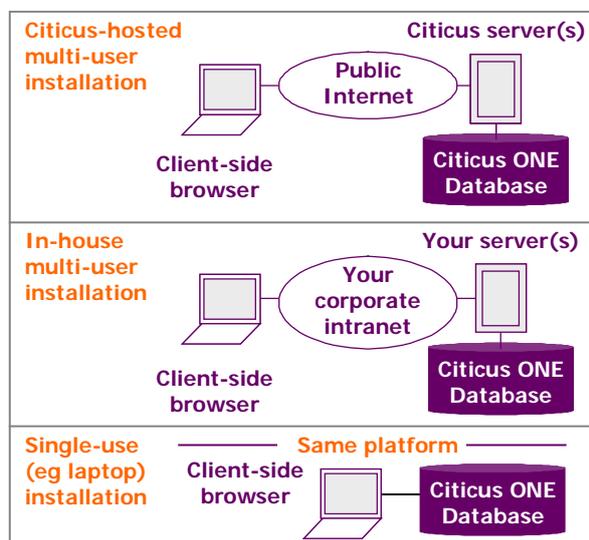


Citicus ONE Release 4.1 technicalities

Deployment options

Citicus™ ONE is designed to run on one or more servers with users gaining access to its capabilities using their browsers via their corporate intranet or the Internet. Its three main deployment options are illustrated below.



Citicus-hosted multi-user installations

Citicus provide access to **Citicus ONE** via two hosted services. Customers of our **standard hosted service** are allocated a dedicated application environment with its own web site and database, running on a shared server. This enables strict separation between customers. A **premium hosted service** is also available to meet particular hosting requirements such as VPN access, directory integration and transaction performance monitoring. Each customer's service runs on dedicated equipment.

In both cases, two implementations are maintained for each customer: one for 'live' running and a second for training, demonstrations and inspecting upgrades.

These implementations are protected as follows:

- they run on servers in dedicated Citicus cabinets located in a major data centre with excellent physical security, resilient power and fast, reliable Internet connectivity
- 24x7 end-to-end application and server monitoring
- data is backed-up within a well-organised back-up cycle (back-ups are taken daily and stored off-site)
- servers are updated promptly with Microsoft® service packs and critical updates
- servers are protected by hardware-based firewalls, intrusion detection and anti-virus technology
- communications are protected with SSL supporting a minimum of 128-bit encryption
- continuity arrangements are capable of restoring service within 24 hours should our servers be unavailable.

In other respects we aim to comply with the Information Security Forum's Standard of good practice.

In-house multi-user installations

Citicus ONE software has two tiers:

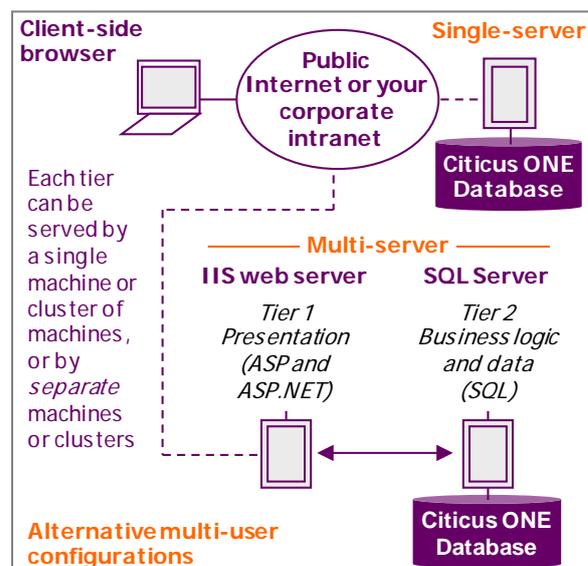
- **Tier 1: Presentation**, written as Microsoft® Active Server Pages (ASP.NET with some legacy ASP), presented by Microsoft Internet Information Services (IIS) in HTML
- **Tier 2: Business logic and data** maintained by a Microsoft SQL Server® database.

Note : JScript™ is employed in Tier 1 but no Java™ applet, ActiveX® control or similar is downloaded to users' machines.

Its tiered architecture means that **Citicus ONE** can be installed on a server or servers connected to your corporate intranet in a way that suits your enterprise's IT infrastructure.

Both tiers can run on the same machine (or cluster of machines) or **Citicus ONE** can be installed such that each tier is served by a separate machine or cluster.

Its single-server and multi-server configurations are illustrated below.



Single-user installations

In single-user installations, both the client-side browser and server-side application run on the same machine (eg a laptop or desktop computer).

Such installations can be useful for running risk workshops and training courses and for demonstrating **Citicus ONE** in rooms with no network connection.

Note however that no integration is provided between single-user (or any other) installations of **Citicus ONE**.

Client-side software requirements

Citicus ONE is optimized for use via Microsoft® Internet Explorer® versions 8 to 11. It also supports use via Mozilla® Firefox® and Google® Chrome™.

To see results at their best, Adobe® Reader® 9.0 or later is required. This is available free from Adobe Systems, Inc. Microsoft Excel® 2007 or equivalent is also required to support certain **Citicus ONE** import and export facilities.

Note: Data can also be exchanged with other applications on-line via a defined web service.

Server-side software requirements

To support access by multiple users, **Citicus ONE** Release 4.1 requires one of the following combinations of system software.

Windows Server® 2008 or 2008 R2

- Microsoft Internet Information Service (IIS)
- Microsoft SQL Server® 2005, 2008, 2008 R2 or 2012
- Microsoft .NET Framework 4.5 (or 4.0 with a hot fix)

Windows Server 2012

- Microsoft Internet Information Service (IIS)
- Microsoft SQL Server 2005, 2008, 2008 R2 or 2012
- Microsoft .NET Framework 4.5.

Citicus ONE Release 4.1 will also run successfully on a desktop or laptop computer with the following combinations of system software.

Windows® 7 or Windows 8

- Microsoft Internet Information Service (IIS)
- Microsoft SQL Server 2005, 2008, 2008 R2 or 2012 Express with Advanced Services (these free editions can be downloaded from Microsoft)
- Microsoft .NET Framework 4.5 (or 4.0 with a hot fix)

Citicus recommends that Microsoft's latest service packs and critical updates are applied in each case.

Required disk space

Citicus ONE requires two areas of disk space. First, there is the area required by the *CiticusONE* folder in the Windows **Program Files** directory (or equivalent). For **Citicus ONE** Release 4.1, this amounts to 2.5 GB for the first instance plus a further 250 MB for each additional instance.

Secondly, there is the disk space is required for the SQL Server database maintained by **Citicus ONE**. This requires a minimum of 550 MB. Its actual size is determined by the:

- number of evaluations completed
- length of each basis of evaluation employed
- documents uploaded to the database
- number and size of database snapshots taken
- space devoted to the system's audit log.

As a guide, a database supporting 2,500 evaluations might require 3-5 GB.

Server-side hardware requirements

Sample hardware configurations for **Citicus ONE** are set out below. See *Installation Guide* for full details.

Simple multi-user server capable of handling around 1,000 evaluations and 100 users, with low concurrent use

- Dell® PowerEdge® R620 with 2 x Intel® Xeon® E5-2609 Quad-Core® 2.4GHz processors, or equivalent
- 16GB RAM
- 4 x 300 GB 10,000 rpm hard drives (RAID10).

Multi-server configuration supporting larger-scale implementations

Tier 1 IIS Web server	Multi-core CPU(s) running at 2.4GHz or faster (eg Dell PowerEdge R620 with 2 x Intel Xeon E5-2609 Quad-Core 2.4GHz processors)
	8 GB RAM
	2 x 300 GB 10,000 rpm hard drives (RAID1).
Tier 2 SQL server	Multi-core CPU(s) running at 2.5GHz or faster (eg Dell PowerEdge R720 with 2 x Intel Xeon E5-2640 2.5GHz 6-Core processors)
	32 GB RAM
	4 x 300 GB 15,000 rpm hard drives (RAID10).

Recommended desktop/laptop configuration

- Processor capable of supporting smooth multi-tasking of **Citicus ONE**, Microsoft SQL Server, Adobe Reader, Microsoft Excel and email (eg 2.33 GHz Intel Core i3)
- 4 GB RAM (Windows 7) or 6 GB RAM (Windows 8)
- Hard drive with at least 5 GB available.

User administration and authentication

Citicus ONE implements a role-based access model.

All aspects of user authentication and administration can be carried out by the application, along with assignment of users' individual roles. Four other methods of user administration and authentication are supported, namely:

- **Windows integrated authentication:** whereby users are authenticated by their Windows domains.
- **LDAP directory authentication and/or administration:** whereby user administration and/or authentication is conducted **in conjunction with an external directory** (eg Active Directory®) via LDAP.
- **CA® SiteMinder®:** whereby users are authenticated by SiteMinder.
- **Simplified sign-on:** where users gain access via a portal (eg a SharePoint® portal).

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