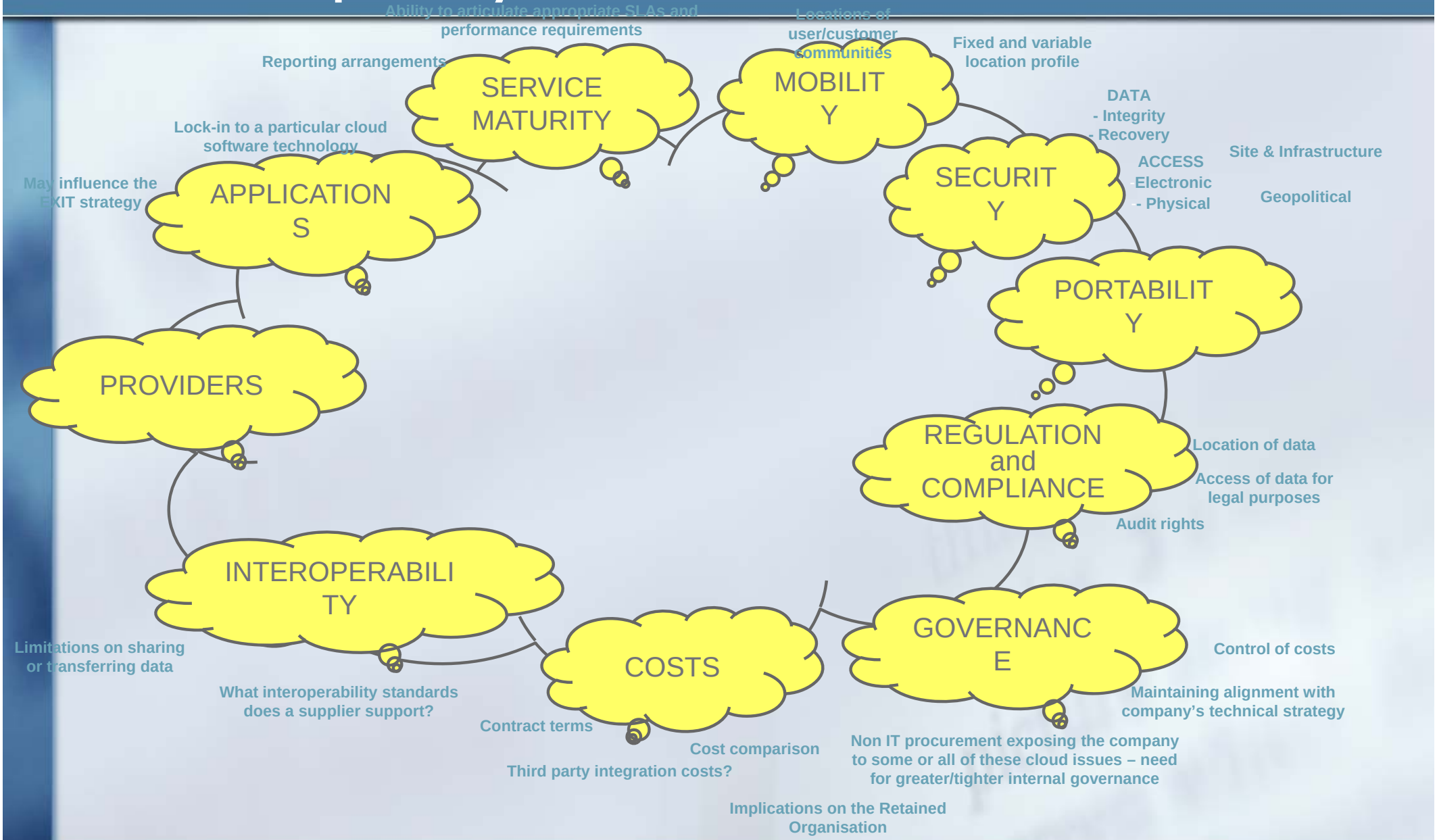
There are benefits…

- Reduced Costs – if done right
  - Better alignment of budgets with application demand
  - Deliver applications without raising the capex budget
- Improved time to application deployment
- Better ability to handle demand peaks
- Ability to share data with reduced security risk

…and also risks

- Multi-tenancy clouds may clash against security, privacy and compliance requirements
- Economics of the new charging model may not stack up
- Risk of vendor lock in
- Some degree of reliability and control is sacrificed
- Integration of Cloud applications may prove difficult and expensive down the line
- Standardised models and workloads may limit custom applications

Will the Cloud feature in YOUR future? There's plenty to think about…



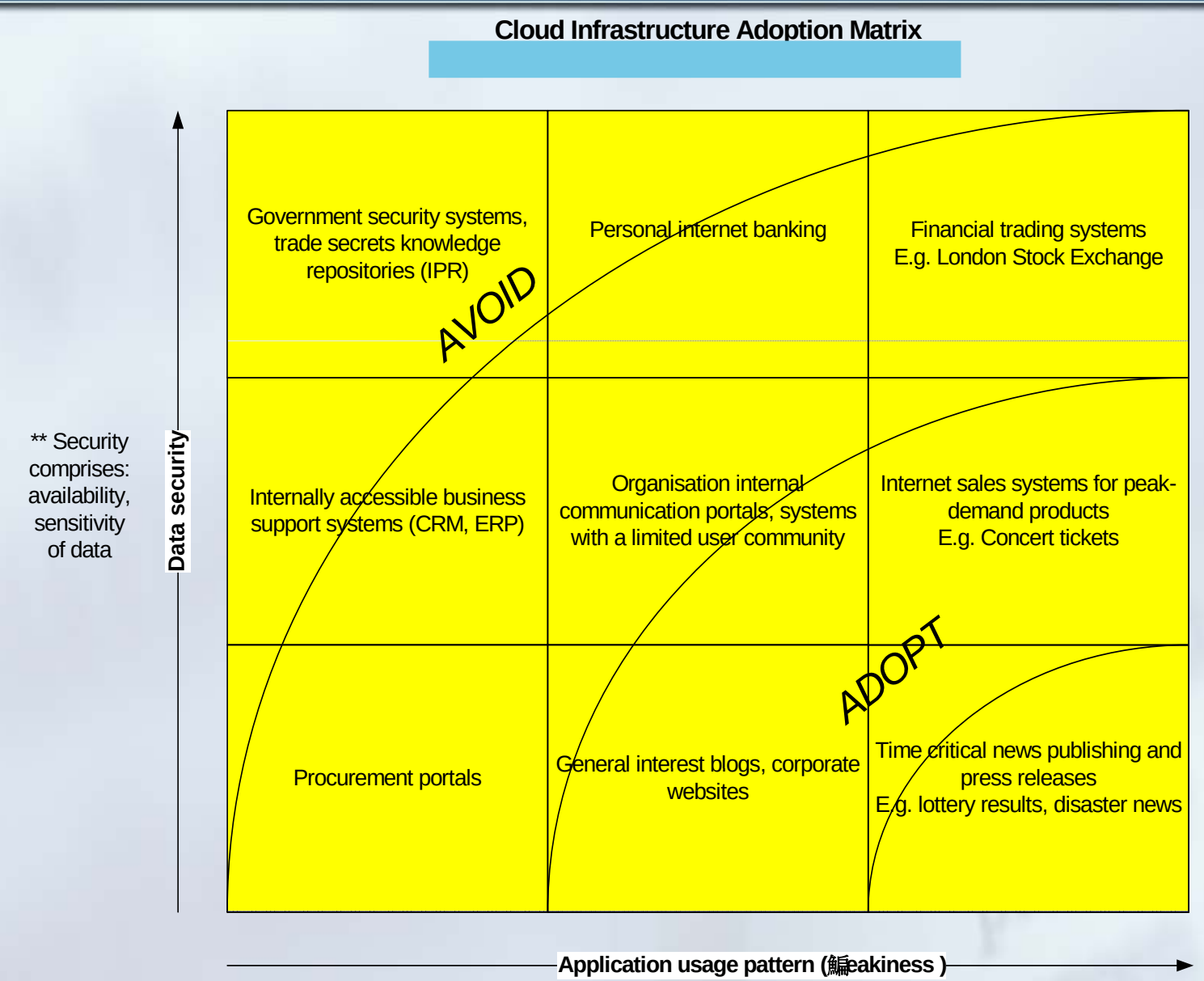
…and it needs to be right for YOU!

There is no 'one size fits' all – every organisation is different. What you see when you look at the cloud depends on the type of business you are…

- There are multiple obstacles to overcome in adopting Cloud Computing and the risks are poorly understood, but the potential benefits could be significant
- Organisations must ensure that they are Cloud-ready and evaluate opportunities by applying a structured framework
  - Identify potential candidates for Cloud-based services
  - Can I do it, and if so where should I start?
  - Is it worth doing?
  - Does it limit my future options?

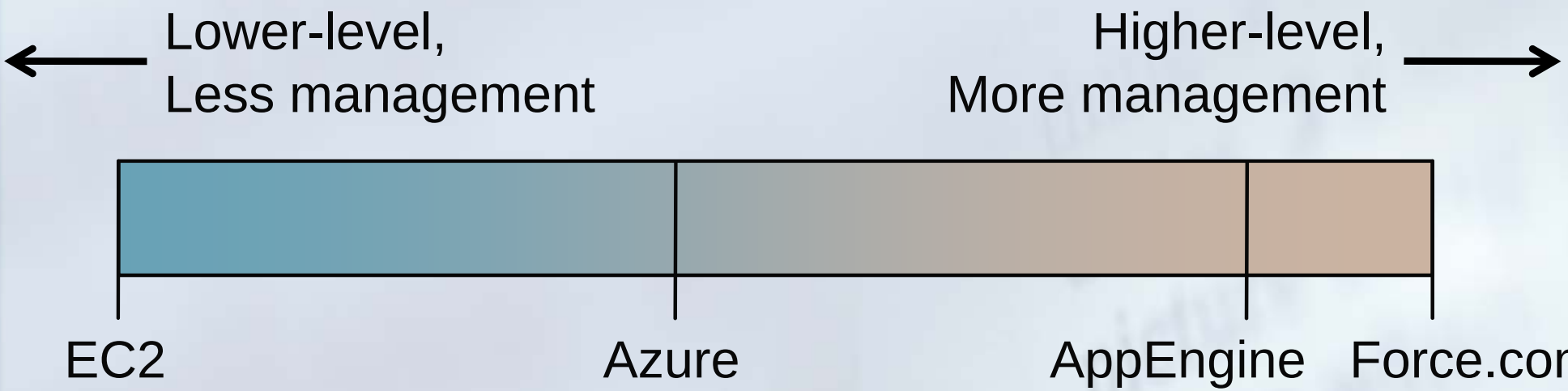
Will you even need an IT department in 5 years time?

Example adoption matrix



Spectrum of Clouds

- Instruction Set VM (Amazon EC2, 3Tera)
- Bytecode VM (Microsoft Azure)
- Framework VM
  - Google AppEngine, Force.com

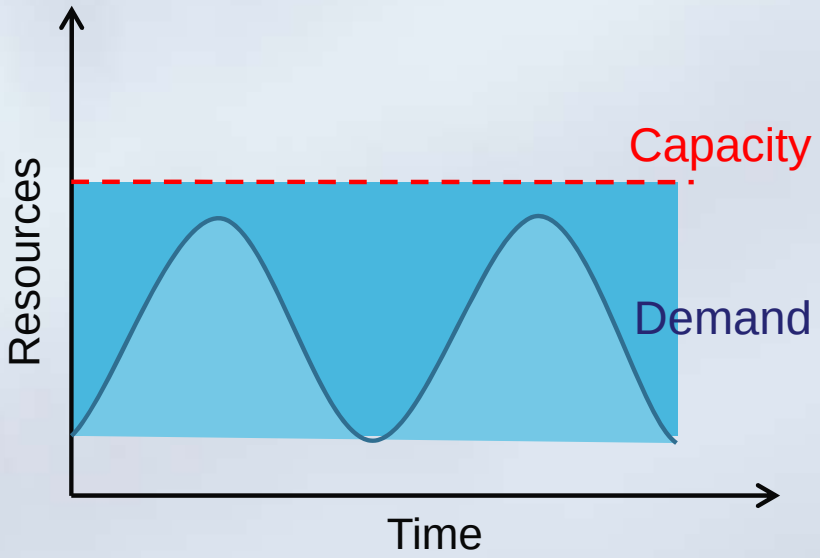


Cloud Killer Apps

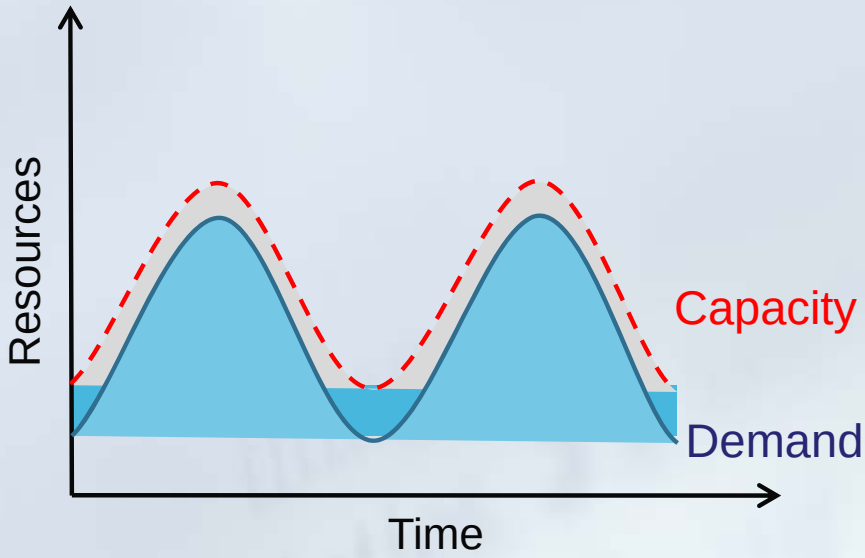
- Mobile and web applications
- Extensions of desktop software
  - Matlab, Mathematica
- Batch processing / MapReduce
  - Oracle at Harvard, Hadoop at NY Times

Economics of Cloud Users

- Pay by use instead of provisioning for peak



Static data center

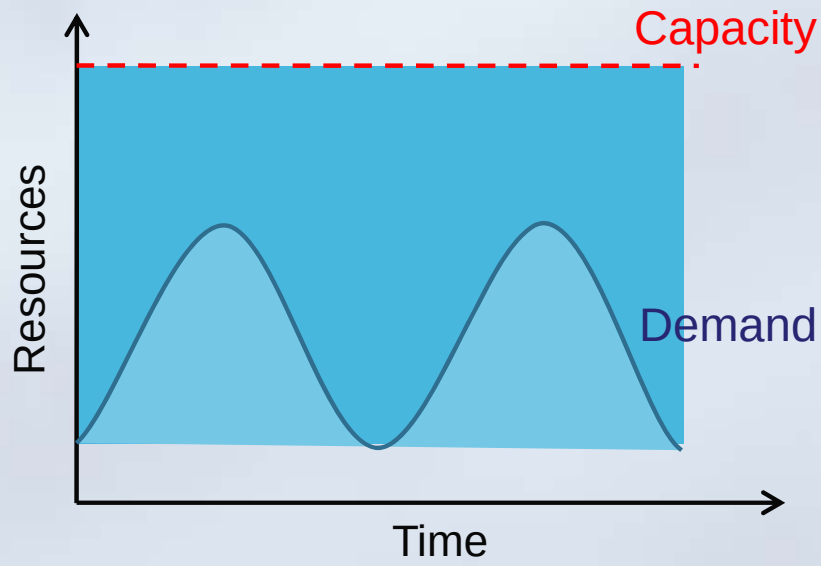


Data center in the cloud

Unused resources

Economics of Cloud Users

- Risk of over-provisioning: underutilization

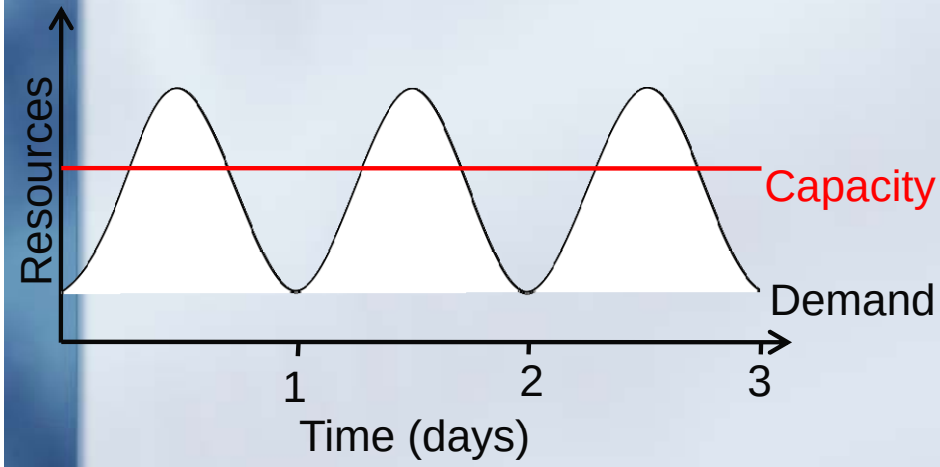


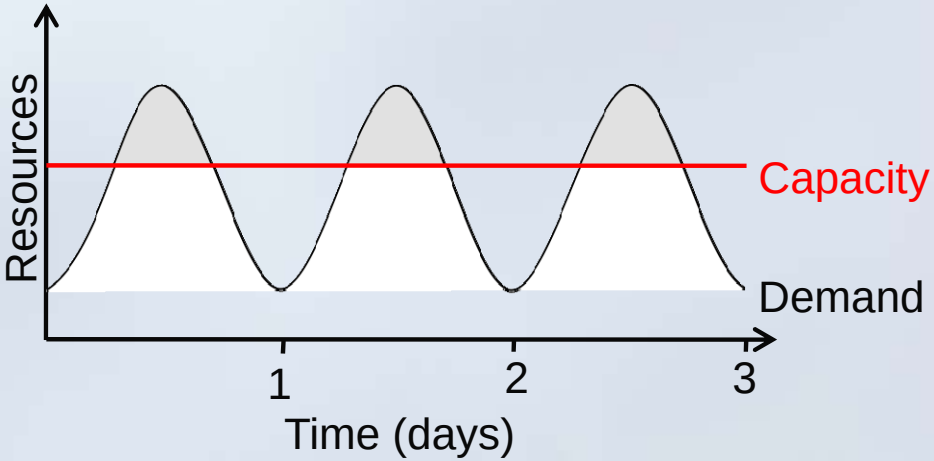
Unused resources

Static data center

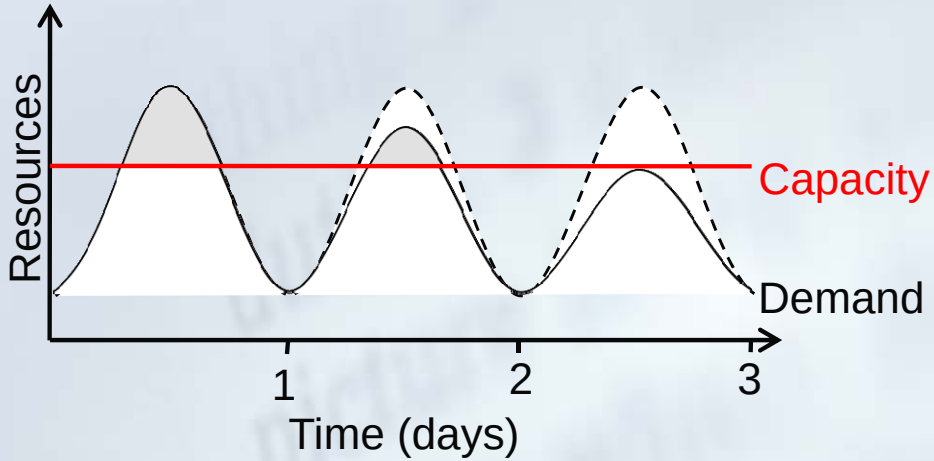
Economics of Cloud Users

- Heavy penalty for under-provisioning





Lost revenue



Lost users

Economics of Cloud Providers

- 5-7x economies of scale [Hamilton 2008]

Resource	Cost in Medium DC	Cost in Very Large DC	Ratio
Network	$95 / Mbps / month	$13 / Mbps / month	7.1x
Storage	$2.20 / GB / month	$0.40 / GB / month	5.7x
Administration	≈140 servers/admin	>1000 servers/admin	7.1x

- Extra benefits
  - Amazon: utilize off-peak capacity
  - Microsoft: sell .NET tools
  - Google: reuse existing infrastructure

Adoption Challenges

Challenge	Opportunity
Availability	Multiple providers & DCs
Data lock-in	Standardization
Data Confidentiality and Auditability	Encryption, VLANs, Firewalls; Geographical Data Storage

Growth Challenges

Challenge	Opportunity
Data transfer bottlenecks	FedEx-ing disks, Data Backup/Archival
Performance unpredictability	Improved VM support, flash memory, scheduling VMs
Scalable storage	Invent scalable store
Bugs in large distributed systems	Invent Debugger that relies on Distributed VMs
Scaling quickly	Invent Auto-Scaler that relies on ML; Snapshots

Policy and Business Challenges

Challenge	Opportunity
Reputation Fate Sharing	Offer reputation-guarding services like those for email
Software Licensing	Pay-for-use licenses; Bulk use sales

Short Term Implications

- Startups and prototyping
- One-off tasks
  - Washington post, NY Times
- Cost associativity for scientific applications
- Research at scale

Long Term Implications

- Application software:
  - Cloud & client parts, disconnection tolerance
- Infrastructure software:
  - Resource accounting, VM awareness
- Hardware systems:
  - Containers, energy proportionality

Usage of Cloud

Two major types of cloud (at least)

- Compute and Data Cloud
  - EC2, Google Map Reduce, Science clouds
  - Provision platform for running science codes
  - Open source infrastructure: workspace, eucalyptus, hub0
  - Virtualization: providing environments as VMs
- Hosting Cloud
  - GoogleApp Engine
  - Highly-available, fault tolerance, robustness, etc for Web capabilities
  - Community example: IU hosting environment (quarry)

Virtualization and Cloud Computing

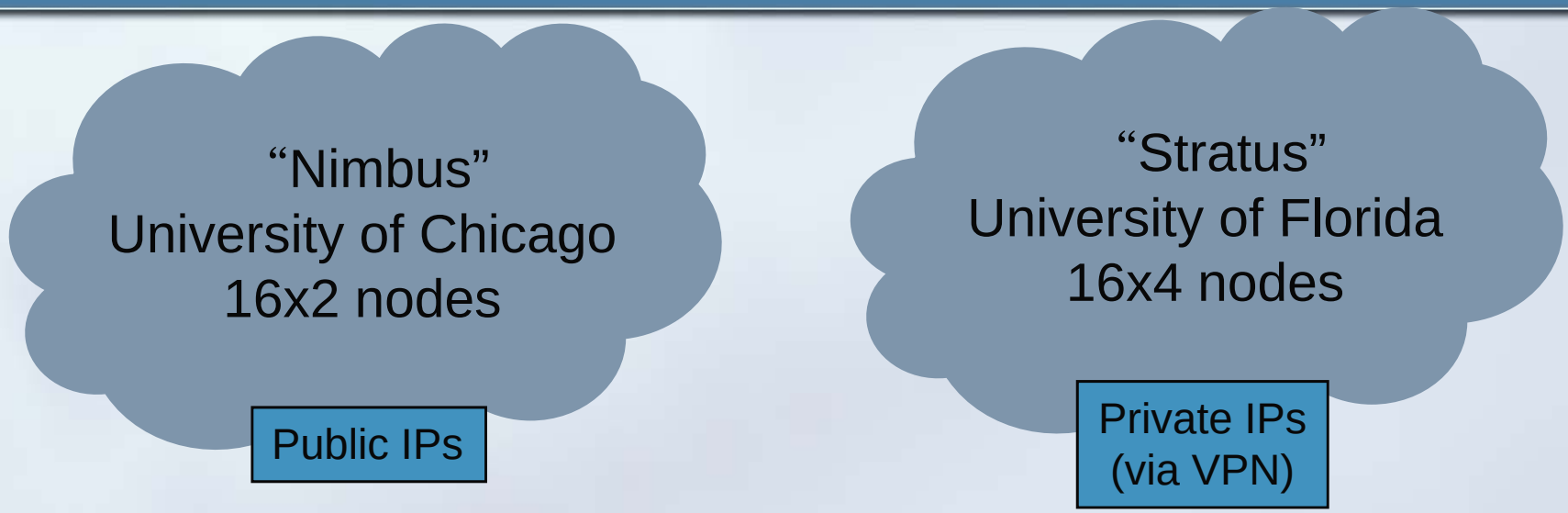
- The Virtues of Virtualization
  - Portable environments, enforcement and isolation, fast to deploy, suspend/resume, migration…
- Cloud computing: a nebulous concept…
  - SaaS: software as a service
  - Service: provide me with a workspace
  - Virtualization makes it easy to provide a workspace/VM
- Cloud computing
  - resource leasing, utility computing, elastic computing
  - Amazon's Elastic Compute Cloud (EC2)
- Is this real? Or is this just a proof-of-concept?
  - Successfully used commercially on a large scale
  - More experience for scientific applications

The Science Clouds: A Case Study

- Objectives:
  - Make it easy for scientific projects to experiment with cloud computing
    - You too can run on the cloud! (we can give you cycles)
    - You too can be a cloud provider! (we can give you open source software)
  - Evolve software in response to the needs of scientific projects

Start with EC2 → *- Refine SLAs*
- One-click virtual clusters (contextualization)
- Lower adoption barriers
- Miscellaneous useful new features

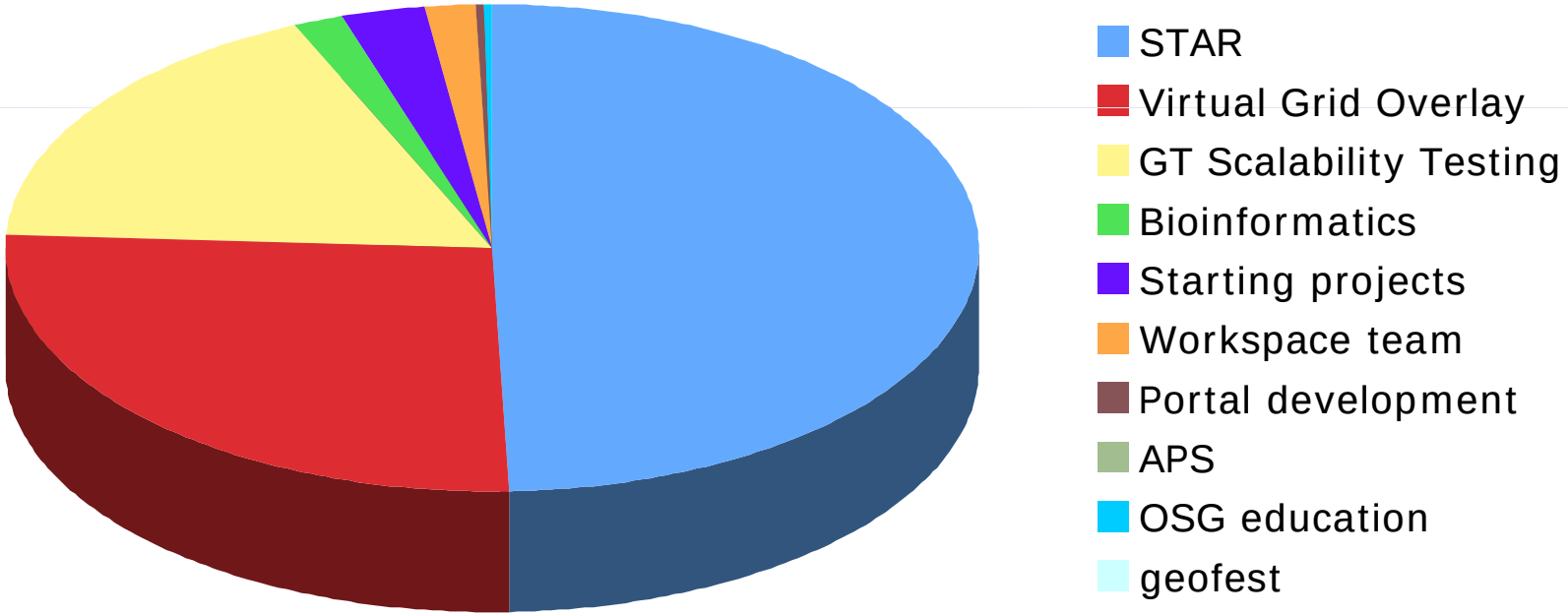
The Science Clouds



- Powered by workspace tools
- EC2-like interfaces (PKI credential vs credit card)
- More clouds on the way
- http://workspace.globus.org/clouds

Who Runs on the Science Clouds?

- Nimbus utilization breakdown since March 4th
- ~30 DNs (a DN represents a community)



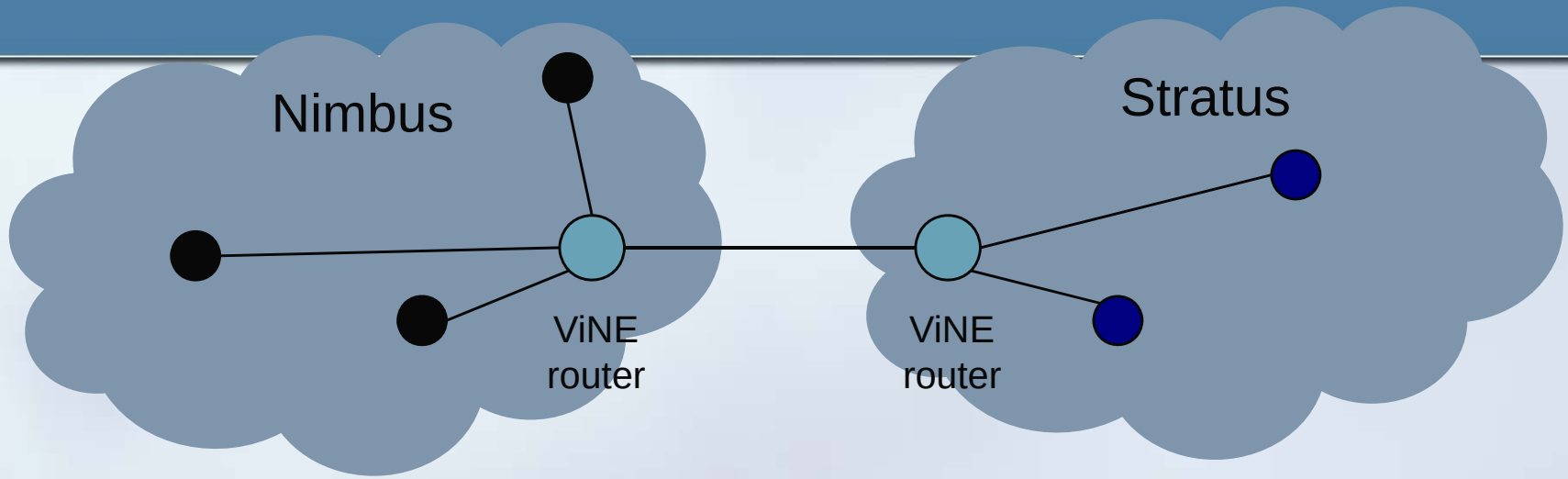
STAR

- Motivation for STAR
  - Resources **with the right configuration** are hard to find
    - Complex environments: correct versions of operating systems, libraries, tools, etc all have to be installed.
    - Require validation
- Virtual Workspace: an OSG STAR cluster
  - OSG cluster
    - OSG CE (headnode), gridmapfiles, host certificates, NSF, PBS
  - STAR worker nodes: SL4 + STAR conf
- Requirements
  - One-click virtual clusters
  - Migration: nimbus/scientific resources -> EC2

STAR (cntd)

- From proof-of-concept to production runs
  - ~2 years ago: proof-of-concept
  - Last September: EC2 runs of up to 100 nodes (production scale)
  - Testing for full production deployment
- Performance
  - Within 10% of expected performance for applications
- Work by Jerome Lauret, Doug Olson, Leve Hajdu, Lidia Didenko
- Long-lived community of many
- Similar work for other HEP communities (Alice and Atlas), bioinformatics, geofest, and others

Virtual Network Overlays



- Motivation
  - CS research: investigate latency-sensitive apps
- Virtual workspace: ViNE router + app VM
- Requirements: access to distributed resources
- First steps in creating a "federated cloud"
- Work by Mauricio Tsugawa, Andrea Matsunaga, Jose Fortes and others
- Medium-lived community of a few

Scalability Testing

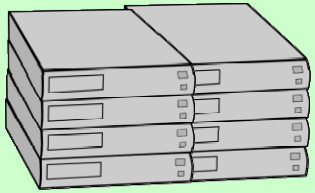
- Motivation
  - Test scalability of various Globus components
  - Test on a different platform
- Workspaces
  - Globus 101 + others
- Requirements
  - very short-term but flexible access to diverse platforms
- Work by various members of the Globus Toolkit (Tom Howe and John Bresnahan)
- Typically very short-lived communities of one

Users, Communities, Providers

Appliance Providers:
All communities large and small
commercial and open “marketplaces”
Appliance management software available

Appliance Deployment:
appliances -> leased compute resources
Coordinating creation of virtual resources
Software layers: an evolving middleware for clouds

Resource Providers:
Scientific computing providers: Science Clouds
Commercial providers: EC2
Grid Providers?



Cloud Computing Tools

- e.g.
  - Google's Cloud Computing

(Case Study)

Questions

Marketing of SMEs by using…

- Social network applications

Abstract

- *"Communities of practice, self reflection and peer critiques have long been an important aspect of learning and teaching in creative arts subjects. With reference to actual practice in HE, Christian will outline how social software applications (chiefly **blogs**, **wikis** and **social networking sites** such as Facebook) are used to support and enrich these aspects of learning."*

Hang on... social software?

- Why am I using the term "social software" rather than "Web 2.0"?
  - Nothing sinister, I just find the term more descriptive of the purpose of such software!
  - Some Web 2.0 software is not reallysocial per se.

Hang on… social software?

- Many of the non-social Web 2.0 technologies are extremely interesting and offer great potential for enhancing learning…
  - e.g. Podcasts
  - Syndication feeds (RSS for instance)
- …however, I could spend a day talking about it all, and I only have about 40 minutes!

Social software

- So what "social software" are people in education using?
- It varies – a massive, massive range!
- Principally, most virtual learning environments contain software tools aiming to facilitate social interaction.
  - Discussion groups and chat fora amongst other tools…nowadays blogs etc. too!

Social software

- The use of social software in supporting teaching is not particularly new…
  - Using forum-based software to foster support communities has been around (and especially in technological subject areas) for several years.
- …but the Web 2.0 movement *has* drastically increased the range of software tools available.

Social software

- Commonly used social software:
  - Instant Messaging/chat rooms
  - Bulletin boards (asynchronous): *phpbb*, etc.
  - Online Journals: *blogger, Wordpress*, etc.
  - Collaborative writing: *Wiki*
  - Social networks: *Facebook*, etc.
  - Social bookmarking/news: *del.icio.us*, etc.
  - Virtual worlds: *Second Life* (& games, too)
  - Email lists…?

Why social software?

- But why should we use these applications in learning & teaching?
  - Aren't they (frankly) just time-wasting apps?
  - Especially Facebook!
- Disclaimer: I have a bias from my teaching philosophy:
  - Social Constructivism
  - Other teaching philosophies/styles may disagree with me entirely!

Social Constructivism

- Learning is:
  - a social activity
  - interactive and co-constructive
  - self-regulated group membership
  - evaluating shared ideas and values
- Teaching is:
  - a joint activity with students
  - a guided conversation
  - assisting joint constructions
  - enacting and role modelling community values

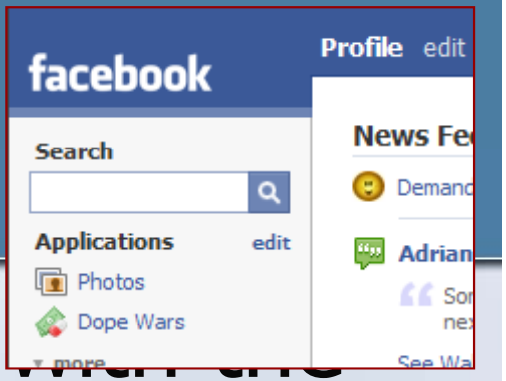
Why social software?

- Thus since teaching is intrinsically linked with social activity, these apps *may* be relevant for that alone.
  - But hopefully for more than just this!
- Can be used in many ways, e.g.:
  - Using social software to support the learning environment (my focus today!).
  - Assessment using social software-based tasks.
  - Teaching through designing social software/experiences.

Learning Activities

- Social software can aid a number of learning experiences (particularly relevant to creative fields of study, but not exclusive to them!)
  - Group critiques
  - Reflective journalling
  - Collaborative working

Social networking



- Some lecturers are experimenting with the use of social networking sites to aid teaching & learning.
  - Typically these are used to foster a sense of community and for communication...
  - Engaging students on their "home ground."
- Potential hurdles:
  - Merging and mixing of private (weekend!) and college personalities.

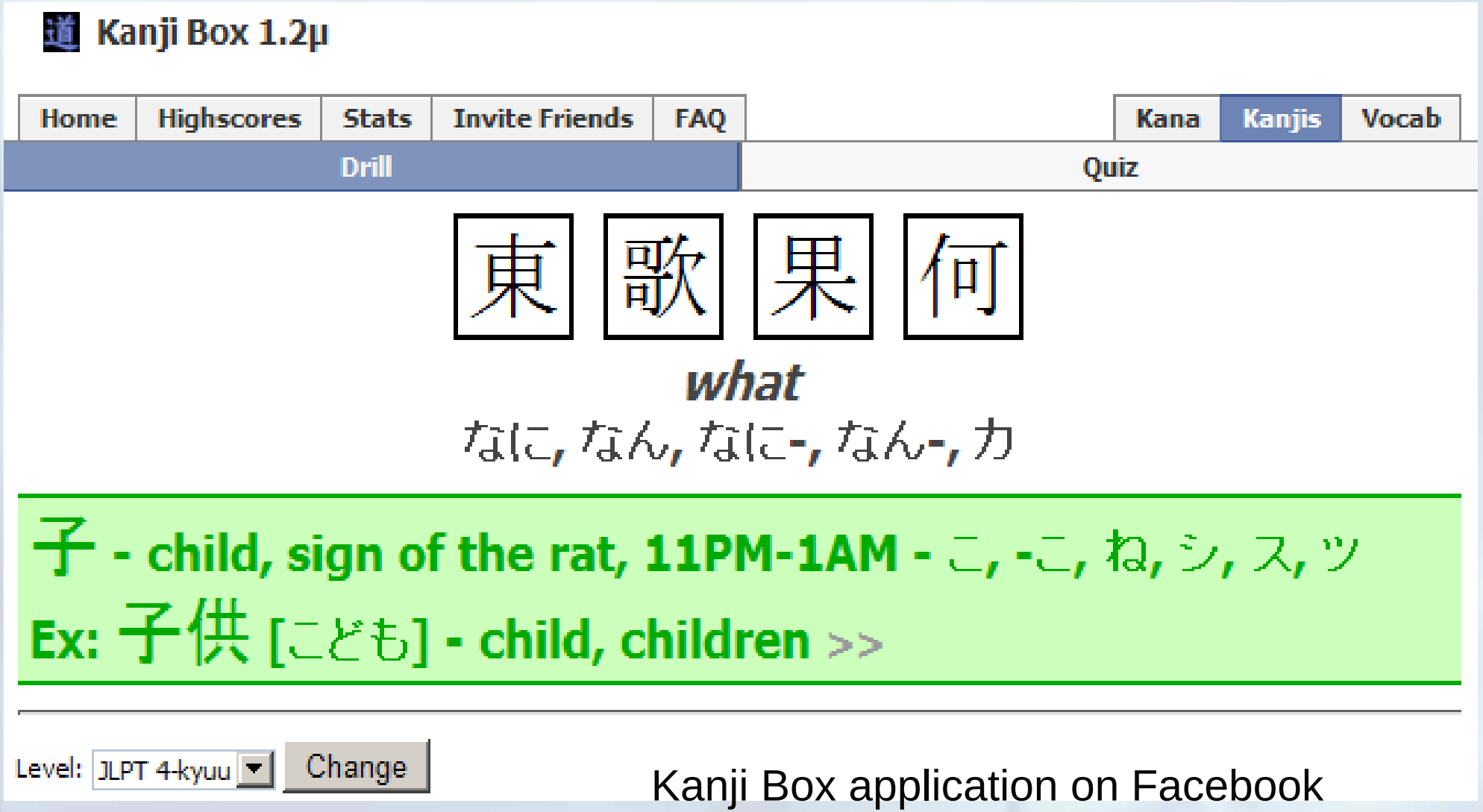
Social networking

- Tutor may be seen as an "intruder" into a friend's only space? (not typically my experience in HE, but may be different for FE and schools).
- The attempts at using these sites may be sidetracked with all the other social aspects offered by the site.
  - "Oi, stop playing Scrabble online!"

Social networking

- The "cool" social networking application of the day changes rapidly.
  - From MySpace to Facebook to Twitter to…?
- However, social networking sites also seem to offer another potential dimension...

Facebook apps



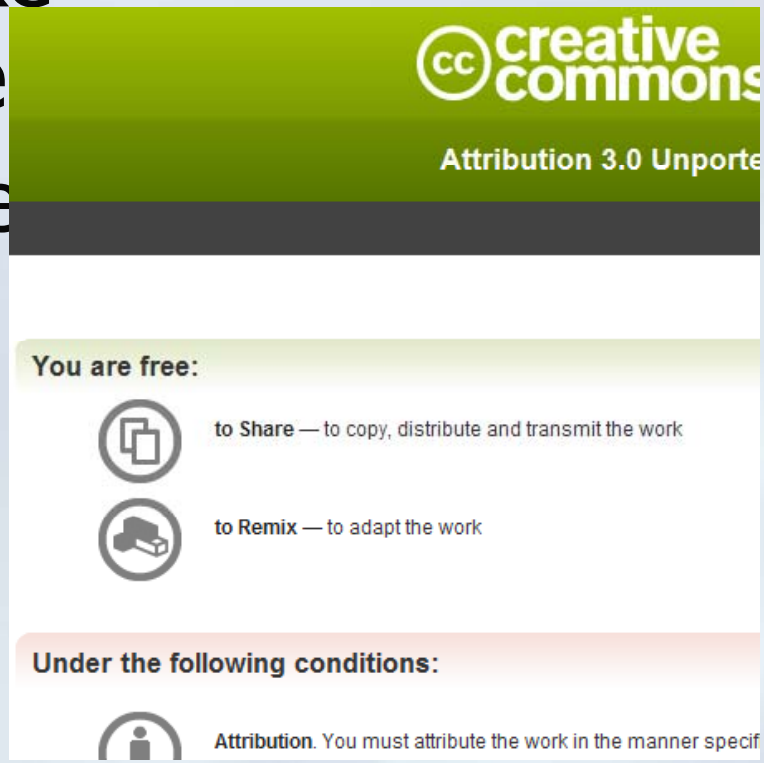
Kanji Box application on Facebook

Group critiques: flickr, etc.

- Social sites such as Flickr and DeviantArt (where people upload pictures/artwork, etc) can form the basis for critiquing online.
  - You can make uploads "friends only" and therefore restrict who you want viewing/commenting.
- These sites also use tagging prominently (good for info. retrieval).

Creative Commons

- And with sites that contain rich media, there are repositories of materials that can be used.
- A set of "copyleft" licenses (like with the Gnu GPL for software
- Encourages sharing, derivative works and dissemination.



User-generated content

- Open-access initiatives such as wikis can allow for collaborative work.
  - Careful of automated "spam bots" that will deface pages
- Again, these can form repositories of materials e.g. Wikipedia.
  - However, it is "mob rules" - does this ensure reliability?

Reflective logging

- The reflective log is seen by many as a vital element in art & design ***practice***
  - and in higher education generally!
- Nature of a reflective log is not entirely fixed, but tends to have one or both of the following characteristics:
  - Documents the processes and influences.
  - Reflection on practice (Kolb's experiential learning cycle?).

Reflective logging

- Depending on viewpoint, a "good log" could be viewed as one that is insightful and demonstrates critical self-awareness.
  - Introspective.
  - Questioning motives, aims, performance.
  - Looking at strengths, weaknesses areas of further work.
- By nature this can be a very private activity, and practitioners can be loath to reveal the details to others.
  - Like reading a persons diary!

Public vs private

- There is a slight complication to this in arts education.
- Somebody needs to intrude in this safe haven of introspection in order to give guidance to help a student improve their abilities in this area.
- The **tutor**.
- It might even (!) be a component of assessment!

Public vs private

- Traditionally, this would take place by the student bringing in their logs to class.
  - Possibly a one to one discussion in private.
  - Possibly group-based discussion of logging/journalling.
- This allows the tutor to give suggestions of things that should be considered within a log.

Blogging

- *"A blog is a website where entries are made in journal style and displayed in a reverse chronological order."* (Wikipedia)
- Vast range of different types, uses and styles of blog from individual through to corporate, text-based through to video (vlog), photo, etc.

Community-based logging

- One of the key defining elements of a blog is the community aspect.
  - "Blogosphere"
- Commenting on entries, creating networks of interrelated blogs and/or users.
- In some cases the comments can lead to more interesting interactions than the original article!

Community-based logging

- Some blogging software plays with this aspect even further, allowing for posts to be restricted to groups of users
  - "friends"
- This essentially adds another level to the public/private division.
- And this is where the potential link to reflective logging comes in!

Reflective blogs

- The ability to restrict posts allows for blogs to be used to supplement traditional reflective logs.
- And adds the possibility of an extra dimension, which may occur spontaneously…
- First a bit of background.

Some blog use in HE teaching

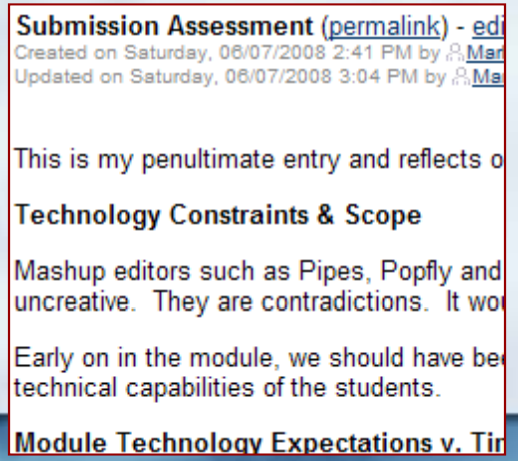
- At Thames Valley University, staff have been engaging with different blogging applications over the past few years.
  - Commercially run e.g. Livejournal, Blogger.
  - Open source e.g. Wordpress.
- …and different approaches to their use.
  - Some use them to document research.
  - Some use them as a forum for discussion.
  - Some use them as a straightforward replacement for a traditional log.

Some blog use in HE teaching

- Components of some module's assessment asked students to maintain a blog documenting research, but also reflecting on practice.
- Just one example of my own(from 2005)
- Allowed open choice of software, but predominately used livejournal
  - **http://www.livejournal.com**

Some blog use in HE teaching

- Blogs could be used entirely as the student wished.
  - One condition: only posts that the tutor could read would be used for formal assessment.
  - Pick and choose what to show and what to hide.
  - Student empowerment.

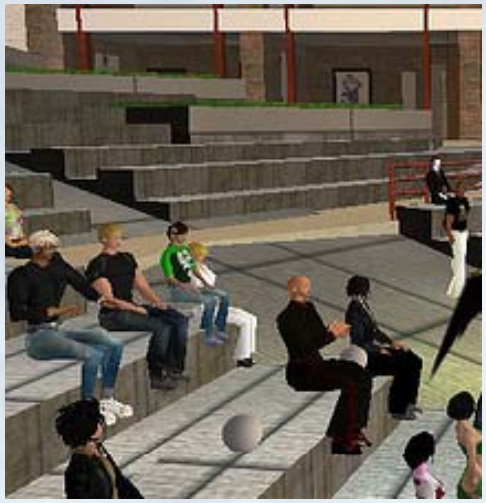


Some blog use in HE teaching

- Side effect: some students developed cliques of friends and allowed the access to more sensitive posts.
- Multiple people making suggestions as to reflective practice, but *invited* rather than forced (as a group discussion f2f may have been)
  - **<paranoia>** Perhaps some posts were shared with friends but not with the tutor…? **</paranoia>**

Some further reading...

- Second life in Education:
  http://sleducation.wikispaces.com/educationaluses
- FlickrEDU: The Promise of Social Networks:
  http://blendededu.com/2005/11/flickredu-promise-of-social-networks.html



Questions

About Catalogues, Shopping Carts, and Online Shops

What is Your Product?

- Are you a content provider?
  - Drive traffic, sell ads
- Do you sell through catalogues?
  - Drive traffic, sell products, support print version
- Are you a retail establishment?
  - Drive traffic, sell products
- Are you a wholesale establishment?
  - Drive traffic, sell products to other businesses

Catalogues

- Should you put your catalogue on the Internet? What should you consider before making this decision?

Catalogues

- Does your current target market use the Web?
- Is the Web target market large enough to focus 100% of your efforts on this group?
- Is your target market local, national, or international?

Catalogues

- How often does your selection of products change?
- How often do prices change?
- What is the “depth” of product information that may be required during the decision-making process?

Catalogues

- Web catalogues make the most sense when your target market matches the demographics of Internet users, when the market is international, when your products and prices change frequently, and when a great deal of product depth is needed to close a sale.

Online Catalogues

- Advantages:
  - Much less expensive to create and distribute
  - Can reduce ordering and administrative costs
  - Instantly available internationally
  - Easy to change

Online Catalogues

- What are the major disadvantages of online catalogues?
  - Can't leaf through to quickly find products
  - Must be online to use
  - More men use the Internet than women

Hardcopy Catalogues

- Advantages:
  - Visual real estate (coffee table)
  - $50 billion a year business
  - Women
    - Women use the Internet for communication.
    - Shopping ranks dead last!

Hardcopy Catalogues

- What are the disadvantages of hard copy catalogues?
  - Menu costs
  - Expensive
  - Resource intensive

Combining Advantages

- Combine the strengths: global reach *and* the coffee table
  - Allow consumers to print out catalogue
  - Use web site to request a hard copy
  - Use one to play off of the strengths of the other

Online Ordering

- How do you place an online order?
  - Simple HTML form
  - Shopping cart software
  - Storefront software

Building an Online Shop

- Two views of a traditional store:
  - The customer's view
    - Aisles of packaged goods
    - Different sections
    - Checkout
  - The back office view
    - Warehouse
    - Accounting
    - Delivery

Building an Online Shop

- Customer:
  - Finding the product
  - Adding to the shopping cart
  - Paying for the products (including tax and shipping)

- Merchant:
  - Tracking Shoppers
  - Merging order and accounting information
  - Adding and deleting products
  - Sales and Promotion
  - Tracking Inventory
  - Fulfillment
  - Updating the Store

Tools for online Shop

- **(Workshop – ZenCart)**
- **(Workshop – Jaspersoft)**

Questions

The End

- Thank You!