

OnDemand Desktop™

Virtualizing Desktops in Governmental Environments

Emerging Trend in Government – *Virtual Desktops Instead of PCs*

Government agencies tend to have a lot of PCs. Maintaining large numbers of distributed PCs, their operating systems (OSs), and the end user productivity applications associated with them is fraught with problems. The entire process is labor and management intensive – PCs and laptops are hard to secure, there are urgent and mounting compliance pressures, there are inter-departmental and inter-agency compatibility and interoperability problems, it's hard for IT managers to keep up with the flood of personnel related moves/adds/changes, and PC upgrades and repairs keep constant pressure on IT human resources.

Today's Solution

One method used successfully in some situations to reduce the burdens of PC support has been the use of traditional server-based computing. A terminal server on which many users can share sessions is outfitted with an application or set of applications. Using applications running remotely on a terminal server eliminates the need for the application(s) to be installed and supported on each individual PC. Unfortunately, there is significant administrative expertise and overhead in configuring and maintaining terminal servers, not all applications run well on them, and individual PCs in the organization still need one-on-one administrative support and upkeep.

Another approach that has been widely adopted is the use of centralized management systems that “push out” OS and application updates to PCs. This method is frequently complicated for organizations that have PC hardware from multiple vendors that require different updates, and endpoints require client software that is yet another item requiring maintenance.

Tomorrow's Solution

Virtual machines have become de rigeur for cost-reducing datacenters through server consolidation, achieving 4-5x improved capacity utilization, and enabling the operational agility to recover quickly when the unexpected happens – just as expected. The hot new trend is to apply VMs as the vehicle for delivering desktops and for the most of the same good reasons that VMs have improved datacenter server operations.

Virtual Desktops from the Datacenter

Virtualization technology has pervaded government datacenters, enabling IT groups to abstract their many and multirole servers into easily manageable “soft” objects (virtual machines, or VMs) that are fully independent of the underlying physical hardware. VMs may be effortlessly created, duplicated, relocated, and resized as necessary.

More recently, the use of VMs has been extended into the desktop arena in the form of **virtual desktops** (VDTs). Today, datacenter servers hosting VDTs are being deployed as a realistic alternative to hosting desktops on distributed personal computers. Existing backend systems for maintaining databases or providing application services require no changes, as they may be accessed from VDTs in the identical manner as they are from physical PCs.

Synchron's OnDemand Desktop solution provides a complete server-based virtual desktop management system that centralizes all desktop administration, support, and runtime operations to the datacenter. End users access their virtual desktops from thin clients or tightly locked down, minimally configured PCs. Thin clients are advantageous for their simplicity and low cost, low power consumption, and the ease by which non-technical personnel they can swap them out and powered them up in the event of any field failures. OnDemand Desktop provides Synchron's Habitat™ deployment technology and its simple methodology that enables IT to cost-effectively provision, manage, and secure enterprise desktops from a centralized, server-based desktop virtualization system.

Advantages of Virtual Desktop Management Using OnDemand Desktop

Ease the challenge of managing enterprise-wide desktops and applications.

- PCs are difficult and expensive for government organizations to maintain, manage, and keep secure.
- Server-based virtual desktops centralize the operation of desktop hardware and administration of desktop images.

Increase productivity.

- Workers may disconnect, roam to any location, and reconnect in seconds from any available client device while remaining securely logged into their private virtual desktops – desktops are just like they left them upon reconnect.
- Performance issues between PC desktops and remote backend systems may be resolved when PC desktops are replaced with VDTs that connect locally over high bandwidth datacenter networks to backend systems.



Any location, any client -- your desktop the way you left it

Reduce costs.

- Centralize PC desktop operations and desktop image management to dramatically decrease desktop administration overhead.
- Extend office-side asset life by replacing fat PCs with low maintenance, long life thin clients used to access virtual desktops.
- Reduce electrical power consumption per desktop user and even more on related cooling costs.
- All OnDemand Desktop VDTs use a **gold image** reference disk and a **differencing disk** technique that slashes runtime disk requirements and capital equipment startup costs.

Increase security; improve operational agility.

- Centralize user desktop data storage to the datacenter, and extend existing data management processes and tools.
- More easily comply with government regulations and applicable laws.

- OnDemand Desktop system architecture enables fault-tolerant system design to flexibly support operational continuity and disaster recovery planning and execution.
- Customize event-triggered desktop policies in support of organizational needs such as printer remapping or other situation-dependent functionality.
- Easily integrate with third party middleware and tools.

Breakthrough Simplicity: Sychron Clusters & Habitats

{ Provision. Manage. Secure. Scale. }

The servers on which OnDemand Desktop is deployed are grouped into **clusters** using OnDemand Desktop's graphical user interface (Command Center). A cluster is a set of 1 – N servers ($N \leq \approx 20$) devoted as computer resources to hosting OnDemand Desktop VDTs. Each cluster is controlled from a **Sychron Management Server** that may be a physical server or a virtual machine-based server. In either case, failover to a standby management server can be automated or simply handled as a manual switchover in the event of a management server outage. When a standby management server is started after any outage, it automatically **re-parents** its cluster to quickly reestablish the normal operation of the cluster. To scale to the requirements of larger organizations, multiple clusters may be created, all accessible for administration from a single Command Center.

Sychron has pioneered a revolutionary approach called **Habitats**, designed to automate the operation and simplify the scaling of a virtual desktop architecture. Simply put, Habitats enable nearly hands-free day-to-day operation of a virtual desktop management system. Habitats are simple to create and manage with OnDemand Desktop's graphical user interface (Command Center) and its system-wide administrative scope. Each cluster may have one or more Habitats created and automatically operated on it. OnDemand Desktop constantly monitors Habitats' status and initiates actions to maintain the overall system in accordance with the individual settings of each Habitat. Habitats automatically provision VDTs of the kind (specified in each Habitat's **gold image**) and in the quantities (via **watermarks**) administrators set for them. Watermarks include both absolute upper and lower bounds as well as load-relative settings that control how many VDTs are powered on and available for immediate login at any given time. As users log in and/or log out, each Habitat will power on or power off VDTs to adhere to its watermark settings.

Habitats handle all virtual desktops as disposable (non-persistent) objects while always preserving end users' personal settings and providing them their private disk storage (i.e., *My Documents*). This method improves reliability and security by enabling each Habitat to discard any unused VDT with impunity. A Habitat's **type of reuse** parameter may be set so its VDTs are fully reprovisioned (recycled) each time a user logout occurs – any user just logging in will therefore always be guaranteed a freshly created, pristine VDT.

Habitats' automated VDT provisioning and reprovisioning behavior is **goal-oriented** – any required provisioning or reprovisioning will be performed in cycles (to reach the watermark goals) so as to never overburden server resources or negatively affect end user VDT performance. Modifying a Habitat's gold image parameter to indicate the location of a new, recently updated gold image will invoke goal-oriented reprovisioning in order to bring all VDTs to the latest revision. During reprovisioning, the Habitat will continuously enforce the availability watermarks and will wait until any logged in users log out before reprovisioning the VDTs they are using.

All VDTs managed by OnDemand Desktop are created from a read-only gold image reference using runtime **differencing disks**. This approach saves a vast amount of disk space, since a differencing runtime disk is on the order of 100+

megabytes, whereas a persistent, cloned VM disk is on the order of 10+ gigabytes. As previously mentioned, OnDemand Desktop VDTs are typically discarded and reprovisioned upon user logout.

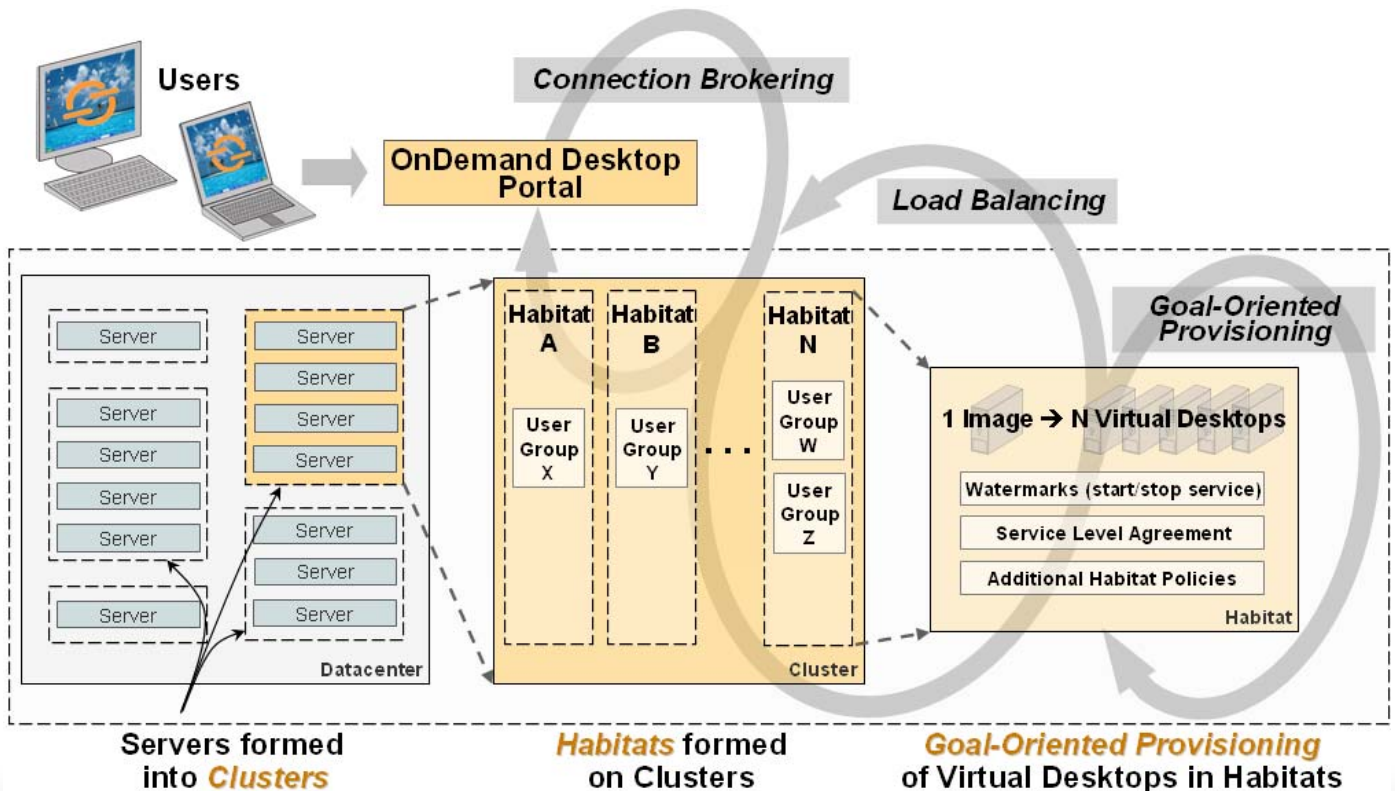
Each Habitat includes settings that automatically protect their users' service level agreement (SLA). SLAs are managed by setting the minimum allowable amount of both CPU performance and memory capacity. During operation, Habitats will only power on additional virtual desktops on a given server to the point at which the sum of the SLA settings is equal to or less than the physical resources of the server. In addition to the gold image, watermark, and SLA settings, Habitats include a number of other handy settings that govern Habitat-to-Habitat business priorities, VDT session idle time limit, MAC address ranging for the virtual NICs of VDTs, and primary and secondary virtual network settings, among several others.

Virtual Desktop Access – The OnDemand Desktop Portal

OnDemand Desktop makes accessing a VDT as simple as navigating a browser to a Sychron Portal and logging in with user credentials once (i.e., single sign-on). Existing VPN infrastructure may be used for secure remote access, or a proxy login server may be employed for secure connectivity. Microsoft's recent release of Windows Server 2008 TS Gateway™ now provides a low-cost SSL-secured remote access method for administrators to easily deploy the OnDemand Desktop Portal for fully secure external access by traveling, home-based, remote office, or disaster recovery personnel.

Connectivity to virtual desktops is via standard RDP (remote desktop protocol). Access devices may use an Internet Explorer™ browser or Sychron's Java-based client utility for login handshaking with the Portal. A wide variety of thin clients is also supported. The Portal integrates with a local network directory service (e.g., Active Directory™ with no schema changes needed) to support user login authentication and authorization. Authenticated users are then automatically assigned to an authorized virtual desktop, and their RDP session window appears on their access device.

Virtual Desktop Management with Sychron Habitats

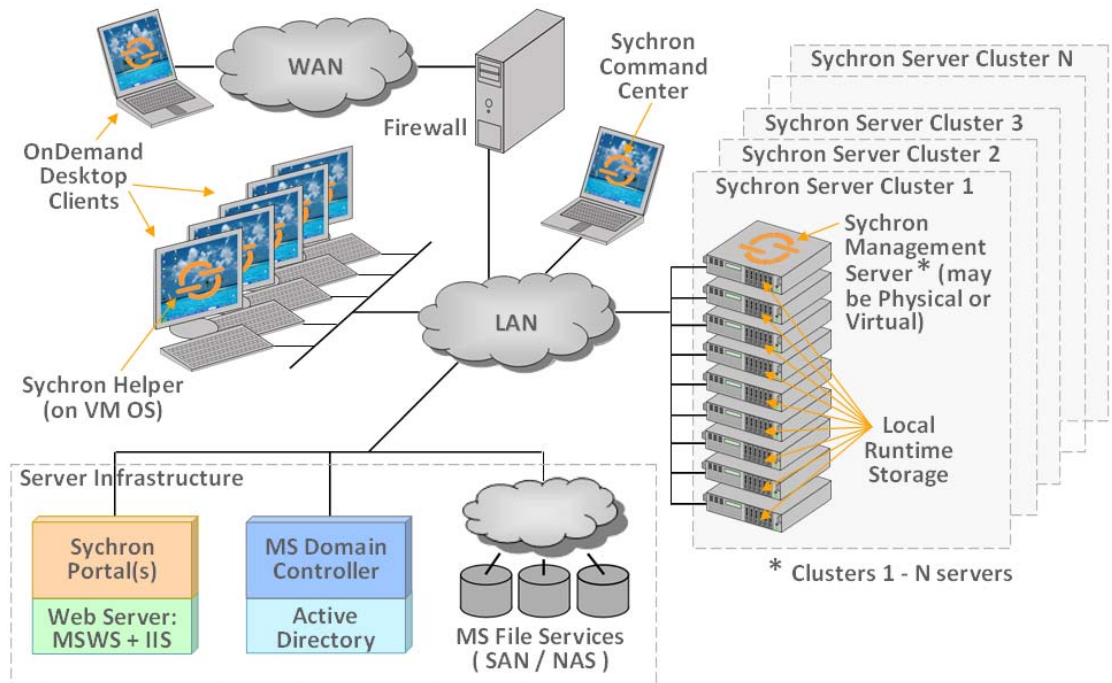


Sychron Example Architecture

Sychron supports heterogeneous networks and multiple virtualization platforms, including VMware VI3, Microsoft Hyper-V, and Microsoft Terminal Server, with additional platforms being added rapidly using the flexible architecture.

A typical architecture may include:

- one or more VMware VI3 clusters
- one or more Microsoft Hyper-V clusters
- one or more Microsoft TS clusters
- multiple virtual desktops (XP, Linux, Windows Server 2003, or Vista)
- combinations (as access clients) of remote or local thin clients, Windows PCs, laptops, tablets, or PCs repurposed as thin clients
- unlimited no-charge instances of OnDemand Desktop Portal
- unlimited no-charge instances of OnDemand Desktop Command Center
- any third-party VPN, firewall, and/or proxy login server solution



Summary

Server-based virtual desktop management using Sychron's next generation Habitat technology provides the best solution for virtualizing enterprise desktop computing. The incredible gains from automation, efficient resource use, and agility can increase enterprise productivity and greatly reduce hardware, energy, and operational costs. Evaluate your virtual desktop solution partner on experience, focus, availability of services, and flexible technology to help you meet your goals. Sychron will help make your desktop virtualization opportunity a reality.