

# Open Source Software Options for Government

Version 2.0, April 2012

## Aim

1. This document presents options for Open Source Software for use in Government.
2. It is presented in recognition that open source software is underused across Government and the wider public sector.
3. This set of options is primarily intended to be used by Government to encourage IT suppliers and integrators to evaluate open source options when designing solutions and services.
4. This publication does not imply preference for any vendor or product. Open source software, by definition, is not tied inextricably to any particular commercial organisation. Any commercial entity can choose to support, maintain, or integrate open source software.
5. It is understood that the software market, and the open source ecosystem in particular, is a rapidly developing environment and any options list will be incomplete and may become outdated quickly. Even so, given the relatively low level of open source experience in Government, this options list has proven useful for encouraging IT suppliers to consider open source, and to aid the assurance of their proposals.

## Context

1. The Coalition Government believes Open Source Software can potentially deliver significant short and long term cost savings across Government IT.
2. Typical benefits of open source software include lower procurement prices, no license costs, interoperability, easier integration and customisation, fewer barriers to reuse, conformance to open technology and data standards giving autonomy over your own information, and freedom from vendor lock in.
3. Open Source is not widely used in Government IT. The leading systems integrators and suppliers to Government do not routinely and effectively consider open source software for IT solutions, as required by the existing HMG ICT policy.
4. There are significant and wide ranging obstacles to Open Source in Government. Some of these are lack of clear procurement guidance, resistance from suppliers, concerns about license obligations and patent issues, misunderstanding of the security accreditation process, and myths around open source quality, support and its development ecosystem.

## Open Source Software Options for Government

### How To Use

1. This document presents suggestions for open source software to be considered for new IT solutions to meet business requirements, or as replacements for existing closed proprietary software. References to real world significant use of the open source software are extensively provided.
2. The primary audiences for this options list are technical and enterprise **architects, commercial / procurement officers** and **project managers** within the civil service, and those from the **supplier** and **integrator** community who influence the design and makeup of ICT solutions to Government. Customers and suppliers in the wider public sector are also encouraged to make use of this document.
3. This set of options can be used to:
  - a. **Inform** the design of new IT solutions.
  - b. **Suggest** opportunities for IT service or solution refreshes.
  - c. **Challenge** a proposed solution that does not use open source technology.
4. This document does not present a list of pre-approved software. This document does not remove existing requirements for due diligence and assurance on the part of Government. In particular it does not transfer any technology risk from IT integrators and suppliers to Government, where it has previously been contractually placed with those suppliers and integrators.

### Notes:

1. The broad criteria for open source software to be listed in this options set is that there should be a realistic opportunity for use in government. Proven significant use is a key factor, where proven can mean:
  - a. Use at large scale, volume or high performance scenarios.
  - b. Use in critical functions, such as supporting health or security.
  - c. Long established history of use, perhaps over many years.

The software should also be commonly recognised as open source, primarily aligned to the OSI definition.

2. By exception, some software may be listed without references where it is felt significant opportunities for value for money may be realised. These are kept to low risk use scenarios.
3. Commentary is the opinion of the author, and does not necessarily represent the views of any government body, vendor or community.
4. If specific open source software is not listed, it does not necessarily mean that it is unsuitable for Government.
5. It should be noted that usage statistics for open source software are very difficult to obtain as there is no registration or licensing process, and there is no central source for the software.

## **Open Source Software Options for Government**

### **Feedback & Suggestions**

Please provide feedback and suggestions to [opensource@homeoffice.gsi.gov.uk](mailto:opensource@homeoffice.gsi.gov.uk)

## Contents

1. Infrastructure & Server .....	5
2. Data & Databases.....	11
3. Middleware.....	14
4. Application Servers .....	17
5. Application Development & Testing.....	19
6. Cloud .....	21
7. Business Applications.....	23
8. Network .....	30
9. Web & Web Applications.....	33
10. Geographic & Mapping.....	39
11. Security Tools.....	42
12. Desktop Office.....	44
13. Specialist Applications.....	48
14. Education & Library.....	51
15. Health.....	53
16. Service Management .....	54
17. Agile Development & Project Management.....	55

## 1. Infrastructure & Server

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Server Operating Systems</b>	<ul style="list-style-type: none"> <li>RedHat Enterprise Linux</li> <li>Canonical Ubuntu Server</li> <li>CentOs Linux</li> <li>Novell SUSE Linux</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Windows Server</li> <li>UNIX - Sun Solaris, IBM AIX, HP UX</li> </ul>	<ul style="list-style-type: none"> <li>General purpose Unix-like operating system with proven higher performance, availability and security record.</li> <li>Enterprise Linux distributions are tested more than cutting edge distributions aimed at developers or home use.</li> <li>With a billion dollar revenue, Redhat is a leading provider of support and services for enterprise grade Linux servers. It has approximately 62% of the commercially supported Linux market.</li> <li>CentOS is a rebuilt from RedHat enterprise versions of the source code but without Redhat trademarks, and usable without commercial support subscription costs. Support for CentOS can also be procured.</li> </ul>	<ul style="list-style-type: none"> <li>London Stock Exchange has moved from a Microsoft .Net based infrastructure to a Novell Suse Linux based infrastructure to improve speed and stability. Reference <a href="http://bit.ly/e2KL7w">http://bit.ly/e2KL7w</a></li> <li>Linux powers the global Wikipedia site. Reference <a href="http://bit.ly/13ynJh">http://bit.ly/13ynJh</a></li> <li>Redhat users include the New York Stock Exchange, US Army, . Reference <a href="http://red.ht/IHgZgr">http://red.ht/IHgZgr</a></li> <li>CentOS is used by the Mexican Federal Power Commission. Reference <a href="http://bit.ly/hrXBgb">http://bit.ly/hrXBgb</a></li> <li>Netcraft Survey March 2011 shows top 5 most reliable web hosting providers run Linux. Reference <a href="http://bit.ly/fyHGxK">http://bit.ly/fyHGxK</a></li> <li>The <a href="http://www.gov.uk">www.gov.uk</a> beta uses Ubuntu Server. Reference</li> </ul>

## Open Source Software Options for Government

<http://bit.ly/zVAoXc>

- FreeBSD, NetBSD, OpenBSD
- Microsoft Windows Server
- General purpose Unix-like operating system with proven performance, availability and security record.
- Force10 routers and switches have an OS based on NetBSD. Reference <http://bit.ly/fDjqZN>
- UNIX - Sun Solaris, IBM AIX, HP UX
- BSDs have a particular record in internet and network services, and underly many commercial network products.
- FreeBSD used in products from major companies including Apple, Blue Coat, Citrix, Ironport, Juniper. McAfee and NetApp. Reference <http://bit.ly/e2wFtE>
- FreeBSD is considered stable and reliable and powers some of in internet's busiest sites, including for a while Microsoft's Hotmail. Reference <http://bit.ly/iev6qZ>
- FreeBSD powers busy sites including Yahoo! Reference <http://bit.ly/3eCauv>

### Desktop Operating Systems

- RedHat Desktop / Workstation Linux
- Microsoft Windows XP, Vista, 7
- Alternative desktops are likely to be successful when their role or use is known to not require Microsoft specific applications. Examples are contact centre desktops requiring access to a web based application.
- Munich saves 4m euros with projected savings of 15m euros over 3-4 years, moving to Linux desktops and OpenOffice. Support tickets reduced from 70 to 46 per month. Reference <http://bit.ly/HIS4hb>
- Canonical Ubuntu
- 220,000 Canonical Ubuntu desktops deployed in Andalusia, Spain. Reference <http://bit.ly/ghu4lg>
- CentOS Linux
- French police deplou Ubuntu desktop to approx 90,000 desktops saving 50m euros 2004-2009, reducing the IT budget by 70% with no loss of capability. Reference <http://bit.ly/119awP> and
- SUSE / OpenSuse Linux

## Open Source Software Options for Government

				<p><a href="http://bit.ly/HQ68IF">http://bit.ly/HQ68IF</a></p> <ul style="list-style-type: none"> <li>Spain's region of Extremadura moves to 40,000 Linux desktops. Compliant to ISO 27001 security. Reference <a href="http://bit.ly/wNsqGM">http://bit.ly/wNsqGM</a></li> </ul>
<b>Virtualisation</b>	<ul style="list-style-type: none"> <li>Linux KVM</li> <li>Xen</li> </ul>	<ul style="list-style-type: none"> <li>VMWare vSphere / ESX / Server</li> </ul>	<ul style="list-style-type: none"> <li>KVM is establishing itself as the leading alternative to the incumbent virtualisation platforms. The Open Virtualisation Alliance which aims to promote KVM over VMWare has more than 160 members including IBM, Redhat, Intel, HP and BMC.</li> <li>Xen pioneered virtualisation but is considered to be overtaken by KVM based platforms. Citrix offers commercial support for Xen based virtualisation.</li> </ul>	<ul style="list-style-type: none"> <li>IBM uses KVM as basis for its IaaS cloud platform. Reference <a href="http://bit.ly/d9yNqL">http://bit.ly/d9yNqL</a></li> <li>KVM leads other virtualisation technologies in SPEC benchmarks. Reference <a href="http://bit.ly/ovT81B">http://bit.ly/ovT81B</a> and <a href="http://bit.ly/vBEtu9">http://bit.ly/vBEtu9</a></li> </ul>
	<ul style="list-style-type: none"> <li>Virtualbox</li> </ul>	<ul style="list-style-type: none"> <li>VMWare Workstation, Parallels for desktop</li> </ul>	<ul style="list-style-type: none"> <li>Desktop virtualisation, developed by Sun, now managed by Oracle. Supports features comparable to commercial software including device passthrough. Compatible with a VMware (vmdk), Microsoft (vhd) and Open Virtualisation Format (OVF) virtual machine images. Light client only software is ideal for development and testing environments.</li> </ul>	<ul style="list-style-type: none"> <li>Oracle's VDI enterprise product is based on Virtualbox. Reference <a href="http://bit.ly/sQHcGI">http://bit.ly/sQHcGI</a></li> <li>Virtualbox was used in the development phase of a disclosure website programme led by the Home Office.</li> </ul>
<b>Remote Desktop</b>	<ul style="list-style-type: none"> <li>rdesktop</li> </ul>	<ul style="list-style-type: none"> <li>Citrix ICA</li> </ul>	<ul style="list-style-type: none"> <li>Rdesktop is a client for</li> </ul>	<ul style="list-style-type: none"> <li>Open source VNC clients are used extensively in a range</li> </ul>

## Open Source Software Options for Government

<p><b>Access Clients</b></p>	<ul style="list-style-type: none"> <li>• RealVNC, TightVNC, UltraVNC</li> </ul>	<p>Microsoft's RDP protocol.</p>	<ul style="list-style-type: none"> <li>• VNC servers and clients enable platform independent remote desktop use. Handshaking allows interoperability between different VNC implementations.</li> <li>• VNC implementations are available for a range of server and client platforms including Linux, Unix, Windows, MacOS and Android. Because VNC is a pixel protocol, it is more compatible and suffers from less edge-case issues than remote desktop protocols which try to intercept graphics subsystems.</li> </ul>	<p>of industries. Examples include the health and agriculture sectors. The commercial service provider RealVNC won the 2011 Queen's Awards for Innovation and International Trade. References <a href="http://bit.ly/KdhFJc">http://bit.ly/KdhFJc</a> and <a href="http://bit.ly/lrE60e">http://bit.ly/lrE60e</a></p>
<p><b>Filers &amp; Storage</b></p>	<ul style="list-style-type: none"> <li>• FreeNAS</li> <li>• Openfiler</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Windows filer server, NetApp, EMC filers</li> </ul>	<ul style="list-style-type: none"> <li>• Software or commodity NASes can be better value than the traditional NAS products, particularly for smaller usage scenarios, or for time-limited use, such as for the development cycle of an ICT projects.</li> <li>• FreeNAS is a software distribution of a filer supporting a range of protocols for network storage and related functions such as authentication. It supports Windows (SMB/CIFS), Apple (AFP), NFS (Unix/Linux) storage protocols, and supports hardware over iSCSI, and RAID configurations. It can be deployed on commodity hardware, virtualised, or via bootable media. It supports common network functions such as SNMP, and</li> </ul>	<ul style="list-style-type: none"> <li>• FreeNAS is used as a backup and storage capability for a Home Office led development phase of a key UK Government website.</li> </ul>



## Open Source Software Options for Government

	<ul style="list-style-type: none"> <li>NextentaStor</li> </ul>	<ul style="list-style-type: none"> <li>Windows filer server, NetApp, EMC filers</li> </ul>	<p>email alerts.</p> <ul style="list-style-type: none"> <li>Open source based hardware appliances can be more cost effective than the traditional leading filer suppliers.</li> <li>Nexentastor is an appliance based on significant open source technologies including the Nexenta OpenSolaris and ZFS development, and is often much cheaper than other NAS vendors. It provides most of the features of enterprise class NAS solutions, such as snapshots, management utilities, tiering services, mirroring, and end-to-end checksumming.</li> <li>A community edition software only version is available free of charge for users with less than 18 terabytes of used disk space.</li> </ul>	<ul style="list-style-type: none"> <li>Nexenta was reported in 2011 as growing faster than NetApp and achieving its 2000<sup>th</sup> commercial deployment, a total of 330 PetaBytes of storage. Users include top 10 finance firms, BAS group largest electronics retailer in Netherlands, iNet, KT formerly Korea Telecom, TWM regional water supplier, via Forensics. Reference <a href="http://bit.ly/hWW8Ty">http://bit.ly/hWW8Ty</a> and <a href="http://bit.ly/l3kxt9">http://bit.ly/l3kxt9</a></li> <li>Performance tests indicate Nextenta is as performing, if not better, than NetApp and EMC products. Reference <a href="http://bit.ly/nBMU1c">http://bit.ly/nBMU1c</a></li> </ul>
<b>Backup</b>	<ul style="list-style-type: none"> <li>Amanda, Bacula</li> </ul>	<ul style="list-style-type: none"> <li>NetVault Backup</li> </ul>	<ul style="list-style-type: none"> <li>Amanda and Bacula are compatible across Linux, Unix, MacOS and Windows systems.</li> </ul>	<ul style="list-style-type: none"> <li>Corporate and public sector testimonials for large scale deployments including Belgian Government backing up 30TB. Reference <a href="http://bit.ly/gp64Jy">http://bit.ly/gp64Jy</a></li> </ul>
<b>Configuration Management</b>	<ul style="list-style-type: none"> <li>Puppet</li> </ul>	<ul style="list-style-type: none"> <li>IBM and CA configuration management tools, HP OpenView configuration product suite</li> </ul>	<ul style="list-style-type: none"> <li>Used in very large scale deployments, and designed to be cross-platform, Puppet can be used to manage the configuration of Linux, Unix and Windows servers, as well as common</li> </ul>	<ul style="list-style-type: none"> <li>The <a href="http://www.gov.uk">www.gov.uk</a> beta uses puppet. Reference <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a></li> <li>Puppet is used by large infrastructures such as Wikimedia Foundation, Dell,</li> </ul>

## Open Source Software Options for Government

applications.

- Puppet Labs received \$8.5 million in funding from Google, VMWare and Cisco at the end of 2011, leading to a total of \$16m investment.
- Enterprise edition enables audit and compliance.
- Puppet provides OpenStack integration.

Rackspace, Zynga, Twitter, NY Stock Exchange, Disney, Citrix, Oracle, Zynga, Nokia, twitter, sugarCRM, Sun/Oracle, Los Alamos National Lab, and Google. Reference <http://bit.ly/JgZzqW> and <http://bit.ly/nDXhXH>

## 2. Data & Databases

Sector	Software	Consider as Alternative to	Comments	Real World Use
Relational Databases	<ul style="list-style-type: none"> <li>MySQL</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft SQL Server</li> <li>Oracle DB</li> <li>IBM DB2</li> </ul>	<ul style="list-style-type: none"> <li>General purpose, long established and proven.</li> <li>Component of established LAMP pattern stack, supporting many common patterns including Joomla, Wordpress, Drupal.</li> <li>Optimised for read speed. Historically not designed to be feature rich.</li> </ul>	<ul style="list-style-type: none"> <li>Some of the largest and user intensive online services use Mysql, including Google, Facebook, Flickr, Wikipedia, Nokia, Youtube. Reference <a href="http://bit.ly/gZf5T7">http://bit.ly/gZf5T7</a></li> <li>Twitter uses MySQL at scale, quoting their engineer "MySQL is the persistent storage technology behind most Twitter data". Reference <a href="http://bit.ly/HuHBVT">http://bit.ly/HuHBVT</a></li> <li>Other users providing studies and testimonials include NASA, UN FAO, US Navy, Whitehouse.gov, New Zealand Ministry of Justice, Ericsson, Cable &amp; Wireless, Nokia. Reference <a href="http://bit.ly/rE8XM">http://bit.ly/rE8XM</a></li> <li>MySQL is used by <a href="http://www.gov.uk">www.gov.uk</a> beta. Reference <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a></li> </ul>
	<ul style="list-style-type: none"> <li>PostgreSQL</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft SQL Server</li> </ul>	<ul style="list-style-type: none"> <li>Long established and proven. Historically developed for feature</li> </ul>	<ul style="list-style-type: none"> <li>Large data oriented services use PostgreSQL including</li> </ul>

## Open Source Software Options for Government

	<ul style="list-style-type: none"> <li>• Oracle DB</li> <li>• IBM DB2</li> </ul>	<p>completeness to compete with commercial databases. Features include streaming replication, triggers, table partitioning and stored procedures resembling Oracle's PL/SQL.</p> <ul style="list-style-type: none"> <li>• Postgresql was an early support of geographic information.</li> <li>• EnterpriseDB variant aims to replace Oracle database.</li> </ul>	<p>Yahoo!, MySpace, Sony Online, Skype, International Space Station. Unmodified PostgreSQL scaling to petabytes. Reference <a href="http://bit.ly/6ttyNn">http://bit.ly/6ttyNn</a></p> <ul style="list-style-type: none"> <li>• 2011 Police Crime Map site uses postgresql database. At peak demand was 220,000 requests/second. <a href="http://www.police.uk">www.police.uk</a></li> </ul>	
<p><b>Distributed Large Storage, Big Data, NoSQL</b></p>	<ul style="list-style-type: none"> <li>• Hadoop</li> <li>• HBase, Cassandra</li> <li>• Redis NoSQL</li> <li>• MongoDB</li> <li>• CouchDB</li> </ul>	<ul style="list-style-type: none"> <li>• Google MapReduce</li> <li>• Google BigTable</li> <li>• Intersystem's Cache, Matisse</li> </ul>	<ul style="list-style-type: none"> <li>• Hadoop is the leading platform for petabyte scale distributed data storage and processing. It is designed to detect and manage failures in commodity compute nodes, thus not relying on expensive high-availability hardware. Compatible with MapReduce APIs.</li> <li>• During 2001, several commercial offering provide support around Hadoop components, or Hadoop-like components, including from EMC, Oracle and IBM.</li> <li>• MongoDB is a document (JSON) oriented noSQL store designed for large scale and performance.</li> <li>• HBase is modelled after Google's distributed database BigTable.</li> <li>• Cassandra developed and open sourced by Facebook provides faster large storage balanced by "eventual consistency". It follows the NoSQL concept. The multi-</li> </ul>	<ul style="list-style-type: none"> <li>• Hadoop is used by leading large scale operations including Amazon/A9 product search, Adobe, AOL, Baidu at 3000TB/week, Ebay 532 node cluster and 5.3PB, Facebook 1100-node cluster 12PB data, Hulu media service, IBM Blue Cloud Computing, Last.fm, LinkedIn, New York Times, Microsoft Powerset, Rackspace, Twitter, Yahoo with more than 40,000 nodes . Reference <a href="http://bit.ly/zl1Wp">http://bit.ly/zl1Wp</a></li> <li>• MongoDB is used by the <a href="http://www.gov.uk">www.gov.uk</a> beta. Real world use includes SAP, MTV, sourceforge, Athena Capital Research, Disney, IGN, The National Archives, Guardian., NYTimes, Forbes, Foursquare, LexisNexis, CERN, Springer, and Doodle . Reference <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a> and</li> </ul>

## Open Source Software Options for Government

master architecture has no single points of failure, and zero-downtime failed node replacement. Designed for highly consistent durable storage through data centre failures.

- CouchDB is a document oriented NoSQL store with ACID semantics and Mapreduce views and filters. It is particularly strong at managing occasionally offline nodes, such as mobile device, to support offline applications. It embraced modern web standards, using JSON for documents, Javascript for queries, and HTTP for its API.
- Redis NoSQL store is governed by VMWare

<http://bit.ly/DkEXr>

- Adobe, Powerset, Stumbleupon, Yahoo!, Twitter, and Facebook use HBase. Reference <http://bit.ly/15mgo5>
- Cassandra used by Accenture, Adobe, Ericsson Cisco, IBM, Digg, HP, Netflix, openwave, Facebook, WebEx, Pitney bowes. Rackspace, Real, Symantec, Twitter. Netflix benchmarked a system performing over 1 million writes per second. References <http://bit.ly/g1HATc> , <http://bit.ly/iesAa4> and <http://bit.ly/tK0wiB>
- CouchDB is used by the BBC for its dynamic content platforms, Credit Suisse for internal commodity markets department, . Reference <http://bit.ly/5Qu15>

### 3. Middleware

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Message Bus</b>	<ul style="list-style-type: none"> <li>RabbitMQ</li> <li>JBOSS</li> </ul>	<ul style="list-style-type: none"> <li>IBM MQ</li> <li>BEA Weblogic</li> <li>Oracle and Tibco messaging products</li> </ul>	<ul style="list-style-type: none"> <li>AMPQ is the establishing open standard for Message Queue technologies. Its development is led by Bank of America Merrill Lynch, JP Morgan, Goldman Sachs, Credit Suisse and Barclays, and Germany's Deutsche Börse stock exchange. Other backers include Microsoft, Cisco Systems, Red Hat and VMware.</li> <li>RabbitMQ is a leading AMPQ implementation. RabbitMQ is supported by a VMWare group company.</li> </ul>	<ul style="list-style-type: none"> <li>RabbitMQ is used by NASA for their cloud platform, and by the BBC for its newsfeeds. Reference <a href="http://bit.ly/o77FY5">http://bit.ly/o77FY5</a></li> <li>India's citizen identity infrastructure used RabbitMQ.</li> </ul>
	<ul style="list-style-type: none"> <li>WSO2 Carbon</li> <li>JBOSS</li> </ul>	<ul style="list-style-type: none"> <li>IBM Websphere ESB, Oracle, Tibco ActiveMatrix BusinessWorks</li> </ul>	<ul style="list-style-type: none"> <li>Java OSGi</li> </ul>	<ul style="list-style-type: none"> <li>Leading Danish bank uses JBOSS ESB for mission critical applications. Reference <a href="http://red.ht/uZ6qUI">http://red.ht/uZ6qUI</a></li> </ul>
	<ul style="list-style-type: none"> <li>Mule ESB</li> </ul>	<ul style="list-style-type: none"> <li>IBM Websphere ESB, Oracle, Tibco ActiveMatrix BusinessWorks</li> </ul>	<ul style="list-style-type: none"> <li>A successful lightweight but enterprise grade ESB, orchestration and integration framework. Commercial enterprise edition provides features such as high availability and easier management.</li> </ul>	<ul style="list-style-type: none"> <li>Serverside case study shows MuleESB beat others according to several criteria including feature coverage, vendor response time, rich user community, product maturity, cost, and minimal dependencies on other</li> </ul>

## Open Source Software Options for Government

		<ul style="list-style-type: none"> <li>• MuleSoft has always been strong in the diverse range of platforms it can connect to.</li> <li>• Mulesoft is now supported commercially running with a Tomcat server, further reducing costs for application server.</li> <li>• MuleESB was initially by IBM as one of the earliest implementations of an ESB</li> </ul>	<p>products. Reference <a href="http://bit.ly/JgV7bq">http://bit.ly/JgV7bq</a></p> <ul style="list-style-type: none"> <li>• Mulesoft has ver 3,200 comanies using it in production. Significant suers include Adobe, AT&amp;T, Bank of America, Barclays, ebay, charlesschwab, Mastercard, Motorola, FedEx, Qualcomm, Yahoo, Xynga, CBS, Starbucks, Boing, HP, GE, Sprint, Xerox, Walmart, Cisco, Verizon, Unisys. Reference <a href="http://bit.ly/riM2yy">http://bit.ly/riM2yy</a></li> <li>• Case studies include Tivo reducing development time by 75%, US case management system used by 600 courts delivery reduced cost, Netherlands e-government reducing time to deliver and avoiding vendor lockin, and reducing infrastructure costs for a health sector fundraising charity. Reference <a href="http://bit.ly/riM2yy">http://bit.ly/riM2yy</a></li> </ul>
<p><b>SOA</b></p>	<ul style="list-style-type: none"> <li>• JBOSS</li> <li>• BEA Aqualogic</li> <li>• IBM ESB, IBM EII</li> </ul>	<ul style="list-style-type: none"> <li>• The JBoss Enterprise SOA Platform is an open-source Java EE-based Service Oriented Architecture platform. It is also part of the commercially supported enterprise-grade offering from RedHat's middleware product suite.</li> </ul>	<ul style="list-style-type: none"> <li>• IBM reference: Camden Council used JBOSS created a single view of the citizen to reduce avoidable contact with the contact centre and improve the citizen experience. Reference <a href="http://red.ht/ueg4sz">http://red.ht/ueg4sz</a></li> <li>• Oystercard web services</li> </ul>

## Open Source Software Options for Government

have been migrated to the JBOSS SOA platform with 80% cost saving, serving approx 10m customers per day. Reference <http://red.ht/vhfAgY> and <http://bit.ly/ueHOKa>

### Job Scheduler

- Quartz Scheduler
- BMC Control-M, Cisco Tidal, IBM Tivoli Workload Scheduler, CA Autosys,
- Quartz is a fully featured enterprise job scheduler, which integrates with the Java J2EE or J2SE platforms. It is suitable for embedding in small applications as well as driving large complex applications.
- Quartz is used by Vodafone Ireland, Covalent, US DoD for a large e-commerce system, Level3 Communications, Cisco in-house systems, Adobe's LiveCycle suite. Reference <http://bit.ly/l40k6K>



## 4. Application Servers

Sector	Software	Consider as Alternative to	Comments	Real World Use
Java Application Server	<ul style="list-style-type: none"> <li>Redhat JBoss</li> <li>Sun / Oracle Glassfish</li> <li>Apache Tomcat</li> <li>Apache Geronimo</li> </ul>	<ul style="list-style-type: none"> <li>IBM Websphere</li> <li>Oracle / BEA Weblogic</li> </ul>	<ul style="list-style-type: none"> <li>JBoss implements the Java EE 6 stack. Fully featured, it supports clustering, failover, load balancing and the range of EE components including JMS, JAAS, JSP and JDBC.</li> <li>Glassfish supports Java EE 6 specification and is known for scalability and speed. Supports clustering and load balancing.</li> <li>Apache Tomcat is a popular and proven servlet container implementing the Java Servlet and JSP specifications. It is known to be embedded in commercial products.</li> <li>Jetty is lighter but compliant application server, often used embedded into others offerings.</li> <li>Apache Geronimo is a full Java EE suite, currently implements Java EE 5 specification.</li> </ul>	<ul style="list-style-type: none"> <li>Testimonials for Glassfish include social networking sites, technology consultancies, software vendors, Peugeot Citroen, US health network, Suncorp insurance. Reference <a href="http://bit.ly/PTDz2">http://bit.ly/PTDz2</a></li> <li>Siemens uses large scale physical mail processing system using JBOSS Application Server, processing 700,000 mail items per hour, with 99.8% availability. Reference <a href="http://red.ht/sjAsYb">http://red.ht/sjAsYb</a></li> <li>Jetty is used by <a href="http://www.gov.uk">www.gov.uk</a> beta. Reference <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a></li> <li>New York Stock Exchange Euronext uses JBOSS platform. Reference <a href="http://red.ht/ugXJX1">http://red.ht/ugXJX1</a></li> <li>JBOSS Application Server use quoted by RedHat with the following: (i) Autotrader in the UK currently runs its high volume website and over</li> </ul>

## Open Source Software Options for Government

120 applications on JBoss Application platform, (ii) UFI / Learndirect runs online education courses and advice sessions for up to 2 million users using JBoss technology, (iii) Siemens have built a high volume, highly performant and highly available (99.8%) mail sorting application for up to 700,000 pieces of mail per hour. Reference <http://red.ht/seYxXk>

## 5. Application Development & Testing

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Programming IDE</b>	<ul style="list-style-type: none"> <li>Eclipse</li> <li>KDevelop</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Visual Studio</li> </ul>	<ul style="list-style-type: none"> <li>Eclipse is a world leading integrated development environment, originally developed by IBM. It is designed to be an extensible platform, and is used for a range of non-development purposes including diagramming for business processes and project management. It is used as a basis for other products, including well known commercial products. Eclipse is established for development of Ada, C/C++, COBOL, Java, J2EE, Perl, PHP, Python, R, Ruby (including Ruby on Rails framework), Scala, Clojure, Groovy and Scheme. It can also be used as a modelling tool, using schemes including UML and BPMN. Eclipse also enables unit testing via JUnit.</li> </ul>	<ul style="list-style-type: none"> <li>The Eclipse foundation has 174 member companies including CA, IBM, Nokia, Oracle, SAP, Adobe, ARM, ATos, Cisco, Ericsson, Google, Intel, Motorola, NEC, RedHat, and Blackberry. Eclipse is used by Google engineers. IBM's Rational modelling tools use Eclipse, as do Fujitsu's application server suite. Reference <a href="http://bit.ly/g5it1n">http://bit.ly/g5it1n</a> <a href="http://bit.ly/HHTrex">http://bit.ly/HHTrex</a> <a href="http://bit.ly/HO4Juu">http://bit.ly/HO4Juu</a> and <a href="http://bit.ly/IU2WYe">http://bit.ly/IU2WYe</a></li> </ul>
<b>Web Application Development</b>	<ul style="list-style-type: none"> <li>PHP, Zend Framework</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft ASP.Net</li> </ul>	<ul style="list-style-type: none"> <li>Very common component of the LAMP pattern. (Linux Apache, MySQL, PHP)</li> <li>Zend Framework provides additional libraries and components for developers.</li> </ul>	<ul style="list-style-type: none"> <li>Real world uses by Cisco WebEx, NYSE Euronext, Fox Interactive Media, Fiat Group, IBM R&amp;D Labs, McAfee. Reference <a href="http://bit.ly/o6TcFz">http://bit.ly/o6TcFz</a></li> </ul>

## Open Source Software Options for Government

<p><b>Code Repository and Version Control</b></p>	<ul style="list-style-type: none"> <li>• Git, Subversion</li> </ul>	<ul style="list-style-type: none"> <li>• Visual Sourcesafe, Rational Team Concert, Perforce</li> </ul>	<ul style="list-style-type: none"> <li>• Git is the leading distributed version control system. Support non-linear development, cryptographic authentication of histories, and is suited to the largest developments.</li> </ul>	<ul style="list-style-type: none"> <li>• One of the world's largest and most distributed developments, the Linux kernel, is managed by git.</li> </ul>
<p><b>Performance Load Testing</b></p>	<ul style="list-style-type: none"> <li>• jmeter</li> </ul>	<ul style="list-style-type: none"> <li>• LoadRunner</li> </ul>	<ul style="list-style-type: none"> <li>• Jmeter is a light but functional and established web application testing tool, which can be extended by plugins from an active ecosystem, including from Google. Vastly cheaper than proprietary alternatives, it is often sufficient for requirements, and in some cases more functional, for example being able to test for media streaming. Jmeter can test a range of common internet and networking protocol services including HTTP, FTP, SOAP, JDBC, LDAP, JMS, POP/IMAP, and provide reports, with tests able to parameterise variables and test assertions. It can create concurrent load though load generating threads.</li> <li>• Jmeter can now operate distributed load tests through load generating nodes. Previously this was a reason for selecting proprietary products.</li> </ul>	<ul style="list-style-type: none"> <li>• Jmeter is used in the Home Office led development of a key UK Government website which is expected to see very large demand on go-live.</li> </ul>

## 6. Cloud

Sector	Software	Consider as Alternative to	Comments	Real World Use
Cloud Infrastructure	<ul style="list-style-type: none"> <li>OpenStack</li> </ul>	<ul style="list-style-type: none"> <li>Amazon Web Services, Microsoft Azure, VMWare, Citrix</li> </ul>	<ul style="list-style-type: none"> <li>Emerging standard with significant multi-vendor backing providing assurance against single-vendor lockin and failure.</li> <li>Primarily developed by NASA and Rackspace, now backed by AMD, Intel, Dell, Citrix, Cisco, Canonical, NTT and over 160 other organizations.</li> <li>Provides virtual machine management (OpenStack Compute) and storage (OpenStack Storage).</li> <li>Supports Xen, KVM, Qemu and Microsoft Hyper-V hypervisors.</li> <li>Supports the open virtual machine format, OVF, supported by Dell, Microsoft, Xensource, VMware, Redhat, IBM and Oracle.</li> </ul>	<ul style="list-style-type: none"> <li>Over 160 significant organisations backing OpenStack including Rackspace, NASA, Citrix, Dell, NTT, AMD, Intel, Cisco, Bull, Memset, NetApp, HP, NEC, Akamai, f5, Quanta, AT&amp;T, Deutsche Telekom, Nexenta, Yahoo, LG CNS, ClearPath. Reference <a href="http://bit.ly/e3AMz6">http://bit.ly/e3AMz6</a></li> <li>NASA production use of OpenStack components. Case studies include San Diego Supercomputer Center, MercadoLibre with 58million customers across Latin America, Australian Government infrastructure for researchers, Rackspace, RightScale cloud management., Fidelity Investments, AT&amp;T, NASA, US Department of Energy . Reference <a href="http://bit.ly/l2QYHq">http://bit.ly/l2QYHq</a></li> <li>Tier 1 ISP using OpenStack object storage. Reference <a href="http://bit.ly/eGQ4Nr">http://bit.ly/eGQ4Nr</a></li> </ul>

## Open Source Software Options for Government

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|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Eucalyptus, Ubuntu Enterprise Cloud</li></ul> | <ul style="list-style-type: none"><li>• Amazon Web Services, Microsoft Azure, VMWare, Citrix</li></ul> | <ul style="list-style-type: none"><li>• Early re-implementation of the industry leading Amazon EC2 and S3 services for managing virtual machines.</li><li>• Now forms part of commercialised cloud management offerings, including Canonical's Ubuntu Enterprise Cloud Services.</li><li>• Allows deployment , management and dynamic scaling of private and hybrid clouds (overflow capacity to public clouds, eg Amazon)</li><li>• Supports Xen, KVM hypervisors</li></ul> | <ul style="list-style-type: none"><li>• Puma.com and related sites use Eucalyptus. Reference <a href="http://bit.ly/hd9Dgy">http://bit.ly/hd9Dgy</a></li></ul>                                                                                                             |
| <ul style="list-style-type: none"><li>• OpenNebula</li></ul>                          | <ul style="list-style-type: none"><li>• Amazon Web Services, Microsoft Azure, VMWare, Citrix</li></ul> | <ul style="list-style-type: none"><li>• Interoperates with Amazon EC2, ElasticHosts</li><li>• Users manage via Amazon AWS compliant APIs</li><li>• Allows deployment , management and dynamic scaling of private and hybrid clouds (overflow capacity to public clouds, eg Amazon)</li><li>• Supports Xen, KVM and VMware hypervisors</li></ul>                                                                                                                              | <ul style="list-style-type: none"><li>• OpenNebula is used by CERN which peaked at 16,000 virtual machines managing 400,000 jobs. References <a href="http://bit.ly/9SaIWZ">http://bit.ly/9SaIWZ</a> and <a href="http://bit.ly/jiB7aE">http://bit.ly/jiB7aE</a></li></ul> |

## 7. Business Applications

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Email Server</b>	<ul style="list-style-type: none"> <li>Zimbra</li> <li>Zarafa</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Exchange Server</li> </ul>	<ul style="list-style-type: none"> <li>Zimbra was acquired by VMWare. It offers email, calendar, global address lists and collaboration. It interoperates through open standards with a range of clients.</li> <li>Zarafa aims to replace Exchange and integrates with MS Outlook. Provides webmail service with Outlook look and feel. Supports ActiveSync devices and Blackberry Enterprise Server. Integrates with SugarCRM, Alfresco ECM and OpenERP. Supports mail search, hierarchical storage and archiving.</li> </ul>	<ul style="list-style-type: none"> <li>Zimbra is used by NTT, Purdue University, Comcast, US Defense Department, Bechtel and Raytheon. Reference <a href="http://bit.ly/8VKcpy">http://bit.ly/8VKcpy</a></li> <li>Zarafa customers include health sector, local authorities, retail and manufacturing and education. Examples are Sixt, Brabantia, and Finnish municipality. Reference <a href="http://bit.ly/rGBRJB">http://bit.ly/rGBRJB</a> and <a href="http://bit.ly/tswL5J">http://bit.ly/tswL5J</a></li> </ul>
<b>Search Engine</b>	<ul style="list-style-type: none"> <li>Lucene / Solr</li> <li>Xapian</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft FAST</li> <li>Exalead</li> <li>Autonomy IDOL</li> </ul>	<ul style="list-style-type: none"> <li>Lucene/Solr is a functionally capable and scalable search engine. Can index PDF, HTML, Microsoft Word and ODF formats, amongst others. Lucene/Solr's strength is in its performance and scalability. It also provides features normally only found in the most expensive search engines.</li> </ul>	<ul style="list-style-type: none"> <li>Lucene provides search capability for Wikipedia. Reference <a href="http://bit.ly/erRSEd">http://bit.ly/erRSEd</a></li> <li>High traffic public websites that use Solr/Lucene include AOL, whitehouse.gov, AT&amp;T, Ticketmaster, The Guardian, Netflix, news.com, dig, NASA PDS, eBuyer.com. Other users include Goldman Sachs, Disney, Apple, Cisco, NASA NEBULA, MTV.</li> </ul>

## Open Source Software Options for Government

				Reference <a href="http://bit.ly/WIANZ">http://bit.ly/WIANZ</a>
<b>Intranet, Portal and Collaboration</b>	<ul style="list-style-type: none"> <li>Alfresco</li> <li>Nuxeo</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Sharepoint, OpenText Vignette, Oracle WebCenter</li> </ul>	<ul style="list-style-type: none"> <li>Alfresco founded by co-founder of Documentum and former COO of Business Objects.</li> <li>Nuxeo is a platform for document management, asset management and case management. It enables business applications with workflows to be designed and built.</li> </ul>	<ul style="list-style-type: none"> <li>30,000 public user capacity at AQA - Assessment &amp; Qualification Alliance. Reference <a href="http://bit.ly/4FY8b8">http://bit.ly/4FY8b8</a></li> <li>Alfresco used by Yell.com. Sony, EA, ofwat, BBC. Reference <a href="http://bit.ly/4FY8b8">http://bit.ly/4FY8b8</a></li> <li>Islington Council. Reference <a href="http://bit.ly/dh3W6i">http://bit.ly/dh3W6i</a></li> <li>University of Westminster Intranet. Reference <a href="http://bit.ly/hRkrX">http://bit.ly/hRkrX</a></li> </ul>
	<ul style="list-style-type: none"> <li>Liferay</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Sharepoint, OpenText Vignette, Oracle WebCenter</li> </ul>	<ul style="list-style-type: none"> <li>Liferay is a leading enterprise portal server. It provides functions and portlets for content management, blogs, instant messaging, SSO, message boards, calendar mail, polls, image gallery, tagging, knowledge base, asset publishing and publishing workflow. It is JSR168 compliant.</li> </ul>	<ul style="list-style-type: none"> <li>Clients include Cisco, T-Mobile, Societe Generale, Barclays, French MoD, Lufthansa, Vodafone, Allianz, . Reference <a href="http://bit.ly/cd5sW3">http://bit.ly/cd5sW3</a></li> </ul>
<b>Document and Content Management System (CMS)</b>	<ul style="list-style-type: none"> <li>Alfresco</li> <li>Nuxeo</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Sharepoint, Opentext, Filenet, Documentum</li> </ul>	<ul style="list-style-type: none"> <li>Alfresco is CMIS 1.0 compliant.</li> </ul>	<ul style="list-style-type: none"> <li>Cisco Internet Business Solutions Group. Reference <a href="http://bit.ly/h1250J">http://bit.ly/h1250J</a></li> <li>French Air Force document information system. Reference</li> </ul>



## Open Source Software Options for Government

				<p><a href="http://bit.ly/i8kPVZ">http://bit.ly/i8kPVZ</a></p> <ul style="list-style-type: none"> <li>Alfresco is used by Irish Revenue Commissioners. Reference <a href="http://bit.ly/bJXbSy">http://bit.ly/bJXbSy</a></li> <li>Customers include Yell., Toyota, SNCF, Fox, La Poste, Merck, Cisco, Endeca, KLM, French MoD, French MoJ, French Interior Ministry. Reference <a href="http://bit.ly/4FY8b8">http://bit.ly/4FY8b8</a></li> </ul>
<b>Records Management (EDRM)</b>	<ul style="list-style-type: none"> <li>Alfresco</li> </ul>	<ul style="list-style-type: none"> <li>Mircrosoft Sharepoint, Documentum, Meridio, TRIM, Objective.</li> </ul>	<ul style="list-style-type: none"> <li>CMIS 1.0 and DoD 5015.02 certifications. Implements Sharepoint protocol to act as substitute backend.</li> </ul>	<ul style="list-style-type: none"> <li>Islington Council. Reference <a href="http://bit.ly/dh3W6i">http://bit.ly/dh3W6i</a></li> <li>EADS 20,000 paper files. Reference <a href="http://bit.ly/hRjx4V">http://bit.ly/hRjx4V</a></li> <li></li> </ul>
<b>Workflow, Forms &amp; Case Management</b>	<ul style="list-style-type: none"> <li>Nuxeo</li> <li>FoxOpen</li> </ul>	<ul style="list-style-type: none"> <li>Sharepoint</li> </ul>	<ul style="list-style-type: none"> <li>Nuxeo is a platform for document management, asset management and case management. It enables business applications with workflows to be designed and built.</li> <li>FoxOpen is developed by Department of Energy and Climate Change and used for rapid application development for workflow, MVC based and case handling applications.</li> </ul>	<ul style="list-style-type: none"> <li>Nuxeo is used by the BBC, French Atomic Energy Commission, The Press Association, French energy ERDF, French Ministry of Defence and related groups including air force, La Poste, French Interior Ministry for public portal, Electronic Arts, and a telco with 160million mobile customers . Reference <a href="http://bit.ly/IOAHEF">http://bit.ly/IOAHEF</a></li> <li>Foxopen Department for Energy and Climate Change</li> </ul>

## Open Source Software Options for Government

				<p>(DECC) applications include Oil &amp; Gas Portal, FOI case management, correspondence handling. Also used by BIS, MoD, Boeing and Australian Dept of Health. Reference <a href="http://bit.ly/gtU1ZY">http://bit.ly/gtU1ZY</a></p>
<p><b>Enterprise Resource Planning (ERP)</b></p>	<ul style="list-style-type: none"> <li>• OpenERP</li> <li>• Openbravo</li> </ul>	<ul style="list-style-type: none"> <li>• SAP, Oracle, Microsoft Dynamics, PeopleSoft, SAGE, SAP</li> </ul>	<ul style="list-style-type: none"> <li>• Open ERP is commercially developed and supported. Modular capabilities include sales, CRM, project management, stock management, accounting and human resources. Also provides vertical industry specific applications over OpenERP.</li> <li>• OpenBravo is commercially developed and supported. Includes finance and accounting, sales, purchasing, inventory, procurement, manufacturing, projects, and business intelligence.</li> </ul>	<ul style="list-style-type: none"> <li>• OpenERP customers include La Poste, Veolia, Danone, Oracle. Reference <a href="http://bit.ly/ej0HHR">http://bit.ly/ej0HHR</a></li> <li>• OpenBravo 3 times winner of Infoworld software awards. Reference <a href="http://bit.ly/9K9Jyx">http://bit.ly/9K9Jyx</a></li> <li>• Open bravo customers include BBVA, Coapte French healthcare, Basque City Hall. Reference <a href="http://bit.ly/mCIVN">http://bit.ly/mCIVN</a></li> </ul>
<p><b>Customer Relationship Managemnt (CRM)</b></p>	<ul style="list-style-type: none"> <li>• SugarCRM</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Dynamics, SageCRM, Salesforce</li> </ul>	<ul style="list-style-type: none"> <li>• SugarCRM is a commercially successful CRM system providing sales-force automation, marketing campaign management, customer support, mobile device CRM and reporting.</li> <li>• In 2011, SugarCRM joined the IBM Global Alliance Portfolio for cloud solutions.</li> </ul>	<ul style="list-style-type: none"> <li>• SugfarCRM customers from comms, financial, healthcare, public , professional services, manufacturing, technology and retail sectors include uzo (Portugal's largest telecoms provider), One Financial, HealthScreen (replacing Siebel), State of Oregon, InterAct (public safety and security), Thomas Cook, ThyssenKrupp, Avis, General</li> </ul>

## Open Source Software Options for Government

				Motors . Reference <a href="http://bit.ly/sEHA3M">http://bit.ly/sEHA3M</a>
<b>Business Intelligence (BI)</b>	<ul style="list-style-type: none"> <li>Pentaho BI Suite</li> </ul>	<ul style="list-style-type: none"> <li>Oracle, IBM, Informatica</li> </ul>	<ul style="list-style-type: none"> <li>Includes ETL, OLAP, reporting, dashboards, workflow and data mining capability. Integrates with Hadoop for large scale data analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Customers include Camden Borough, US Naval Air Systems Command, Harris Computer Systems, Sun Microsystems, Specsavers, NHS Islington, Brussels Airport, Norways TV2. Reference <a href="http://bit.ly/ehITaM">http://bit.ly/ehITaM</a></li> </ul>
<b>Data Integration</b>	<ul style="list-style-type: none"> <li>Talend</li> </ul>	<ul style="list-style-type: none"> <li>IBM, Oracle, Software AG, Tibco, Progress, Informatica</li> </ul>	<ul style="list-style-type: none"> <li>Mature data integration tools covering file migrations, data warehousing, ETL, master data management, data quality profiling. Application integration and ESB functions. Integration with Hadoop aims at “big data” analysis.</li> <li>Talend is one of the largest companies with an open source business model.</li> </ul>	<ul style="list-style-type: none"> <li>Customers include ebay, Deutsche Post, Allianz, ING, Alcatel-Lucent, AOL, BNP Paribas, Orange, Virgin Mobile, Sony, SNCF, Land Registry, UNHCR. Reference <a href="http://bit.ly/4odsN">http://bit.ly/4odsN</a> and <a href="http://bit.ly/4odsN">http://bit.ly/4odsN</a></li> <li>The Irish Revenue Commissioners use Talend for data integration and quality. Reference <a href="http://bit.ly/HNLvOP">http://bit.ly/HNLvOP</a></li> </ul>
<b>Reporting</b>	<ul style="list-style-type: none"> <li>Jasper Reports</li> </ul>	<ul style="list-style-type: none"> <li>Crystal Reports, Business Objects</li> </ul>	<ul style="list-style-type: none"> <li>A flexible reporting platform, used on its own, but also found integrated into other offerings. Jasper is particularly developer friendly, enabling integration of reporting functions to applications.</li> <li>Reports can include dashboards, tables, crosstabs, charts and</li> </ul>	<ul style="list-style-type: none"> <li>JasperSoft, which also provides business intelligence capability, has a large number of customers across several sectors who have often replaced proprietary technologies. These include a major Irish Government Department resulting in significant savings, Virgin Money, USA</li> </ul>

## Open Source Software Options for Government

			<p>gauges.</p> <ul style="list-style-type: none"> <li>Active ecosystem of related tools include report servers such as the open source JasperServer, to provide additional functionality such as report scheduling. Graphical report design can be achieved with iReports. Other tools create reports to Excel, Word and PowerPoint formats, in addition to HTML, PDF, CSV and XML.</li> </ul>	<p>National Institute of Food and Agriculture, and several tax authorities in the Netherlands. References <a href="http://bit.ly/Fxapm">http://bit.ly/Fxapm</a> and <a href="http://bit.ly/HLcQsC">http://bit.ly/HLcQsC</a></p>
	<ul style="list-style-type: none"> <li>OpenReports</li> </ul>	<ul style="list-style-type: none"> <li>Crystal Reports, Business Objects</li> </ul>	<ul style="list-style-type: none"> <li>Flexible web based reports server which can use several reporting engines, including Jasper, JFreeReport, XJLS and Eclipse BIRT.</li> <li>Server manages permissions and security, scheduling and auditing.</li> </ul>	<ul style="list-style-type: none"> <li>Customers include leading USA retail store Macy's, and Senegal public sector for microfinance, health insurance and HR applications. At Montpellier University it has replaced Business Objects for many tasks. Reference <a href="http://bit.ly/IMP6Dc">http://bit.ly/IMP6Dc</a></li> </ul>
<p><b>Business Process Modelling (BPM)</b></p>	<ul style="list-style-type: none"> <li>Activiti BPM</li> <li>Intalio BPM</li> <li>ProcessMaker</li> </ul>	<ul style="list-style-type: none"> <li>IBM products for BPM</li> </ul>	<ul style="list-style-type: none"> <li>Activiti is now governed by Alfresco.</li> <li>Intalio is a widely deployed business process management system, based on the popular Eclipse platform.</li> <li>Processmaker is a web based workflow and BPM system. Colosa which develops ProcessMaker meets ISO9001 quality management certification.</li> </ul>	<ul style="list-style-type: none"> <li>Activiti is used by Scarlet to automate the provision of multi-play telecoms. Reference <a href="http://bit.ly/lrGNib">http://bit.ly/lrGNib</a></li> <li>Processmaker's customers include Lenovo, BBVA, GTBank, Toyota. Reference <a href="http://bit.ly/lrHk3K">http://bit.ly/lrHk3K</a></li> <li>Intalio implementation gold partners include CSC a global systems integrator. Technology partners include</li> </ul>

## Open Source Software Options for Government

VMWare and HP. Clients include Thales, US Army, US DoD, US DoE, Accenture, CapGemini, CSC, Orange, Sky, Vodafone, Veolia, BP, BNP Paribas, Santander, Allianz, Samsung, Toyota, Irish Revenue, New Zealand MoJ and Brazilian government, Singapore Airlines, Informatica.  
Reference  
<http://bit.ly/lypgFJ>  
<http://bit.ly/lggasQ> and  
<http://bit.ly/lgr8Fs>

### Human Resources (HR)

- OrangeHRM

- Oracle, SAP

- OrangeHRM is a corporately developed HR management system that covers leaving, joining, time management, recruitment, performance, expenses, leave, reporting. There are delivery partners across the globe.

- Customers include Landmark property management .  
Reference  
<http://bit.ly/tMa19s>

## 8. Network

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Network Monitoring</b>	<ul style="list-style-type: none"> <li>Nagios, other</li> <li>OpenNMS</li> <li>Zabbix</li> <li>Hyperic HQ</li> <li>GroundWork</li> <li>ZenOSS</li> <li>Opsview</li> </ul>	<ul style="list-style-type: none"> <li>BMC, CA, Orion</li> <li>IBM Tivoli, HP OpenView</li> </ul>	<ul style="list-style-type: none"> <li>Nagios has heritage in many ISPs. Often used with the ganglia graphing system.</li> <li>OpenNMS is a scalable enterprise class network monitoring system. Integrates with service management Request Tracker.</li> <li>Hyperic acquired by VMware also supports monitoring of virtualised infrastructure. In addition to server, application and performance management it has integration into VMWare's vshpere products.</li> <li>Zabbix is a mature monitoring framework with agents for many operating systems and software stacks.</li> <li>ZenOSS is a leading network monitoring system, deployed to 35,000 customers across 35 countries.</li> <li>Opsview, using the nagios core, can monitor a range of applications, operating systems and hardware. Functions include</li> </ul>	<ul style="list-style-type: none"> <li>Nagios provides monitoring for the Wikipedia infrastructure. Reference <a href="http://bit.ly/erRSEd">http://bit.ly/erRSEd</a></li> <li>Zabbix is used by large organisations such as DEAC IT services across four continents, leading Polish telecoms Netia monitoring 20,000 parameters, NTT Comms, large Brazilian energy company PetroBras. Reference <a href="http://bit.ly/swdGQw">http://bit.ly/swdGQw</a></li> <li>Hyperic is used by Yahoo, Cisco, hi5, Goldman Sachs, Deutsche Bank, Avis, comcast. Reference <a href="http://bit.ly/lg7iHn">http://bit.ly/lg7iHn</a></li> <li>ZenOSS is used by Rackspace, LinkedIn, VMWare, Motorola, Los Alamos, LexisNexis, Deutsche Bank, US Army, Broadcom, Telstra, CapGemini. Reference <a href="http://bit.ly/vrdvui">http://bit.ly/vrdvui</a></li> <li>Opsview is used by</li> </ul>

## Open Source Software Options for Government

			distributed monitoring, service desk integration, and reporting. Opsview Enterprise 3.10 won the 2011 Techworld One to Watch award.	Symantec, Sky, Siemens, Telefonica, US Army, Plusnet ISP, Adecco, Lidl, Allianz, and Irish Revenue. Reference <a href="http://bit.ly/kMpTel">http://bit.ly/kMpTel</a>
<b>Mail Transport</b>	<ul style="list-style-type: none"> <li>• Sendmail</li> <li>• Postfix, Exim</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Exchange</li> </ul>	<ul style="list-style-type: none"> <li>• Sendmail has been powering email globally since the early 80s.</li> <li>• Postfix is a mail transport agent, originally developed by IBM, which for which complex configuration is relatively easier. For example, it supported virtual domains early and in a relatively manageable manner.</li> <li>• Developed at the University of Cambridge, Exim is an administrator and developer friendly MTA. It allows flexible builds and extensions, and greater number of mail policy controls.</li> </ul>	<ul style="list-style-type: none"> <li>• Postfix users include the University of Malaga for approx 100,000 mailboxes, Connect.com.au (now AAPT) amongst Australia's largest network service providers, US Navy. Reference <a href="http://bit.ly/JI5d7I">http://bit.ly/JI5d7I</a></li> <li>• Sendmail is the most popular MTA on the internet, and though it's use is declining it still leads. Reference <a href="http://bit.ly/JBqNMS">http://bit.ly/JBqNMS</a></li> <li>• Exim is popular within large ISPs and universities, handling thousands of mail accounts. Reference <a href="http://bit.ly/8ri5mx">http://bit.ly/8ri5mx</a></li> </ul>
<b>Certificate Authorities</b>	<ul style="list-style-type: none"> <li>• CA-Cert</li> <li>• OpenCA</li> </ul>	<ul style="list-style-type: none"> <li>• Digicert, Entrust, GlobalSign, Thawte, Verisign.</li> </ul>	<ul style="list-style-type: none"> <li>• OpenCA is open source software to implement a certificate authority. It is used by leading project ssuch as OpenLDAP, OpenSSH and Apache.</li> <li>• CACert is a community driven certificate authority which issues public key certificates free of charge. CACert has over 200,000 verified users and has issued nearly 800,000 certificates as of</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

## Open Source Software Options for Government

January 2012.				
<b>Network Packet Capture and Protocol Analyser</b>	<ul style="list-style-type: none"> <li>• Wireshark (formerly Ethereal)</li> </ul>	<ul style="list-style-type: none"> <li>• NetWitness, Capsa</li> </ul>	<ul style="list-style-type: none"> <li>• Wireshark is the de facto protocol analyser. It has very comprehensive ability to decode and present a wide range of protocols running over a network. For very large infrastructures wireshark may be paired with hardware optimised to capture large volumes of network traffic.</li> </ul>	<ul style="list-style-type: none"> <li>• Wireshark is the de facto protocol analyser in the security and developer community.</li> </ul>
<b>Network Services</b>	<ul style="list-style-type: none"> <li>• Vyatta</li> </ul>	<ul style="list-style-type: none"> <li>• Cisco Integrated Services Routers, Cisco ASA security appliances</li> </ul>	<ul style="list-style-type: none"> <li>• Provides network services and applications based on open source core and software, including routing, VPN.</li> <li>• Commercial support available. Considered cheaper than incumbents</li> <li>• Similar interface to Juniper JUNOS and Cisco IOS, as well as graphical interface.</li> </ul>	<ul style="list-style-type: none"> <li>• Customers include Toyota, CBS, CSC, EMC, Dell, Nokia, VMWare, Rackspace, FranceTelecom, US Homeland Security, US Justice Department. Reference <a href="http://bit.ly/gbFoTu">http://bit.ly/gbFoTu</a></li> </ul>
<b>Telephony VOIP</b>	<ul style="list-style-type: none"> <li>• Asterisk</li> </ul>	<ul style="list-style-type: none"> <li>• Cisco Unified Communications Manager</li> <li>• Hardware appliances</li> </ul>	<ul style="list-style-type: none"> <li>• Asterisk is a mature software PBX, covering PSTN and VoIP services. Features include voicemail, conference calling, and automatic call distribution. Protocols supported include SIP, MGCP, H323. Asterisk is known to support commercial PBX products.</li> </ul>	<ul style="list-style-type: none"> <li>• Customers of services based on Asterisk include US Army, Symbian Foundation, La Poste, University of Pennsylvania. Reference <a href="http://bit.ly/b8zhvN">http://bit.ly/b8zhvN</a></li> </ul>



## 9. Web & Web Applications

Sector	Software	Consider as Alternative to	Comments	Real World Use
Web Server	<ul style="list-style-type: none"> <li>Apache web server</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft IIS</li> </ul>	<ul style="list-style-type: none"> <li>Apache is the web server behind the majority of internet websites, and has been dominant for 15 years.</li> </ul>	<ul style="list-style-type: none"> <li>Netcraft survey April 2011 shows 61% of internet websites hosted by Apache, compared to 18% by Microsoft IIS.</li> <li>Apache serves the global Wikipedia site. Reference <a href="http://bit.ly/13ynJh">http://bit.ly/13ynJh</a></li> </ul>
	<ul style="list-style-type: none"> <li>Lighttpd, nginx, Cherokee</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft IIS</li> </ul>	<ul style="list-style-type: none"> <li>High performance alternatives to Apache. Designed for performance and scalability, not for a wide range of functionality.</li> <li>Nginx and Cherokee have built in media streaming capability to serve you-tube like capability.</li> </ul>	<ul style="list-style-type: none"> <li>Netcraft survey April 2011 shows 6.5% of the million most active sites served by nginx.</li> <li>Lighttpd serves static content for Wikipedia. Reference <a href="http://bit.ly/erRSEd">http://bit.ly/erRSEd</a></li> <li>Lighttpd is used by Youtube, Sourceforge and torrent sites facing more than 1000 hits per second. Reference <a href="http://bit.ly/g5bke7">http://bit.ly/g5bke7</a></li> <li>Nginx is used by <a href="http://www.gov.uk">www.gov.uk</a> beta. Reference <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a></li> </ul>

## Open Source Software Options for Government

<b>Web Cache, Reverse Proxy</b>	<ul style="list-style-type: none"> <li>Squid, Varnish</li> </ul>	<ul style="list-style-type: none"> <li>F5 BIG IP, McAfee Web Gateway, Zeus, Blue Coat, Microsoft Proxy Server</li> </ul>	<ul style="list-style-type: none"> <li>Squid and Varnish are popular web caches and reverse proxies. They are ideal for offloading from content heavy dynamic web applications.</li> <li>Varnish is designed to be, and evidence suggests, more performant than squid and provides greater visibility of its operation. Squid is a more established product.</li> </ul>	<ul style="list-style-type: none"> <li>Squid cache supports the global Wikipedia and Flickr sites. Reference <a href="http://bit.ly/dJi4U1">http://bit.ly/dJi4U1</a></li> <li>Varnish is used by Facebook, to serve billions of requests per day, and MercadoLibre Latin America's largest e-commerce site. Reference <a href="http://bit.ly/le6TYC">http://bit.ly/le6TYC</a></li> <li>Varnish is used by <a href="http://www.gov.uk">www.gov.uk</a> beta. Reference <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a></li> </ul>
<b>Flash Media Player</b>	<ul style="list-style-type: none"> <li>JWFlashplayer</li> <li>Flowplayer</li> </ul>	<ul style="list-style-type: none"> <li>Adobe Flash Player</li> </ul>	<ul style="list-style-type: none"> <li>JWFlashplayer is compatible with media sources hosted by CDNs such as Amazon CloudFront and Akamai.</li> <li>JWFlashplayer also supports HTML5 playback, avoiding the requirement for Flash. This makes it compatible with non-Flash devices such as the iPhone and iPad.</li> </ul>	<ul style="list-style-type: none"> <li>JWFlashplayer users include Whitehouse, Thomson Reuters, Avis, AT&amp;T, Harvard, Intel and Nasdaq. Reference <a href="http://bit.ly/tRAwk6">http://bit.ly/tRAwk6</a></li> </ul>
<b>Web Content Management System (CMS)</b>	<ul style="list-style-type: none"> <li>Drupal</li> <li>Joomla</li> <li>Plone</li> </ul>	<ul style="list-style-type: none"> <li>Morello, Vignette/Openext, Interwoven/Autonomy</li> </ul>	<ul style="list-style-type: none"> <li>Open source web content management systems are a very dynamic and established market segment where the case against proprietary products is strong. Features commonly include web publishing, blogs, content syndication, discussion forums, and large pool of community developed extensions. WordPress, Drupal and Joomla</li> </ul>	<ul style="list-style-type: none"> <li>Drupal is used by the UK <a href="http://data.gov.uk">data.gov.uk</a> and the USA <a href="http://whitehouse.gov">whitehouse.gov</a>. Other sites include fastcompnay, Greater London Authority, Rutgers University, the primary Economist site (migrating from coldfusion and Oracle), and the World Food Programme. References</li> </ul>

## Open Source Software Options for Government

feature significantly amongst the top internet sites. Reference <http://trends.builtwith.com/cms>

- Drupal is a very modular cms and web application framework, with much of its functionality provided by contributed modules. Aside from the thousands of optional modules, the core modules include content creation, user management, logging, search and workflow functions. The Drupal community is very active, with 10,000 developer accounts, with 3000 attending the 2011 developers conference. Drupal aims to be a general purpose web framework, distinct from single-purpose products such as blogging tools.
  - Joomla is a leading web cms, with a more community focus. Joomla won the Packt Publishing Open Source Content Management System Award in 2006, 2007, and 2011. [
  - Plone is particularly suited to more complex applications, workflows. It also has a strong security record. Plone's interface confirms to accessibility standard WCAG-AAA higher than most competitors. Plone has strengths in standards conformance, access control, internationalisation, and security.
- <http://bit.ly/dawP27>  
<http://bit.ly/9rCzRg> and  
<http://nyti.ms/3NmpYO>
- Joomla is used by many government sites. Joomla.gov lists geographic locations of over 3000 government sector Joomla sites including Italy (765 sites), Spain (209), Chile (135), USA (94), UK (76). UK government users include MoD and Defra. Other users include the EU, UN and WHO . Joomla is very successful across other sectors including arts, business, health, media, technology and education. References <http://bit.ly/jGCXxO> and <http://bit.ly/GcSJ>
  - Very large number of Plone customers include Brazilian Government, Norwegian Archive, Kent Connects and Kent CC, Scottish National Party, Warwickshire Police, UK MoD Defence Academy, NASAScience, Keble Oxford and Bristol University, NHS Networks. Reference <http://bit.ly/vThQAn>
  - Plone is also used by the FBI, US Dept of Energy, European Environment Agency, United Nations, . Reference <http://bit.ly/g0XtIrl>

## Open Source Software Options for Government

<ul style="list-style-type: none"> <li>• Wordpress</li> </ul>	<ul style="list-style-type: none"> <li>• Morello, Vignette/Opentext, Interwoven/Autonomy, Sharepoint</li> </ul>	<ul style="list-style-type: none"> <li>• Wordpress is a leading web content publishing system, primarily focussed on blog-publishing, but now extending to more general content and functions. Like other open source web content systems, it has an active ecosystem of extension plugins. Usage statistics suggest it is the most common web content platform.</li> </ul>	<ul style="list-style-type: none"> <li>• UK Civil Service website redeveloped in 6 weeks from legacy platform to Wordpress in 2011. Significant users of Wordpress include Ebay, Yahoo, Digg, Ford, Wall Street Journal, Sony, Samsung, NYTimes, CNN, General Electric, Reuters, Forbes, GM, UPS and VW. Reference <a href="http://bit.ly/ghocs2">http://bit.ly/ghocs2</a> <a href="http://bit.ly/3RU64">http://bit.ly/3RU64</a> and <a href="http://bit.ly/QRzxo">http://bit.ly/QRzxo</a></li> <li>• Approximately 63% of the top million sites use Wordpress according to trends monitor builtwith.com. Reference <a href="http://bit.ly/bJzvxB">http://bit.ly/bJzvxB</a></li> </ul>
<ul style="list-style-type: none"> <li>• Squiz</li> <li>• EZ Publish</li> </ul>	<ul style="list-style-type: none"> <li>• Morello, Vignette/Opentext, Interwoven/Autonomy</li> </ul>	<ul style="list-style-type: none"> <li>• Squiz is the only open source web content management solution in the Gartner 2011/12 magic quadrant.</li> <li>• Squiz aims to minimise IT involvement in the operation of a web content management system, emphasising ease of use for content roles.</li> <li>• EZ Publish is an established content management and publishing system, with functions for ecommerce, online communities and role-based</li> </ul>	<ul style="list-style-type: none"> <li>• Squiz clients include Ministry of Justice, Electoral Commission, Australian Federal Government, Royal Parks, Westminster Abbey, Royal College of Nursing, London School of Economics, University of Oxford, Hargreaves Lansdown, Australian Securities Exchange, and the V&amp;A. Reference <a href="http://bit.ly/bC0g4G">http://bit.ly/bC0g4G</a></li> <li>• EZ Publish supports the customer facing sites for Elle Magazine, Vogue Australia,</li> </ul>

## Open Source Software Options for Government

			access.	Eurostar, CNBC, Cosmopolitan, Oslo Stock Exchange, Financial Times, EMI Music, BMW, Wall Street Journal, Heinz, European Space Agency, US DoD, French MoD. Reference <a href="http://bit.ly/kBaub">http://bit.ly/kBaub</a> and <a href="http://bit.ly/Ji294o">http://bit.ly/Ji294o</a>
	<ul style="list-style-type: none"> <li>Alfresco</li> </ul>	<ul style="list-style-type: none"> <li>Morello, Vignette/Openext, Interwoven/Autonomy</li> </ul>	<ul style="list-style-type: none"> <li>Includes web authoring, workflow and publishing.</li> </ul>	<ul style="list-style-type: none"> <li>Fox Broadcasting Company public site Fox.com is supported by Alfresco. Reference <a href="http://bit.ly/ffAhmW">http://bit.ly/ffAhmW</a></li> </ul>
<b>Blog Engine</b>	<ul style="list-style-type: none"> <li>Wordpress</li> </ul>	<ul style="list-style-type: none"> <li>sss</li> </ul>	<ul style="list-style-type: none"> <li>Leading blog engine with rich functionality. Users benefit from large pool of community developed extensions.</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Live Spaces migrates to Wordpress blog engine. Reference <a href="http://bit.ly/d545X0">http://bit.ly/d545X0</a></li> </ul>
<b>Wiki</b>	<ul style="list-style-type: none"> <li>MediaWiki</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>MediaWiki is the leading wiki engine.</li> </ul>	<ul style="list-style-type: none"> <li>MediaWiki is the software behind global scale Wikipedia. Reference <a href="http://bit.ly/13ynJh">http://bit.ly/13ynJh</a></li> <li>The developers of <a href="http://www.gov.uk">www.gov.uk</a> beta use Mediawiki. Reference <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a></li> </ul>
<b>Web Analytics</b>	<ul style="list-style-type: none"> <li>Open Web Analytics (OWA)</li> <li>Piwik</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>OWA is a leading web analytics with support for bespoke sites and integration into WordPress, Drupal and MediaWiki. Offers campaign tracking and user in-</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>

## Open Source Software Options for Government

page tracing.

- Piwik aims to offer functions similar to Google Analytics.

## 10. Geographic & Mapping

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Geographic Information Systems (GIS)</b>	<ul style="list-style-type: none"> <li>Quantum GIS</li> <li>GRASS GIS</li> </ul>	<ul style="list-style-type: none"> <li>ESRI products such as ArcView and ArcWeb and ArcGIS</li> <li>Bentley Map, Intergraph GeoMedia</li> </ul>	<ul style="list-style-type: none"> <li>Open source Geographic Information Systems (GIS) can potentially make significant savings in a sector where proprietary tools are expensive.</li> <li>With a decade of continuous development, Quantum GIS is a desktop application, enabling viewing, editing and analysis of geographic data. It supports a range of data types and sources including ESRI shapefiles.</li> <li>GRASS GIS was originally developed by the US Army, and is now used widely across academia an industry.</li> </ul>	<ul style="list-style-type: none"> <li>Quantum GIS is commercially supported with providers based in most European countries. Case studies from a UK services company include the Environment Agency's National Flood and Coastal Defence Database modelling. Reference <a href="http://bit.ly/IOATqS">http://bit.ly/IOATqS</a></li> </ul>
<b>Web Mapping</b>	<ul style="list-style-type: none"> <li>GeoServer (WMS reference server)</li> <li>UMN MapServer</li> </ul>	<ul style="list-style-type: none"> <li>ESRI ArcGIS Server, Envinsa, GeoWebPublisher, GeognoSIS, GeoMedia, Oracle MapViewer, SIAS, ERDAS APOLLO</li> </ul>	<ul style="list-style-type: none"> <li>GeoServer is the reference server for the WMS standard.</li> <li>UMN MapServer was originally developed by NASA for its public satellite imagery.</li> </ul>	<ul style="list-style-type: none"> <li>GeoServer is used by UK Ordnance Survey, French National Mapping Agency, World Bank, UN Food and Agriculture Organisation, NY City IT and Telecoms. Reference <a href="http://bit.ly/b5h1fH">http://bit.ly/b5h1fH</a></li> <li>MapServer is used by Minnesota DNR to provide</li> </ul>

## Open Source Software Options for Government

	<ul style="list-style-type: none"> <li>• OpenLayers</li> <li>• MapFish</li> </ul>	<ul style="list-style-type: none"> <li>• Google Maps, Bing Maps</li> </ul>	<ul style="list-style-type: none"> <li>• OpenLayers is a web client side javascript library for rendering map data.</li> <li>• Mapfish, compliant with Open Geospatial Consortium standards, combines tools such as OpenLayers and GeoExt.</li> </ul>	<p>thousands of web maps.</p> <ul style="list-style-type: none"> <li>• OpenLayers is used by OpenStreetMap. Reference <a href="http://bit.ly/6Zy41J">http://bit.ly/6Zy41J</a></li> </ul>
<p><b>Spatial Database</b></p>	<ul style="list-style-type: none"> <li>• PostGIS</li> </ul>	<ul style="list-style-type: none"> <li>• Oracle Spatial</li> <li>• Commercial products with spatial extensions including Sybase/Boeing SQS, DB2, Informix</li> </ul>	<ul style="list-style-type: none"> <li>• PostGIS enables the Postgresql to work with geospatial data. It is a mature product, initially released in 2001. PostGIS is used by many geospatial products, including those for spatial analysis and mapping.</li> </ul>	<ul style="list-style-type: none"> <li>• PostGIS is used as a data backed by many products, including established commercial products such as ERDAS Apollo and CadCorp SIS. Reference <a href="http://bit.ly/sW8e1l">http://bit.ly/sW8e1l</a></li> <li>• PostGIS underlies the mapit data and webservice supporting the GDS <a href="http://www.gov.uk">www.gov.uk</a> domain's geolocation functions. Reference <a href="http://bit.ly/92Rr9P">http://bit.ly/92Rr9P</a> and <a href="http://bit.ly/zVAoXc">http://bit.ly/zVAoXc</a></li> <li>• Other case studies for PostGIS include SITEL for Mexican government agencies, GlobeExplorer migrating from Informix serving over a million requests per day from terabytes of data, and the French national mapping agency maintains over 100 million topographical features. A UK example is</li> </ul>



## Open Source Software Options for Government

Infoterra satellite and aerial imagery which stores the entire Ordnance Survey database with PostGIS Reference  
<http://bit.ly/13ux9p>

## 11. Security Tools

Not all public sector requirements for security tools require specific product certifications, and a wider set of options can be explored. For example, the use of SSH encryption can be sufficient for some scenarios, and the cost of more expensive infrastructures can be avoided.

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Disk and Data Encryption</b>	<ul style="list-style-type: none"> <li>• TruCrypt</li> <li>• SSL</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial products</li> </ul>	<ul style="list-style-type: none"> <li>• TruCrypt is easy to use and offers capabilities similar to market leaders. It supports Windows, Linux and Mac OS. Functions include transparent real-time on-the-fly encryption, hidden containers, pre-boot authentication for Windows, multiple keys, hardware acceleration, and two factor authentication. Can encrypt whole disk, partition, file and swap space.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Password strength testing</b>	<ul style="list-style-type: none"> <li>• John the Ripper</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial products</li> </ul>	<ul style="list-style-type: none"> <li>• Logn established tool for brute force attacks against passwords</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Intrusion Detection Systems</b>	<ul style="list-style-type: none"> <li>• Snort</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial products</li> </ul>	<ul style="list-style-type: none"> <li>• Snort is a network intrusion detection and prevention system. It is not a host based intrusion or prevention system.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Portscanning and Host</b>	<ul style="list-style-type: none"> <li>• nmap</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial products</li> </ul>	<ul style="list-style-type: none"> <li>• Nmap is a security scanner which aims to identify and discover host</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

## Open Source Software Options for Government

<b>Identification</b>	types and services.		
<b>Vulnerability Scanning</b>	<ul style="list-style-type: none"> <li>• Nessus, OpenVAS</li> <li>• Nikto</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial products</li> </ul>	<ul style="list-style-type: none"> <li>• Nessus was a leading vulnerability scanner. It became closed proprietary and was forked to OpenVAS. It has a very comprehensive database of checks to test for vulnerabilities, including the ability to execute some attacks.</li> <li>• Nikto is a web server / application specific vulnerability scanner.</li> <li>• The German Federal Office for Information Security (similar to the UK's CESG) supported various features of the OpenVAS software framework as well as various network vulnerability tests. Reference <a href="http://bit.ly/LwQLz">http://bit.ly/LwQLz</a></li> </ul>

## 12. Desktop Office

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Desktop Office Applications</b>	<ul style="list-style-type: none"> <li>• Libre Office / OpenOffice</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Office</li> </ul>	<ul style="list-style-type: none"> <li>• LibreOffice is community developed and has significant development partners and momentum.</li> <li>• OpenOffice is now governed by Apache, originally developed by Sun as StarOffice.</li> <li>• The Document Foundation, which develops LibreOffice is supported by companies such as Google, RedHat, and Intel.</li> <li>• LibreOffice is planning Android, iOS, and web-only cloud implementations.</li> <li>• The interoperability gap between LibreOffice/OpenOffice and Microsoft Office is continuously being narrowed.</li> </ul>	<ul style="list-style-type: none"> <li>• OpenOffice has significant use in some sectors globally including, The Guardian newspaper since 2008, 20,000 school computers in Andlaucia Spain, 20,000 desktops at Vietnam Department for Education, 80,000 PC at Extremadura Spain, French National Assembly, 70,000 desktops at the French Gendermerie, City of Vienna, 50,000 Brazil Federal desktop, Bangkok Airways, Future Publishing UK, Peugeot Citroen, Travel Republic. Reference <a href="http://bit.ly/bf0RFN">http://bit.ly/bf0RFN</a></li> <li>• IBM's corporate Symphony office suite is based on OpenOffice.</li> </ul>
<b>PDF Creation</b>	<ul style="list-style-type: none"> <li>• PDFCreator</li> </ul>	<ul style="list-style-type: none"> <li>• Adobe Acrobat</li> </ul>	<ul style="list-style-type: none"> <li>• Creation of PDFs from any Windows application that can print. Provides more control over PDF creation than alternative "print to file" solutions. Features include digital signing, PDF/A archives, merging PDFs and</li> </ul>	<ul style="list-style-type: none"> <li>• Inforworld 2008 Open Source Software award.</li> </ul>

## Open Source Software Options for Government

			encryption. Runs on terminal servers.	
<b>Media Player for Audio &amp; Videos</b>	<ul style="list-style-type: none"> <li>VLC</li> </ul>	<ul style="list-style-type: none"> <li>QuickTime, Adobe products</li> </ul>	<ul style="list-style-type: none"> <li>VLC is an established “swiss army knife” of media players with support for a very large range of audio and video formats.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Project Management</b>	<ul style="list-style-type: none"> <li>Project.net</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Project</li> </ul>	<ul style="list-style-type: none"> <li>Project.net is an enterprise scale project management application.</li> </ul>	<ul style="list-style-type: none"> <li>Project.net is listed in Gartner Magic Quadrant for IT Project and Portfolio Management Applications. Reference <a href="http://bit.ly/cX3O8w">http://bit.ly/cX3O8w</a></li> <li>Customers include FT Services, Genesys Conferencing, City of San Francisco, Trak, Penn State University. Reference <a href="http://bit.ly/uORUMi">http://bit.ly/uORUMi</a></li> </ul>
<b>Mind Mapping</b>	<ul style="list-style-type: none"> <li>Freemind, Xmind</li> </ul>	<ul style="list-style-type: none"> <li>MindMaple, MindManager, MindGenius, Visual Mind</li> <li>Microsoft Visio</li> </ul>	<ul style="list-style-type: none"> <li>Freemind and Xmind are both “mind mapping” tools, enabling the creation and editing of concept or idea maps. Further feature include exporting to PDF, HTML or document formats, and the production of project management charts.</li> </ul>	<ul style="list-style-type: none"> <li>Xmind is used by KBC, netpioneer, MIGros, Rovio, Union Investment, . Reference <a href="http://bit.ly/RVX5">http://bit.ly/RVX5</a></li> <li>Freemind testimonials are listed on the freemind website. Reference <a href="http://bit.ly/2iJyWM">http://bit.ly/2iJyWM</a></li> </ul>
<b>Email Encryption</b>	<ul style="list-style-type: none"> <li>GnuPG/GPG</li> </ul>	<ul style="list-style-type: none"> <li>Symantec / PGP Corporation products</li> </ul>	<ul style="list-style-type: none"> <li>OpenPGP based products are typically used to encrypt email communications.</li> <li>There are several</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>

## Open Source Software Options for Government

				implementations of the OpenPGP standard RFC4880. GnuPG is an open source implementation and Windows interfaces are available.
<b>Email Labelling</b>	<ul style="list-style-type: none"> <li>Outlook plugin for email labelling from The National Archives</li> </ul>	<ul style="list-style-type: none"> <li>Boldon James</li> </ul>	<ul style="list-style-type: none"> <li>Outlook plugin is developed by The National Archives</li> </ul>	<ul style="list-style-type: none"> <li>The National Archives</li> </ul>
<b>Web Browser</b>	<ul style="list-style-type: none"> <li>Firefox, Chrome/Chromium</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Internet Explorer</li> </ul>	<ul style="list-style-type: none"> <li>Firefox, which grew out of the Mozilla/Netscape efforts, became the leading browser noted for its standards compliance.</li> <li>Recently during 2011, Google's Chrome browser was measured to be on track to become the leading browser.</li> <li>Historically, Internet Explorer has been considered by many not be as standards compliant as alternative browsers. Its use of ActiveX as a mechanism has led some to consider it to have a greater attack surface. It is best practice for web developers to test against a range of browsers, with IE-only support considered bad practice.</li> </ul>	<ul style="list-style-type: none"> <li>Guardian reports that in Europe Firefox has overtaken Internet Explorer as most widely used browser. Reference <a href="http://bit.ly/fQ2hXH">http://bit.ly/fQ2hXH</a></li> <li>Department of Health uses multiple web browsers, including Firefox.</li> <li>2011 IE has only 38.9% user share, trends show Chrome will become dominant browser soon. <a href="http://bit.ly/rqnIQi">http://bit.ly/rqnIQi</a></li> </ul>
<b>Assistive Technologies</b>	<ul style="list-style-type: none"> <li>NonVisual Desktop Access (NVDA)</li> </ul>	<ul style="list-style-type: none"> <li>Dragon</li> </ul>	<ul style="list-style-type: none"> <li>Screen reader for Windows, providing feedback through synthetic speech and Braille. Supports over 20 languages. Integrates with Internet Explorer, Outlook Express, Microsoft Word</li> </ul>	<ul style="list-style-type: none"> <li>NVDA has received significant global recognition and awards. Yahoo! Uses NVDA for testing and demonstration. References</li> </ul>

## Open Source Software Options for Government

and Excel, LibreOffice and OpenOffice, Thunderbird and Firefox. Protocols supported include WAI-ARIA for web applications, Microsoft Active Accessibility.

<http://bit.ly/fJKfhg>

- The [www.gov.uk](http://www.gov.uk) beta is tested against several usability tools, including NVDA. Reference <http://bit.ly/zVAoXc>

### 13. Specialist Applications

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Statistics &amp; Data Analysis</b>	<ul style="list-style-type: none"> <li>GNU R</li> </ul>	<ul style="list-style-type: none"> <li>S/S-plus, SAS, SPSS</li> </ul>	<ul style="list-style-type: none"> <li>GNU R is the leading and mature statistics and numerical computing system. It is now the established lead in academia and increasingly in industry, displacing commercial products.</li> </ul>	<ul style="list-style-type: none"> <li>Gnu R is becoming the defacto statistical programming environment, as evidenced by subject texts and its use in universities.</li> <li>Real world examples include use by Google, Pfizer, Merck, Bank of America, Stanford University, InterContinental Hotels Group and Shell. Reference <a href="http://nyti.ms/4xpont">http://nyti.ms/4xpont</a></li> </ul>
<b>Data Mining</b>	<ul style="list-style-type: none"> <li>RapidMiner</li> </ul>	<ul style="list-style-type: none"> <li>SPSS, SAS PASW, SAS Enterprise Miner, MATLAB, Oracle DM, , Excel</li> </ul>	<ul style="list-style-type: none"> <li>Leading data mining and exploration toolkit, providing access to proven tools, such as WEKA, through a graphical user interface. Includes text mining capability.</li> </ul>	<ul style="list-style-type: none"> <li>KDnuggets leading professional newsletter for data mining sector poll shows RapidMiner as most used tool. Reference <a href="http://bit.ly/dy9XwP">http://bit.ly/dy9XwP</a></li> </ul>
<b>Audio Editing</b>	<ul style="list-style-type: none"> <li>Audacity</li> </ul>	<ul style="list-style-type: none"> <li>Wavelab, Amadeus, QuickAudio, Logic Pro, Wavestudio.</li> </ul>	<ul style="list-style-type: none"> <li>Audacity is a cross platform mature audio recording, editing, mixing and processing tool which does a few things very well. It is used by professionals, be they in film production or music teachers. Audacity is not a music</li> </ul>	<ul style="list-style-type: none"> <li>Audacity was used to process some of the audio for a feature film. It is also used in education as a cost effective audio tool. Reference <a href="http://bit.ly/cOJXSc">http://bit.ly/cOJXSc</a> and</li> </ul>



## Open Source Software Options for Government

			composition tool.	<a href="http://bit.ly/pMbk8B">http://bit.ly/pMbk8B</a>
<b>Video Editing &amp; Transcoding</b>	<ul style="list-style-type: none"> <li>• OpenShot</li> <li>• Avidemux</li> </ul>	<ul style="list-style-type: none"> <li>• Adobe GoLive, Quicktime Pro,</li> </ul>	<ul style="list-style-type: none"> <li>• Openshot is a video editor, designed to be easy to use and perform the most common functions effectively.</li> <li>• Avidemux is a powerful tool for converting between audio and video formats, with very fine control over the format and transcoding parameters.</li> </ul>	<ul style="list-style-type: none"> <li>• Both Openshot and Avidemux were used in the development phase of a programme to support a public disclosure of material led by the Home Office.</li> </ul>
<b>Image &amp; Photo Manipulation</b>	<ul style="list-style-type: none"> <li>• GIMP</li> </ul>	<ul style="list-style-type: none"> <li>• Adobe Photoshop</li> </ul>	<ul style="list-style-type: none"> <li>• GIMP is a very capable image editor and for many use cases can be used instead of proprietary software. Installers for Windows are available.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Desktop Publishing</b>	<ul style="list-style-type: none"> <li>• Scribus</li> </ul>	<ul style="list-style-type: none"> <li>• Adobe InDesign, Quark</li> </ul>	<ul style="list-style-type: none"> <li>• Scribus is a rapidly maturing and effective desktop publishing system. It is currently capable of supporting most common design and layout tasks, and can publish production quality output, including pre-flight checks.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Vector Drawing</b>	<ul style="list-style-type: none"> <li>• Inkscape</li> </ul>	<ul style="list-style-type: none"> <li>• Adobe Illustrator</li> </ul>	<ul style="list-style-type: none"> <li>• Inkscape is a rapidly maturing vector graphics design tool. It has features normally only found in the most expensive products. It is capable of producing production quality output.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Diagramming</b>	<ul style="list-style-type: none"> <li>• Dia</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Visio</li> </ul>	<ul style="list-style-type: none"> <li>• Support for open standard formats such as EPS and SVG.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

## Open Source Software Options for Government

	<ul style="list-style-type: none"> <li>• LibreOffice / OpenOffice drawing tools</li> </ul>		<p>Installers for Windows are available.</p> <ul style="list-style-type: none"> <li>• Visio diagram support is improving in LibreOffice</li> </ul>
<b>CAD</b>	<ul style="list-style-type: none"> <li>• QCad</li> </ul>	<ul style="list-style-type: none"> <li>• AutoCAD</li> </ul>	<ul style="list-style-type: none"> <li>• Simple CAD application uses AutoCAD DXF common file format. Windows installer available.</li> <li>• TBA</li> </ul>
<b>3DModelling, Rendering &amp; Animation</b>	<ul style="list-style-type: none"> <li>• Blender</li> </ul>	<ul style="list-style-type: none"> <li>• Maya</li> </ul>	<ul style="list-style-type: none"> <li>• Comparable to commercial software, used to render production quality scenes and animations.</li> <li>• Feature films have used Blender for support, animation and effects. Reference <a href="http://bit.ly/huBi3R">http://bit.ly/huBi3R</a></li> <li>• TV commercials. Reference <a href="http://bit.ly/gA5ze2">http://bit.ly/gA5ze2</a></li> </ul>

## 14. Education & Library

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Course Management</b>	<ul style="list-style-type: none"> <li>Moodle</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Learning management system for course creators and administrators. Very successful in the academic sector, it is designed to be extensible, and has an active ecosystem of contributors.</li> </ul>	<ul style="list-style-type: none"> <li>Moodle has significant use in the education sector, including Open University, Australian National University, London School of Economics. April 2012 Moodle has a user-base of approx 66,000 registered active sites with 58 million users in 6 million courses in 215 countries and in more than 75 languages. The UK Open University is the thrid largest deployment for 840,000 users and 7000 courses. Reference <a href="http://bit.ly/gXRiAV">http://bit.ly/gXRiAV</a> and <a href="http://bit.ly/JBndAm">http://bit.ly/JBndAm</a></li> </ul>
<b>Integrated Library Management</b>	<ul style="list-style-type: none"> <li>Koha</li> </ul>	<ul style="list-style-type: none"> <li>SirsiDynix, Symphony, Unicorn, ExLibris, Talis</li> </ul>	<ul style="list-style-type: none"> <li>Koha is establishing itself as the leading open source library management system. It is entirely web based, making integration relatively simple, and cloud solutions exist. It supports common library management standards.</li> </ul>	<ul style="list-style-type: none"> <li>Significant global use of Koha including many European libraries. UK examples of various kinds of library include management consultancy Booz and Co, Race Equality Foundation, Royal Pharmesutical Society of Great Britain, Tavistock Hospital, The National Archives, The Kings Fund. Significant use on Spain,</li> </ul>

## Open Source Software Options for Government

Germany, Italy, Sweden,  
France, and many examples  
in the USA. Reference  
<http://bit.ly/kPK92g>

## 15. Health

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>Patient Records</b>	<ul style="list-style-type: none"> <li>VistA</li> </ul>	<ul style="list-style-type: none"> <li>Commercial products</li> </ul>	<ul style="list-style-type: none"> <li>VistA is a health information system centred around health records. It is used extensively in the US Department of Veterans Affairs. It consists of approximately 160 modules covering clinical care, financial functions, and infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>VistA is used by the Veterans Health Association, which manages the largest medical system in the USA. This covers over 8 million veterans, 180,000 medical personnel operating 163 hospitals, over 800 clinics, and 135 nursing homes throughout the USA. Nearly half of all U.S. hospitals that have a complete enterprise-wide implementation of an electronic health record system are VA hospitals using VistA. VistA is also used by the World Health Organisation, and in countries such as Mexico, Finland, Germany, Nigeria, India, Brazil, and Denmark. Reference <a href="http://bit.ly/aNmMd">http://bit.ly/aNmMd</a></li> </ul>

## 16. Service Management

Sector	Software	Consider as Alternative to	Comments	Real World Use
<b>IT Service Management</b>	<ul style="list-style-type: none"> <li>OTRS ITSM</li> </ul>	<ul style="list-style-type: none"> <li>Remedy</li> </ul>	<ul style="list-style-type: none"> <li>OTRS ITSM is the leading open source helpdesk and service management solution. It aligns to the ITIL model for service management.</li> <li>It is the only open source solution PinkVERIFY certified as ITIL v3 compliant.</li> <li>Includes change request and SLA management, self service, dashboards and impact reporting.</li> </ul>	<ul style="list-style-type: none"> <li>100,000 deployments include Philips, NASA, CSC, Lufthansa, Fujitsu, Nokia, Deutsche Post, Boeing, Virgin Australia, New York State Department of Civil Service, German Office for Information Security (similar to UK CESG), . Reference <a href="http://bit.ly/17QcZh">http://bit.ly/17QcZh</a></li> </ul>
<b>File Audit</b>	<ul style="list-style-type: none"> <li>DROID</li> </ul>	<ul style="list-style-type: none"> <li>No commercial analogue</li> </ul>	<ul style="list-style-type: none"> <li>TNA developed for Digital Continuity Programme, DROID inventories and analyses files held by an organisation by intrinsic pattern analysis. NO known commercial competitor.</li> </ul>	<ul style="list-style-type: none"> <li>The National Archives</li> </ul>

## 17. Agile Development & Project Management

Sector	Software	Consider as Alternative to	Comments	Real World Use
General	<ul style="list-style-type: none"> <li>trac</li> </ul>	<ul style="list-style-type: none"> <li>JIRA</li> <li>Microsoft Project</li> </ul>	<ul style="list-style-type: none"> <li>Trac offers several development functions, of which project management (roadmap, milestones) and issue or ticket tracking are key. Other features include integration with version management systems and reporting. Online trac supported projects are recognised by their common function bars showing wiki, timeline, roadmap, browse source, view tickets, new ticket and search functions.</li> </ul>	<ul style="list-style-type: none"> <li>trac is used in the development of significant software as varied as the lading blog engine Wordpress, leading macports, GRASS GIS software, to the Haiku OS. Organisations include NASA, Oxford University, Nokia, Qype, . Reference <a href="http://bit.ly/aVSyI8">http://bit.ly/aVSyI8</a></li> </ul>
Bug Tracking	<ul style="list-style-type: none"> <li>Bugzilla</li> </ul>	<ul style="list-style-type: none"> <li>JIRA</li> </ul>	<ul style="list-style-type: none"> <li>Long established web based bug tracking system, open sourced in 1998 and actively developed since then.</li> <li>Bugzilla is focussed on software defect tracking, and not as general purpose issue ticket tracking or project management tool. Used by many projects and over many years, it has refined to support an established defect and feature request tacking workflow, including assignment of new items.</li> </ul>	<ul style="list-style-type: none"> <li>Bugzilla is extensively used globally, and is established over a decade. Notable users include RedHat for their enterprise products, Novell, NASA, Facebook, Akami, Nokia, NYTimes, Yahoo, EMC, Motorola. The Bugzilla site lists over 1000 organisations.. Reference <a href="http://bit.ly/bWszW">http://bit.ly/bWszW</a></li> </ul>