Thinfinity®
VirtualUI™

Web-Enabling Solution for Windows Desktop Applications

White Paper

1. Introduction

Thinfinity® VirtualUI™ offers a GUI remoting solution for in-house Windows desktop developments, allowing them to be delivered as Windows/HTML5 dual-platform applications simply by adding one line of code.

These Windows applications can keep their standard desktop environment behavior and, alternatively, be accessed remotely from any modern web browser in a multi-user, multi-instance fashion when hosted on a Thinfinity VirtualUI Server environment.

VirtualUI's web-enabling method allows developers to web-publish their own desktop applications in a matter of minutes. Using the Thinfinity VirtualUI library, it can be as simple as adding one line to your existing source code to have a virtualized GUI available through any current Web browser.

With a little additional development work, it is fairly easy for developers to enhance their existing applications with new Web-based features. By using the Thinfinity VirtualUI's Javascript Remote Objects (jsRO) framework, they can integrate multimedia resources and online data such as weather forecasts, updated stock market news, etc., adding value and making their current application a more media-rich experience for users on the Web.

The traditional desktop-to-Web transitioning process required a large investment of time and money, and the need to perform a great amount of recoding. This has forced many companies and developers to put this costly transition on hold. However, this also means they are missing out on untold numbers of potential users—users who have moved away from Windows desktops to IPad®s and other such devices.

Web-enabling their applications, developers will have the control needed to shift to the Cloud model. Thinfinity VirtualUI makes it possible to better serve their current customers, increase the user base and generate new revenue.

Many developers may want to keep their desktop platform while also moving to the Web. Having two platforms, Windows/Browser does not have to equal twice the work. With Thinfinity VirtualUI there is no need to maintain multiple source code versions.

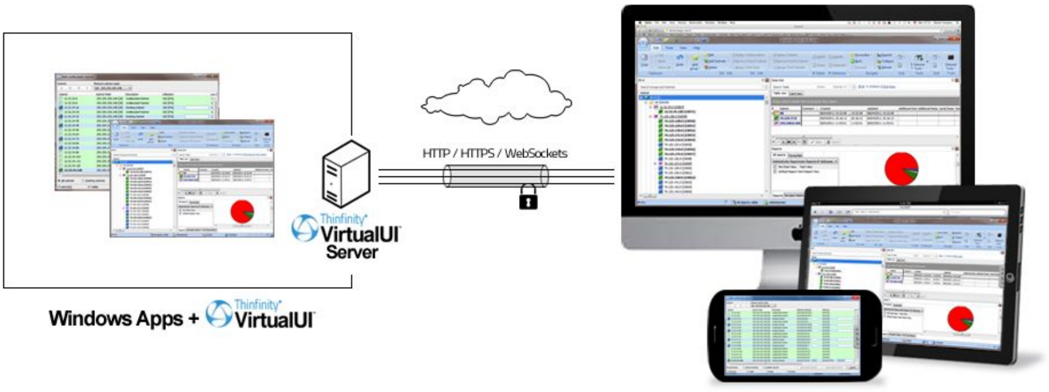
The additional Thinfinity VirtualUI code will not affect the running of the app in the Window's environment. It dramatically reduces the total cost of ownership (TCO) by slashing IT costs and simplifying administration.

Thinfinity VirtualUI is an affordable solution, it lowers the cost of entry to make it an inexpensive solution for the individual developer while still being a scalable solution for large software companies.

With several End-User Authentication methods and Registry and File Transfer Virtualization, VirtualUI achieves a virtualization and integration level that is unique in its kind.

With Thinfinity VirtualUI you can:

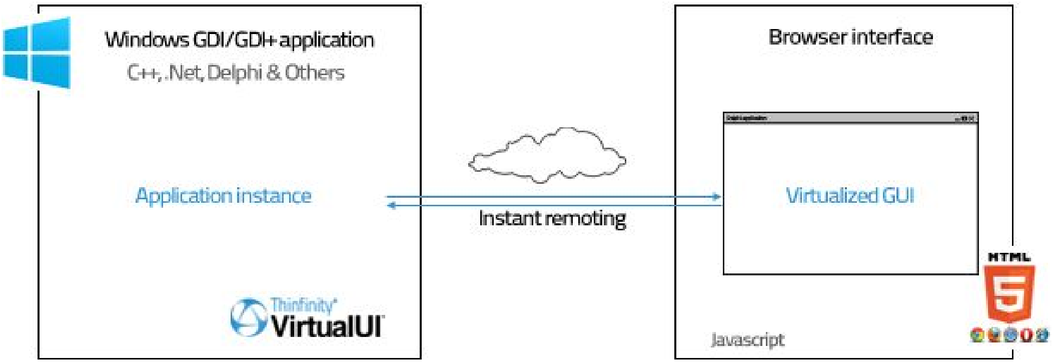
- Instantly transform applications built in .Net (Winforms and WPF), Delphi, Visual C++, Visual Basic and others into dual-platform Windows/HTML5 Apps.
- Enable full Windows-to-Web integration, by adding two-way interaction between the Windows application and the web page.
- Easily and instantaneously deliver applications as cross-browser, cross-device web apps.
- Publish all or only part of the Win32/Win64 app front end.
- Immediately upgrade and modernize Windows applications.
- Expand application availability to reach a wider user base.
- Deliver your software to customers as a managed service in the cloud.
- Dramatically reduce the Total cost of ownership (TCO), by slashing IT costs and simplifying administration.


Thinfinity VirtualUI Server
HTTP / HTTPS / WebSockets
Windows Apps + Thinfinity VirtualUI

2. Technology

2.1 Instant Web Enabling

Simply by adding the Thinfinity VirtualUI library to the source project and then typing in a single line of code, in-house applications are available for instant remoting from any modern web browser, on any OS and device.

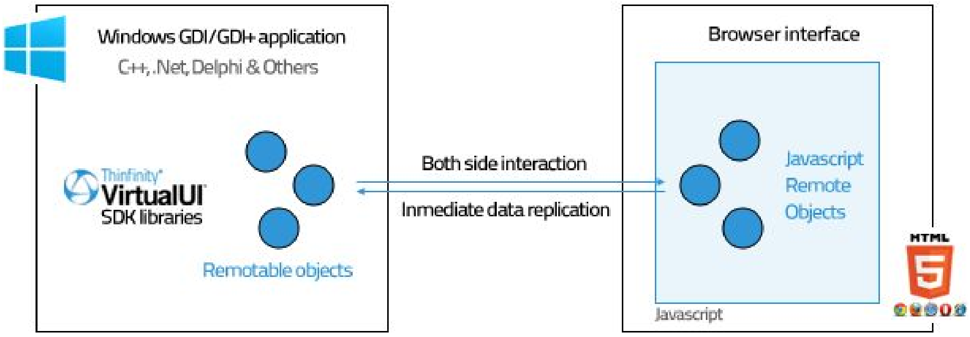


While the application instance runs in a Thinfinity VirtualUI Server, the virtualized GUI is shown in the web browser, connected through WebSockets with a fallback to AJAX.

2.2 Windows-to-Web Integration

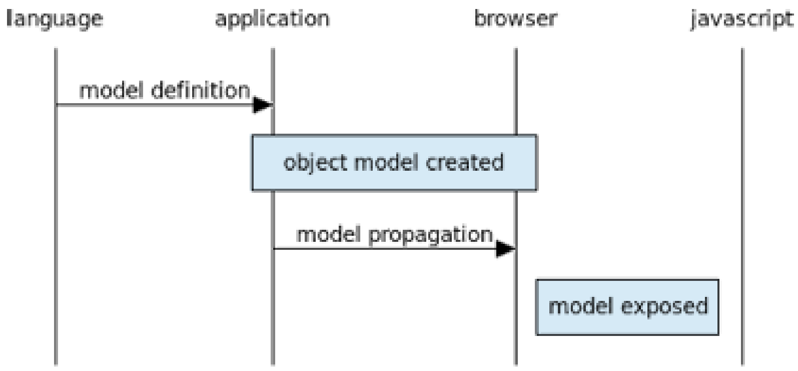
Thinfinity VirtualUI paves the way to bidirectional integration between the Windows-based apps and Internet resources by blending the application with the web environment.

Thinfinity VirtualUI allows your desktop application to be reshaped into a completely tailor-made one, permitting you to expose application data to the browser side and vice-versa, and combining the application with available web and multimedia resources.


Windows GDI/GDI+ application
C++, .Net, Delphi & Others
Thinfinity VirtualUI
SDK libraries
Remotable objects
Both side interaction
Inmediate data replication
Browser interface
Javascript Remote Objects
Javascript
HTML 5

The interaction between the application and the web page is achieved by using the new Javascript Remote Objects framework (jsRO), conceived by Cybele Software's development team, which allows for a seamless interaction of the desktop app with resources available in the cloud.

The jsRO framework allows you to create remotable server objects, with their properties, methods, and events propagated to the web as native Javascript objects, enabling both-side interaction and immediate data replication.



2.3. Support for External Authentication

Thinfinity VirtualUI includes an enhanced authentication scheme that broadens the horizon of end-user identification and application access protection. This authentication scheme also enables guest access to the applications, allowing for the combination of authenticated and anonymous access.

Developers can select how end-users will access their applications, via one or more of these methods: Windows Logon, OAuth/2 (Google, Facebook, etc), RADIUS and/or a Custom Authentication method implemented by them with the Thinfinity Authentication API.

2.4. Virtualization Features

The File System Virtualization helps developers to create a secure environment by exposing only relevant application folders and providing private folders based on the application's authentication system (usually database driven).

With a similar approach, Registry Virtualization allows developers to store user information in the Windows Registry in a controlled and isolated way. Registry entries can now be redirected to shared or private entries, also based on the application's authentication system.

2.5. Architecture

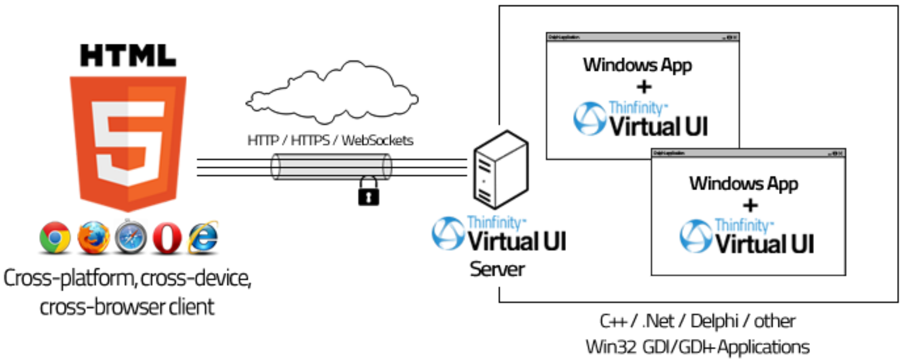
Thinfinity VirtualUI is composed of:

VirtualUI Server

The VirtualUI Server is an HTTP(s)/WebSockets server that communicates with the Windows app through the VirtualUI SDK libraries, taking the GDI/GDI+/DirectX redirection commands to the web browser.

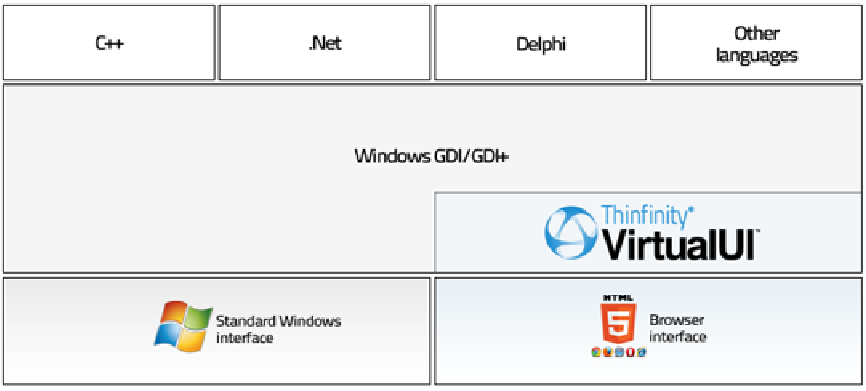
VirtualUI Client

The VirtualUI Javascript/HTML5 Client is responsible for the actual drawing on the web-browser canvas and interacting with the end-user mouse and keyboard events.


HTML
Cross-platform, cross-device, cross-browser client
HTTP / HTTPS / WebSockets
Thinfinity Virtual UI Server
Windows App + Thinfinity Virtual UI
Windows App + Thinfinity Virtual UI
C++ / .Net / Delphi / other Win32 GDI/GDI+ Applications

VirtualUI SDK

The VirtualUI SDK is a set of libraries that plugs into the developer's programming framework to redirect Windows calls and drawing commands to the remote HTML5 canvas. It also provides an object remoting framework (jsRO) devised to ease the integration between the Windows application and the Web.

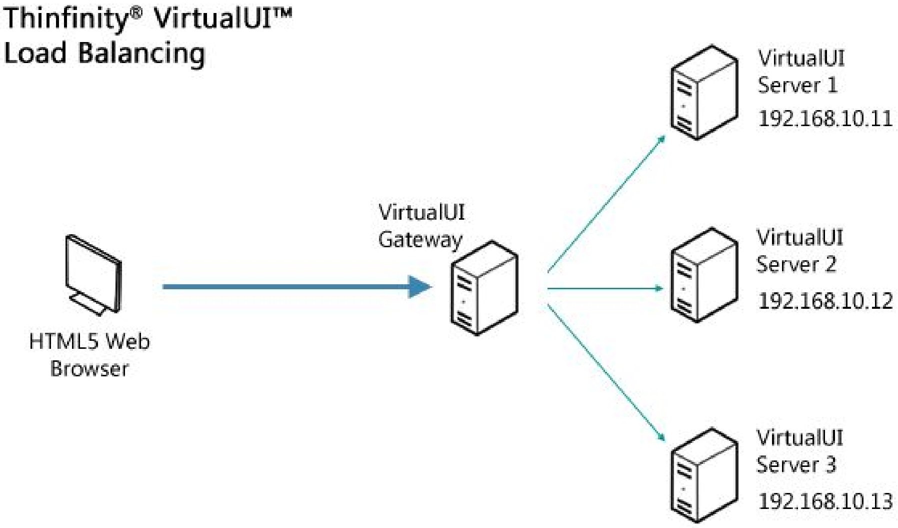


VirtualUI Gateway

The VirtualUI Gateway service makes possible the redirection of HTTP and WebSockets traffic to VirtualUI Servers.

VirtualUI Broker

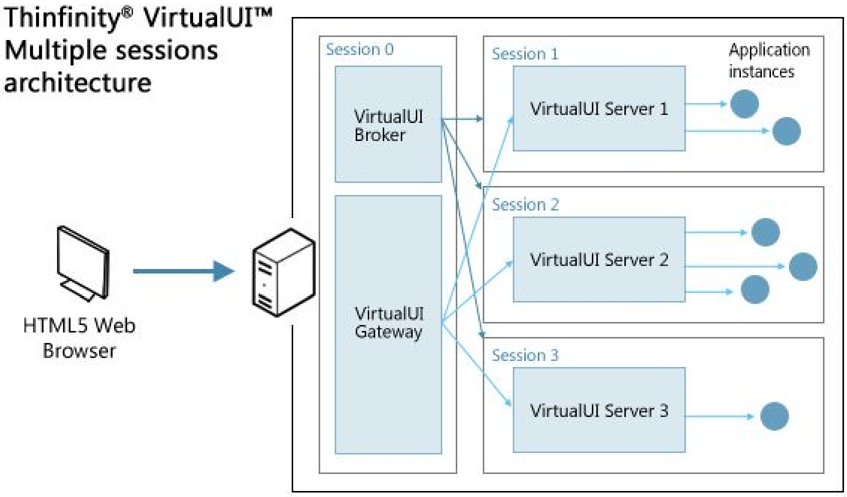
The VirtualUI Broker service is responsible for opening new Windows sessions when needed. Also, this service will keep a balanced load between all open sessions.



2.4 Scalability

Thinfinity VirtualUI complements its architecture with two components designed to ensure scalability and fault-tolerance in different scenarios, supporting multiple RDS sessions and/or load balancing using multiple servers.

The **VirtualUI Gateway Service** makes possible the redirection of HTTP and WebSockets traffic to **VirtualUI Servers**, and the **VirtualUI Broker Service** keeps the load balanced across servers.



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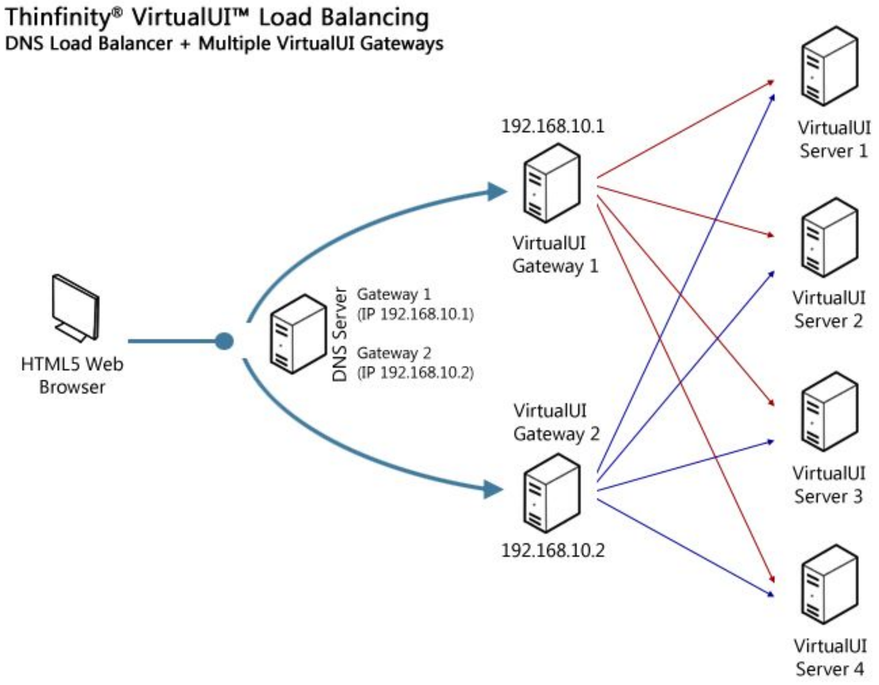
These modules provide access to VirtualUI applications in three ways:

- Server instances running in different RDS sessions on the same machine.
- Balanced access to different physical servers.
- The previous two can also be combined to make the most out of your environment.



3. Requirements

These are the requirements for each component of the Thinfinity VirtualUI architecture:

- **Development machine**
    - **Operating Systems:**
        - Microsoft Windows 7 32bit / 64bit
        - Microsoft Windows 8 32bit / 64bit
        - Microsoft Windows 10 32bit / 64bit
        - Microsoft Windows Server 2012
    - **Development environment**
        - Microsoft Visual Studio
        - Delphi 5 to RAD Studio 10.1 “Berlin”
        - C++ Builder
        - Microsoft Visual Basic
        - Microsoft Visual FoxPro
        - PowerBuilder
        - other
    - **The application can use .NET WPF, GDI, GDI+ and limited DirectX calls.**

- **Server machine**
  - Microsoft Windows 8 32bit / 64bit
  - Microsoft Windows 10 32bit / 64bit
  - Microsoft Windows Server 2012
- **Gateway machine**
  - Microsoft Windows 8 32bit / 64bit
  - Microsoft Windows 10 32bit / 64bit
  - Microsoft Windows Server 2012
- **End-user client**
  - Any machine or portable device with an HTML5-compliant Web Browser such as IE10/11, Edge, Chrome, Safari, Firefox, Opera, etc.

4. Conclusion

Thinfinity VirtualUI allows developers to:

- Create dual-platform Windows/HTML5 applications effortlessly, by adding only one line of code to their existing projects built in .Net (WinForms or WPF), Delphi, Visual C++, and others.
- Fully integrate their Windows application into a web application using the *Javascript Remote Objects (jsRO)* framework included in Thinfinity VirtualUI.
- Expose application data to the browser side and vice versa, adding interaction between the application and the web page.
- Expand applications' availability by delivering them normally on a Windows environment, or by installing them on a Thinfinity VirtualUI Server environment to be accessed remotely from any HTML5-compliant Web browser.
- Instantly upgrade and modernize Windows-based applications.
- Dramatically reduce the total cost of ownership (TCO) by slashing IT costs and simplifying administration, avoiding costly virtualization/remoting solutions.

Complete Reference:
Find the complete **Thinfinity® VirtualUI™** reference in the following pages:

- Product Page
- Live Demo
- Tutorials
- Tech Support