
stoneware, inc.

Stoneware™ Inc.

webNetwork Whitepaper

Stoneware, Inc.

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Related Product: webNetwork

Introduction

For the past 10 years Stoneware, Inc. has been solely focused on one core belief; the data center and the services within it will be delivered via web technologies.

This fundamental belief and the technology that has been created in the pursuit of this vision has allowed Stoneware to go one step further by redefining the desktop in web technologies.

To state it simply, *Stoneware provides web-enabled delivery of the data center through a desktop built in a browser.* It is a new computing model built for a dynamically evolving computing environment driven by three key market trends:

- Web 2.0

Over the past few years, organizations have been steadily switching out their enterprise Windows applications with their web-based counterparts. The transition to enterprise web applications has been based on the desire to reduce client-side software distribution, increase scalability, and support a broader set of desktop operating systems (Windows, Linux, Mac, etc.). Today there are tens of thousands of web-based applications spanning both vertical and horizontal markets. In addition, these applications are being deployed both internally within the data center and externally as a service (SaaS - Software as a Service).

- Cloud

Ask a vendor or industry expert what “cloud” means and you are likely to get a million different answers. However, the term cloud best describes the rapidly growing trend to collapse applications, data, and services into the data center. This trend is a reversal from the last 20 years of decentralized, client computing where the desktop stored both applications and data. After billions of dollars and thousands of lives, client-side computing has proved to be unsustainable in an enterprise computing environment. Cloud is the transition to a centralized computing model where applications and data can be centrally managed, stored, and provisioned for the purpose of reducing costs and improving security.

- Device

Perhaps nothing will change the IT landscape more than the increasing number of sub-notebook devices that are being introduced by hardware vendors. These devices (e.g. – iPads, slates, netbooks, smartphones, etc.) are extremely popular and making their way into the hands of enterprise users. These are mobile, personal, and running a variety of underlying operating systems. It is these products that create a new category of products known as the “unmanaged” device. They create new challenges for IT in delivering both enterprise applications and services.

The factors listed above all underscore why we will see the biggest shift in Information Technology since the transition from mainframe to personal computer. The applications and data will be collapsed back into the data center and the browser will become the new “dumb” terminal. This shift will allow IT to scale services, reduce costs, and eliminate desktop management. Stoneware’s webNetwork has been designed from inception to create this new computing environment. Stoneware’s webNetwork software enables the move from a client-centric desktop model to a centralized cloud computing model where the browser becomes the

Brief:

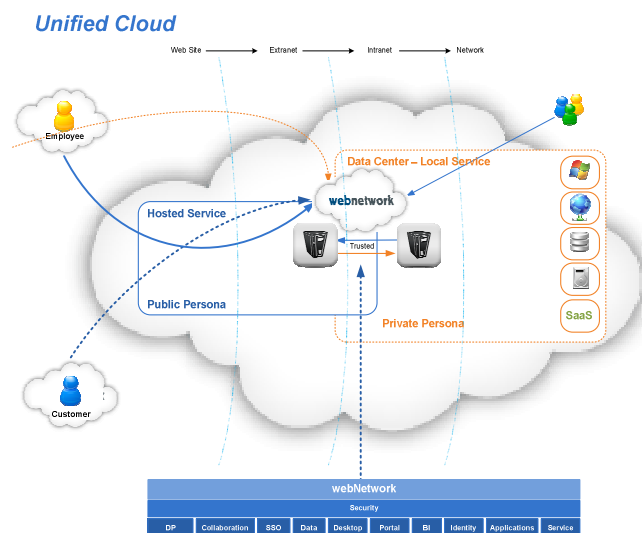
This document is a whitepaper describing how Stoneware’s webNetwork provides web-enabled delivery of the data center through a desktop built in a browser.

desktop and applications and services are provisioned from the data center. This white paper discusses the key elements of the transition and how any organization can begin to walk or run to this new computing model.

Public or Private?

The question of private or public cloud computing is not an “either / or” question. Private and public cloud computing mostly describes physical location; in the data center located on premise or at a remote third party site. For the customer, it will most likely be a combination of both. There will be applications and services that will always remain within the corporate data center while other applications (based on cost, etc.) will be hosted by offsite, third party vendors.

The real challenge for IT is not to decide between private or public cloud; instead it is to figure out how to bring these two worlds together, thus hiding the issues of complexity, integration, and physical location from the end user.



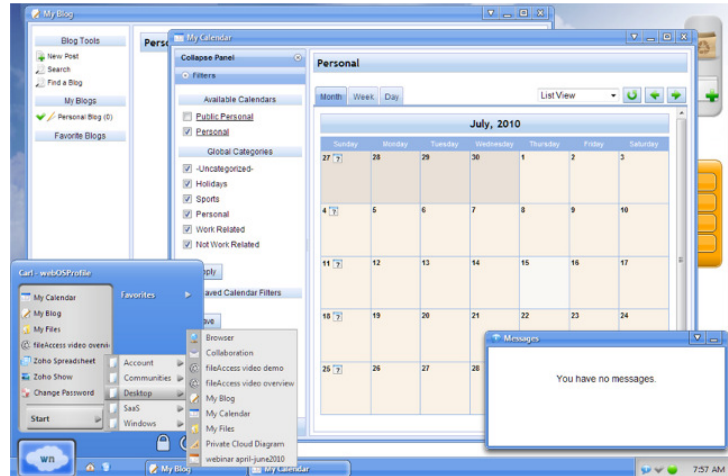
webNetwork software creates a unified cloud platform where both private and public applications and services can be deployed in a single virtual web desktop available from any web browser. Organizations easily can publish their local applications (Web and Windows) along with their network file systems, databases, and collaborative systems into the webNetwork private cloud platform. In addition, they can publish the growing number of hosted applications such as Google Docs, Office Live, Salesforce.com, Zoho, etc. into the same cloud environment. Authentication, single sign-on, security, management, provisioning, presentation, and integration are all configured through Stoneware’s webNetwork software.

The Desktop

Probably the most difficult concept for people to grasp when discussing Stoneware's cloud technology is that the desktop accessed via the cloud is "built in the browser". It is not a Windows desktop. It is not a remote control session of a Windows desktop located in the data center. It is a true desktop built on web technologies (e.g. – Ajax, Comet, etc.).

So why not have Windows running everywhere? Why won't Windows be the desktop of cloud computing?

The answer is simple. While the Windows operating system is certainly the most widely used operating system on the planet, only the web browser is more universal. The web browser is found on almost every device. *Many of the devices that are being manufactured and sold at an unbelievable pace (iPhones, iPads, slates, netbooks, smartphones, Blackpads, etc.) do not have Windows; but they all have a browser.* So the browser becomes the "common denominator" between all devices - the "dumb" terminal so to speak. It is the browser where enterprise IT will focus its delivery of applications and services. Understanding this and that the transition to web-based applications is well underway in many organizations, makes the browser the perfect platform to redefine the desktop.



The Stoneware webOS desktop has many of the features of a traditional desktop: menus, taskbars, desktop icons, custom settings, shortcuts, system tray, etc. The desktop runs in all of the popular web browsers including Firefox, IE, Safari, Opera, and Chrome. Just like a real desktop, IT personnel can control the desktop's services, presentation, and features. The benefits of a web-enabled desktop are significant:

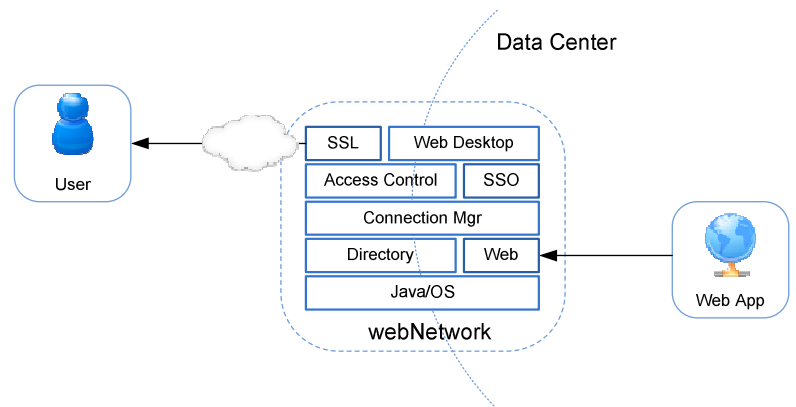
- Support a broad range of devices. Desktops, laptops, netbooks, iPads, iPhones, smartphones, Droids, Palms, slates, Blackberries, etc.
- Deliver IT applications and services anywhere there is a device with an Internet connection and web browser.
- Eliminate desktop management. Allow the device to remain personal while enterprise services and applications remain securely in the data center and accessed via the webNetwork cloud.
- Control backend hardware costs by leveraging the scalability of web technologies. A single processor server with a 32-bit operating system can support over 1,500 concurrent web desktop users.
- Significantly reduce costs by delivering Stoneware's web-enabled desktop. The cost of a web-enabled desktop is typically one-tenth of the cost of a traditional VDI solution.

Applications

The goal of Stoneware's cloud technology is to aggregate both enterprise applications and services to users that are accessing the system via a web browser. For many organizations, application access is a key element of their cloud computing strategy. Stoneware categorizes application access into three main areas:

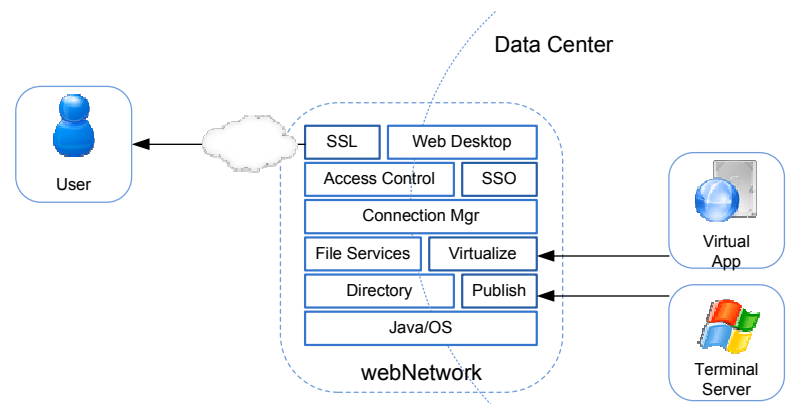
- Internally Hosted Web Applications

These are web applications that have been developed "in-house" or by third party application vendors that run over the HTTP/HTTPS protocol. These applications are hosted inside the data center and can be natively delivered into the user's web desktop through webNetwork's Connection Manager Service. Provisioning, security, single sign-on, and encryption are all managed by the webNetwork system. Most all of the web applications and portals on the market today can be easily configured and deployed via the webNetwork private cloud in just a matter of minutes.



- Windows Applications

While Stoneware's vision for cloud computing is based on web technologies, it is important that webNetwork can integrate existing Windows applications to provide a migration path to true web-based cloud computing. The integration of Windows applications into the webNetwork system is accomplished in using one of two common methods:



- Publishing

This is a process by which a Windows application is remotely delivered from a terminal server running inside the data center. Keyboard strokes and mouse movements are sent to a window inside the user's web desktop via a browser-based RDP (Remote Desktop Protocol - webRDP) client. Just like web applications, application services such as provisioning, security, encryption, and single sign-on are all managed by the webNetwork system. This method of Windows integration will integrate a large majority of applications found inside the enterprise.

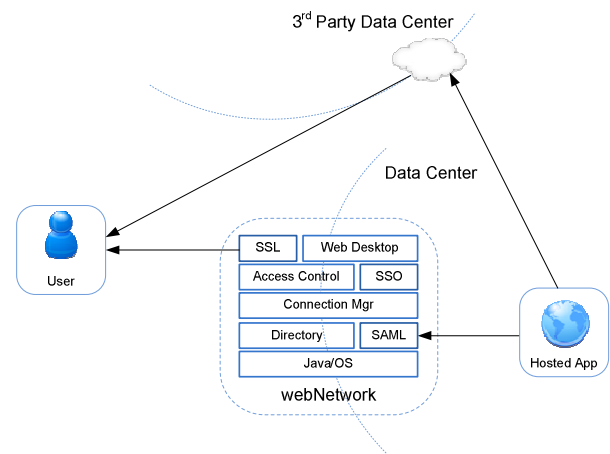
- Application Virtualization

Application virtualization is a method of deploying Windows client-side software in which the application is typically bundled in a single executable and deployed

dynamically to a remote client. The benefits of this deployment strategy include the ability for the local device to process the application (e.g. – Video, memory, etc.). When the user is done accessing the application, it will often be removed from the device or possibly cached for later use. Single sign-on, provisioning, security, and encryption will all be managed by the webNetwork system when this deployment method is used.

- Externally Hosted Web Applications (SaaS – Software as a Service)

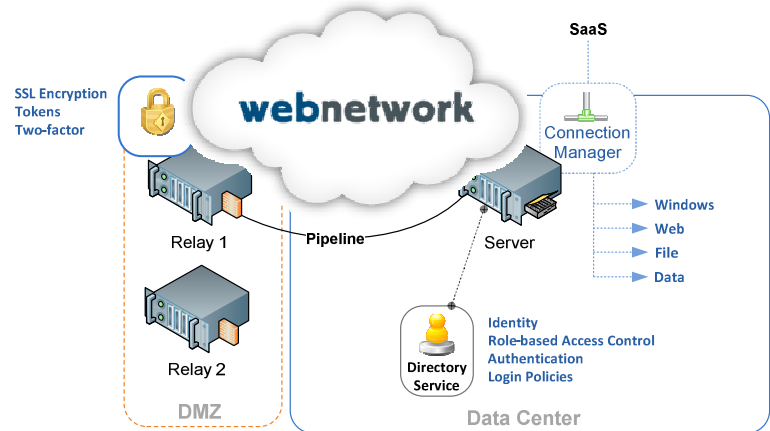
Externally hosted web applications are the fastest growing category of application being deployed by the enterprise. These applications are typically hosted by 3rd parties at an off-site data center and purchased in a subscription model. From an IT perspective, these applications must be integrated into a common desktop just like any other enterprise application. The ability for IT to control access and security to these applications is critical. In addition, unifying the hosted application into a common desktop simplifies access and reduces confusion for the end user. Technologies such as SAML, Delegated Authentication, MS Live, and Form Authentication create a trusted connection between the hosted application and the webNetwork system. This provides the user with seamless and secure web desktop integration.



Security

Stoneware's unique two-tier, Server/Relay architecture is unmatched in the industry. It allows for the delivery of services and applications to be moved back into the data center while isolating the users safely inside the DMZ. The architecture provides a wide range of security and authentication services to guarantee that applications and digital resources integrated into the private cloud are protected at all times.

In the diagram to the right, the webNetwork Server is placed inside the data center to communicate with applications, databases, and internal network file systems. The webNetwork Relay is placed within the DMZ to communicate between the end users and the webNetwork Server over a communication channel known as the Pipeline service. As a result, new applications and services introduced into the cloud do not require additional changes to internal firewalls or the DMZ. Services such as two-factor authentication, encryption, and tokens are off-loaded at the webNetwork Relay to provide both security and scalability to the system. All of these features are configured, managed, and controlled through the directory service connection made by the webNetwork Server. Further detail on each service is provided below:



- **SSL Encryption**

webNetwork will encrypt all communication between the user and the system in SSL. This creates one common IP address and one secure port for all communications.

- **Pipeline Service**

A unique two-tier technology that creates a single connection between the DMZ and internal data center to communicate with internal applications and services.

- **Two-factor Authentication**

Supports various types of secondary authentication methods for improved authentication security

- USB (e.g. - USB Keys, thumb drives, etc.)
- Secure Tokens (SecurID, ActivCard, etc.)
- Directory Attributes (e.g. - workforce ID, employee number, etc.)

- **Desktop Authentication**

Designed to simplify user access to the webNetwork system in an Intranet setting. Desktop Authentication allows users to automatically authenticate from their workstation directly into the webNetwork system without prompting for user credentials. With Desktop Authentication, users can seamlessly access internal applications, service, and content without continuously authenticating to the system.

- Login Policies

Determine the type of authentication that is required based on the entry point into the private cloud.

- Directory Service Integration

Provides direct integration with the network's directory service to eliminate duplication of user and group management. Integrates with popular directory service products including Microsoft Active Directory, Novell eDirectory, OpenLDAP, and Open Directory.

- Role-based Access Control

Control access to all private cloud applications and services by a user's role within the organization. Leverage directory service integration to assign rights directly to the user, group, or any organizational container.

Private Cloud Services

webNetwork provides a rich set of private cloud services that integrate all of an organization's IT infrastructure, not just the applications. A list of some of the services and a brief description is given below:

- File Services

Provides users with access to internal network file systems through the webOS, portal, or mobile interface. With File Services, users can access shared, home, and public directories from anywhere they have an Internet connection. File Services supports features such as drag/drop, local edit, copy/paste, etc.

- Personal Desktop

Feature designed to connect a user with his desktop when working from home or on the road. Personal desktop provides users with access to files, documents, report, and applications sitting on their personal desktops that may not be practical to publish in the webNetwork cloud.

- Registration

Self service feature allowing users to register their own system account. Supports CAPTCHA, directory integration, and can be customized to validate against third party databases.

- Self Service

A set of applications that enable a user to manage their own system account

- Password Self Service

Allows users to reset their forgotten passwords. The Challenge/Response system requires users to answer a set of challenge questions before password reset. Supports immediate reset or emailed activation link.

- News and Alerts

Provides users with news and alert messages based on their role within the organization. Administrators can easily notify all or specific users of corporate events, departmental notices, or system maintenance.

- Login Scripts

Allows the administrator to change the login process for any user by adding simple script commands. Login script commands can contain conditional logic, Stoneware variables, and Lockbox variables.

- Forums

Social networking application designed for the discussion of ideas. The forum provides the end user with a means of presenting an idea and then monitoring the feedback from other users with regards to the idea.

- Push Console

Advanced web technology that allows administrators to "push" events out to the user's web desktop. With no client or plug-in code required, the push console can automatically start applications, send messages, lock the web desktop, open web sites, log the user off the system, etc.

- Calendaring

Enables the sharing of personal and group calendars with other users accessing the webNetwork system. Supports features such as email notification, event approval, and integration with the Groupware Agent.

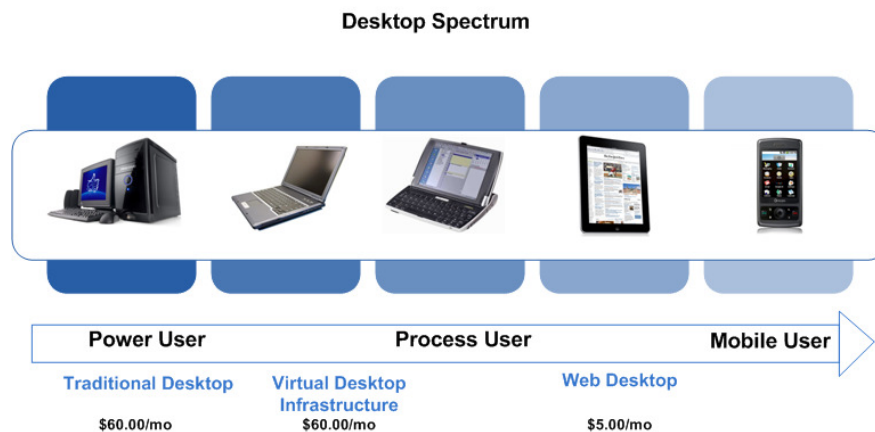
- External Users

Provides external users and groups with access to webNetwork resources without creating these accounts in their production network environment. The External User feature federates a secondary directory to store non-organizational accounts (e.g. - vendors, customers, public, etc.) which reduces licensing costs and improves account security.

Strategy

Stoneware's products are designed with the single goal of delivering services out of the data center using web technologies. Stoneware sees the delivery of applications, data, and services via web technologies as being more scalable, cost effective, and better aligned with a dynamically changing device market. Many CTOs, CIOs, managers, and IT personnel share this vision. They see the move to web-based delivery of information technology as being the only way to scale, control costs, and deliver more services over the next 3 to 5 years. The only question that remains is how? How do you move from point A (client-centric Windows world) to point B (centralized, web-enabled IT services)? This section discusses the thoughts and strategies around shifting to web-enabled IT delivery.

In a perfect world, an IT manager would simply push a button and all applications and services would seamlessly convert to web-based technologies. However, many organizations find themselves in a mix of web and Windows technologies with a growing number of users working outside the four walls of the organization. Add in a growing number of sub-notebook devices (pads, slates, netbooks, smartphones, etc.) that were acquired by the end users over the holidays, and you have complete chaos. The strategy for moving this chaotic environment forward starts with identifying the desktop spectrum (see below).



The desktop spectrum shows how organizations typically have different types of users that need to be addressed within their work environment. Some users qualify as "power users" while other users are more task or process oriented. In addition, organizations have an increasing number of users who are mobile and working with a new class of devices that are not Windows and not easily managed. When organizations identify the type of users and their desktop needs, they can begin creating a strategy around the shift from Windows to web technologies. Each time a user moves from a traditional or virtual desktop to a web-enabled desktop, there should be immediate savings in licensing, hardware, and management costs. Some examples are provided below:

- Power User

The power user might be an office manager who uses a large variety of applications to perform his daily job functions. He heavily uses Microsoft Office, some graphic applications, and most of his data resides on his personal machine. For the power user,

maintaining the status quo or providing a virtual desktop from Citrix or VMWare might be the best solution. It is minimally disruptive to their work environment based on the fact that nothing dramatically changed. He is using the same Windows desktop and accessing the same applications. The costs associated with supporting this type of user remains approximately the same. There will be Windows licensing, virtualization licensing, backend infrastructure costs, and software management costs.

- Process User

The process (task) user looks more like a help desk, telemarketer, clerk, or shop floor employee. He tends to spend much of his computing time in a few select applications that are oriented around his job function. He needs occasional access to office applications and most likely is not allowed to store data on the local machine. This user can be easily served by a Stoneware web desktop that provides access to both enterprise and office applications. The cost of delivering the web desktop is significantly reduced based on the reduction of Windows licensing and backend hardware costs to support the desktop.

- Mobile User

The definition of a mobile user is evolving every day based on the new devices entering the market (pads, slates, smartphones, and netbooks). Users are acquiring these devices at a significant pace and demanding access to any and all IT services. These devices do not necessarily have Microsoft Windows and have a challenging form factor that does not allow itself to be easily molded around the traditional desktop user interface. Because Stoneware's web desktop is not reliant on the underlying operating system, it becomes the perfect desktop for the mobile user. The web desktop can leverage the browser that is available on all of these devices and deliver services from the data center.

- Unmanaged User

The "unmanaged user" is a new category of user that defines someone who operates from a device that cannot be managed by IT. These users may be operating from an unmanageable device (e.g. – iPad, home computer, smartphone) or the users themselves might be unmanageable (e.g. – customer, vendor, client, patient, student, etc.). These are the growing number of users that are becoming more problematic for Information Technology. Traditional desktop management schemes do not apply to the unmanaged user. The strategy surrounding this type of user is not to create "better" management, but instead, not manage the device at all. IT will require this user to have a browser and working Internet connection to consume IT services. IT will not attempt to manage, install software on, or control the user's personal device. IT will treat all unmanaged users as potentially hostile and leverage the security architecture of webNetwork to limit threats and deliver services.

Conclusion

Stoneware's webNetwork is a software product that encapsulates a true shift in thinking. It redefines how Information Technology is delivered and the desktop by which it is accessed. By building a platform based on the concept of web-enabled delivery of the data center, IT organizations can create an environment that leverages the vision of web technology: scalable, cost effective, and client-less. It is this vision that allows Stoneware to redefine the data center and thus the desktop. Web-enabled computing is the future of information technology.