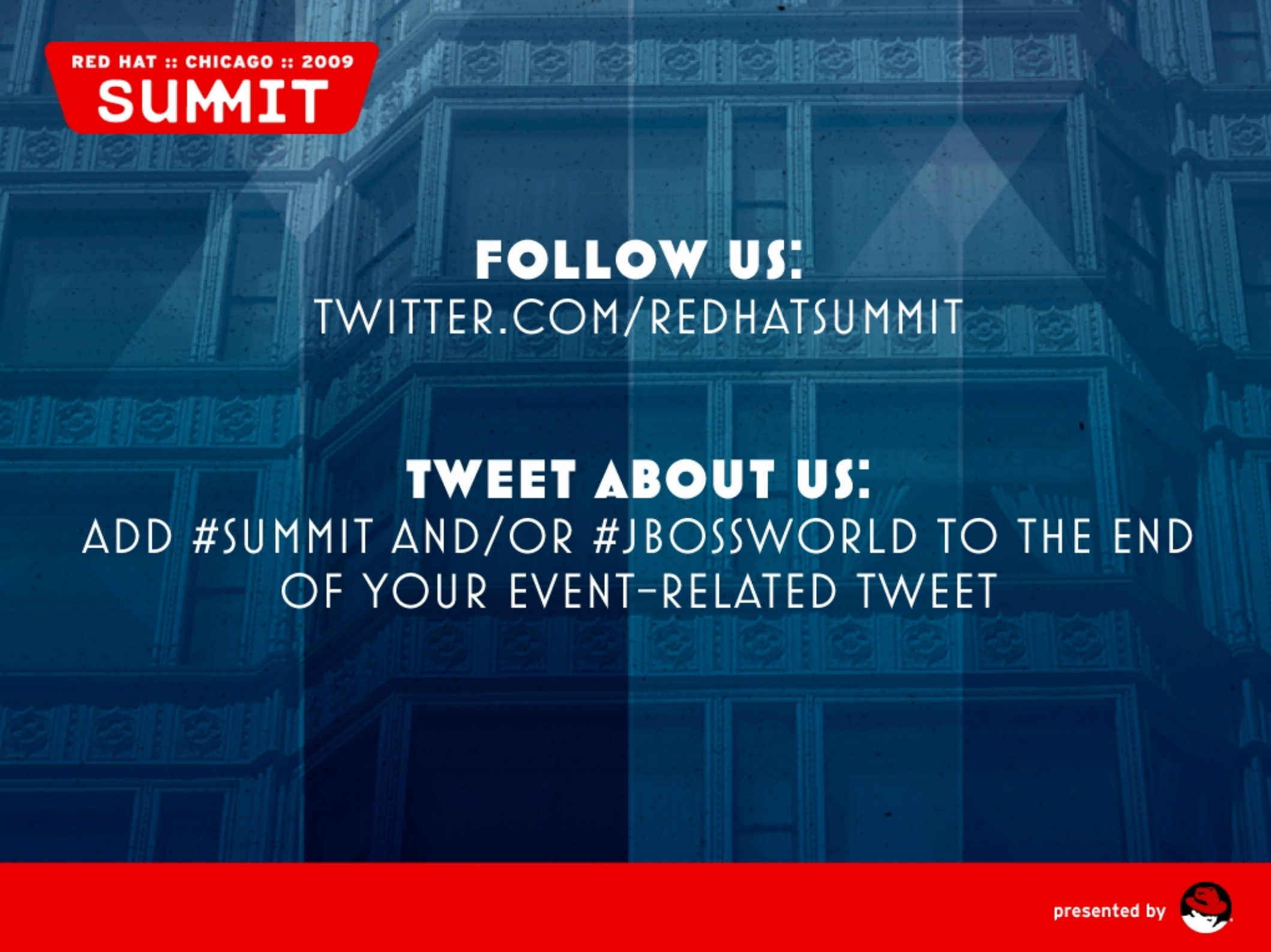
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DETERMINING THE REAL TCO OF VIRTUAL DESKTOP ENVIRONMENTS

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presented by

AGENDA

The Hosted Virtual Desktop and Red Hat

Enterprise Desktop Deployment Challenges

Real Virtual Desktop TCO

The Future of the Desktop and the savings

What is a Virtual Desktop?

Similar to a virtual server, a virtual desktop is an operating system instance **separated** from its physical environment.

- This encapsulates the operating system to give full **portability** throughout the enterprise.
- Access to the desktop is provided via an end-device such as a physical personal computer or **thin client**.
- Operating system runs in a hypervisor thus all CPU instructions and disk I/O is executed on a Server running KVM

Entire user environment is **“streamed”** to the end-user

- Graphical desktop is “drawn” over the network to the end-device
- Mouse movements and keyboard strokes are translated from the end device to the virtual session

Is a virtual desktop the same as Microsoft Terminal Services or Citrix Presentation Server/XenApp?

NO - Virtual Desktops run a unique copy of the operating system and deliver an isolated environment to the end-user. Terminal Services and Citrix share an operating system with the users with no isolation

What is the impact of the end-client device in a virtual desktop environment?

All computations and network and disk I/O operations occur on the server which makes the end-client computing power irrelevant. However, the graphics capabilities of the end-device directly control the user experience.

Red Hat and the Hosted Virtual Desktop

A hosted desktop virtualization solution in which entire desktop images run inside virtual machines on a server.

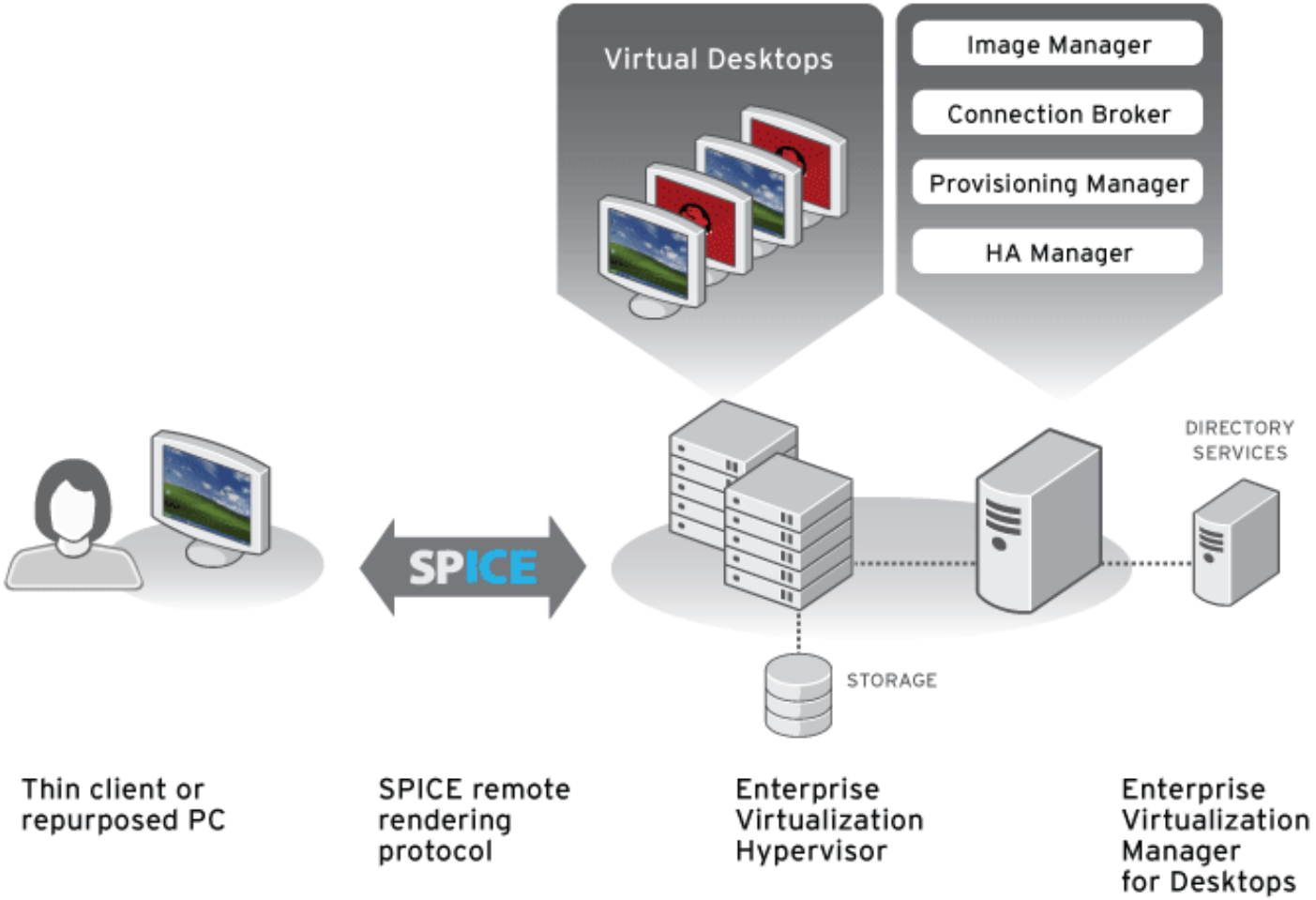
Users access their desktops from a thin client or PC with a browser using either Red Hat's SPICE protocol or RDP.

A virtual desktop is the user's entire work environment
i.e. the entire display pixel for pixel, cursor, keyboard, audio, plus all applications, data and storage.

Each desktop is dedicated to a user. Provides complete isolation from other users' desktops.

Bottom Line:
Significant reduction of TCO
Unsurpassed desktop manageability
Superior user experience, same as a physical PC

Red Hat Enterprise Virtualization Manager for Desktops



Key Benefits

Improved Data Security

- Data resides within a centralized data center, rather than on less-secure client devices

Increased Manageability

- Desktops can be centrally created, monitored and managed, reducing or even eliminating the need for on-site support

Increased Business Agility and Continuity

- Desktop replacements can be deferred due to the elimination of dependencies between operating systems and hardware
- Different operating systems can be accessed from the same device
- Entire desktop images can be backed up, ensuring business continuity in the event of hardware failure

Red Hat & Virtualization – Past and Present

First introduced integrated virtualization as part of Red Hat Enterprise Linux 5.0 in March 2007

Acquired Qumranet in September 2008:

- KVM (Kernel-based Virtual Machine) – next generation hypervisor
- SPICE – Simple Protocol for Independent Computing Environments
- Solid ICE – complete hosted desktop virtualization solution

Red Hat Enterprise Virtualization Hypervisor

Standalone hypervisor

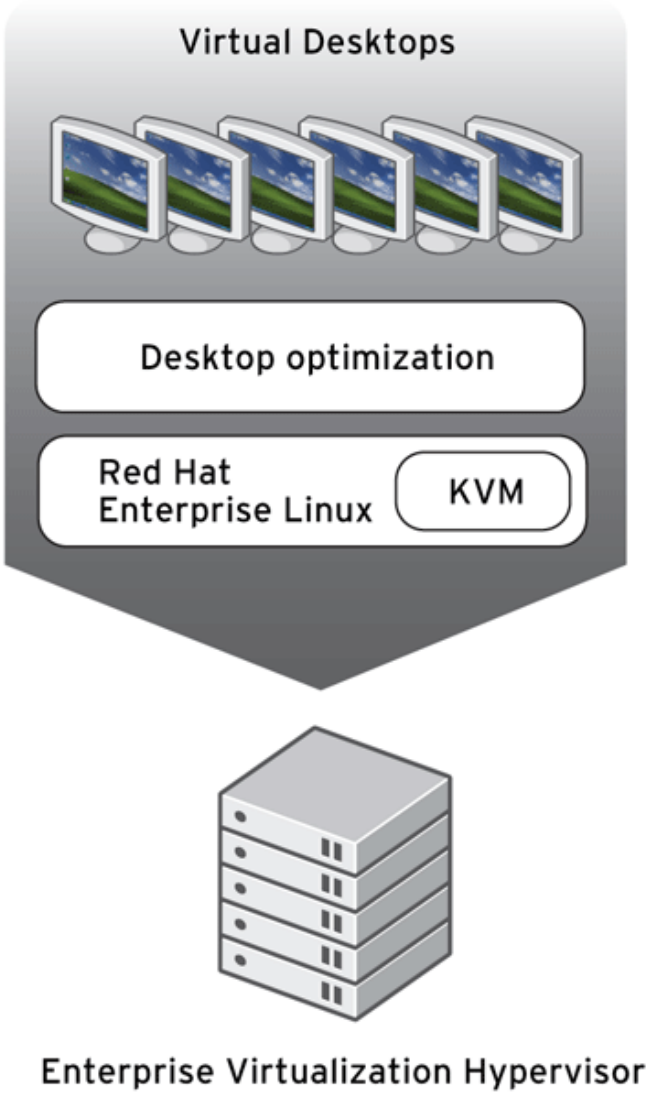
- Only runs virtual machines
- No support for running applications

Reduced footprint – optimized image

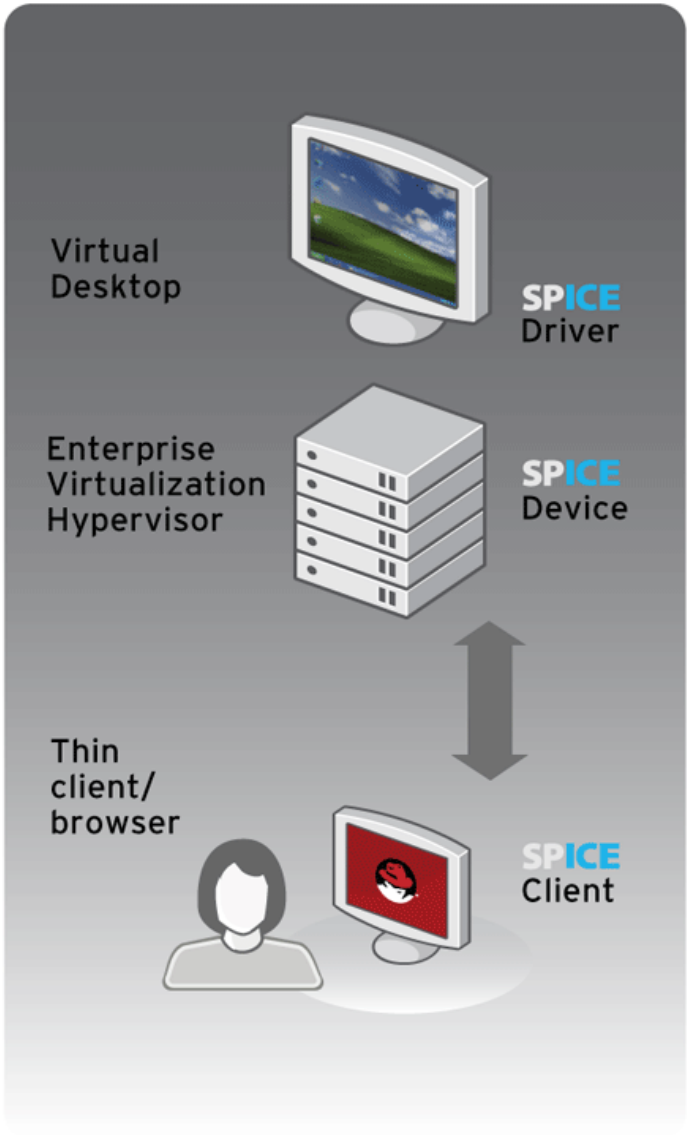
- Lightweight < 100MB
- Easy to install and manage
  - Boot from network via PXE
  - Run from flash drive
  - Installed on local disk or SAN

Built on Red Hat Enterprise Linux 5 kernel with KVM

- Supports wide range of certified hardware platforms



SPICE – Remote Rendering Protocol



Excellent User Experience

30+ frames per second video

Supports flash and other graphics

Bi-directional audio and video for (for video -conferencing/phone)

Multi-monitor support (4+ monitors)

USB 1.1 and 2.0 support

Adaptive remote rendering solution

Utilizes GPU of the server and/or client

Offloads graphics processing/rendering to client (if powerful)

Improves desktop density on the server

Minimizes server side rendering (adaptive behavior)

The Real TCO of Virtual Desktops

Items to Consider

Why deploy a virtual desktop? The ROI

Major Motivation for Hosted Virtual Desktop Deployments:

Reduce capital and maintenance expenditures when compared to a physical personal computer.

Virtual Desktops from any competitor CAN deliver **Hard** and **Soft** Savings

When can you initiate the savings

During a Desktop Hardware Refresh

A Hosted Virtual Desktop solution can save or preserve existing capital investment during a **hardware refresh cycle**:

Extend the life of current Personal Computer 1 -2 years

and/or

Replace $700 Personal Computers with $300 Thin Clients

When does this event occur?

- Most customers deploy desktops in a staggered refresh fashion usually every three to four years.
- Three year refresh is common in environments where desktops are leased, four-year occurs mostly in environments where the assets are owned.

HARD Cost Savings

Reduction in Capital Expenditures

Average physical desktop cost is $700.00.

Virtual Desktops allow a customer to reuse their existing personal computers as dumb terminals or use thin clients.

Thin clients range from $300 to $500 in capital costs and have up-to seven- eight years of life.

Power Savings “Green Initiative”

Reduction in power.

- Thin Clients typically use 15W – 20W vs. 150W for a physical PC
- Nearly 40% power reduction

A typical Personal Computer with a 150W Power Supply will cost at a minimum, $56.00 a year to operate vs. $14.00 for a thin client.

SOFT Cost Savings

Reduce Deskside Visits

With the entire desktop virtualized, the need for desktop deskside visits is minimized or eliminated.

Using a FTE (Full Time Employee) Rate of $75.00, this reduces deskside visits by 4 hours a year by $300.00.

Reduce Desktop Conversion Time

When customers transition from one desktop platform to another, either the desktop is re-imaged or the entire environment is reloaded.

Encapsulating a desktop within a virtual machines eliminates this time consuming tasks.

Even with enterprise deployment tools, this arduous task still takes 6 hours or $450.00 of FTE time.

Savings Rates from Engineering to Support

Area	Typical Savings	Rationale
Desk-side PC support	90%	Desk-side support, other than for hardware failures, is eliminated
Security and user administration	75%	Administration is policy-based and authorized users can be allowed to administer their own entitlements (rule-based, delegated admin)
Power & cooling	60%	Blade and Thin Client solution gives maximum power efficiency
Help desk	**50%**	**Simplified environment reduces complexity and support calls Moves, adds and changes typically do not require IT support**
Network engineering and support	**50%**	**All traffic is over HTTPS No need for complex firewall configuration and administration**
Software distribution staff	**50%**	**Packaging happens once for servers and desktops Software distribution is gradually replaced with software publishing**
Desktop engineering	**75%**	**The need for complex desktop engineering is eliminated though the combination of wrapping applications and moving to a central model**
Security engineering	**50%**	**Security administration eased through the introduction of a simplified infrastructure**

(Source: Gartner Research)

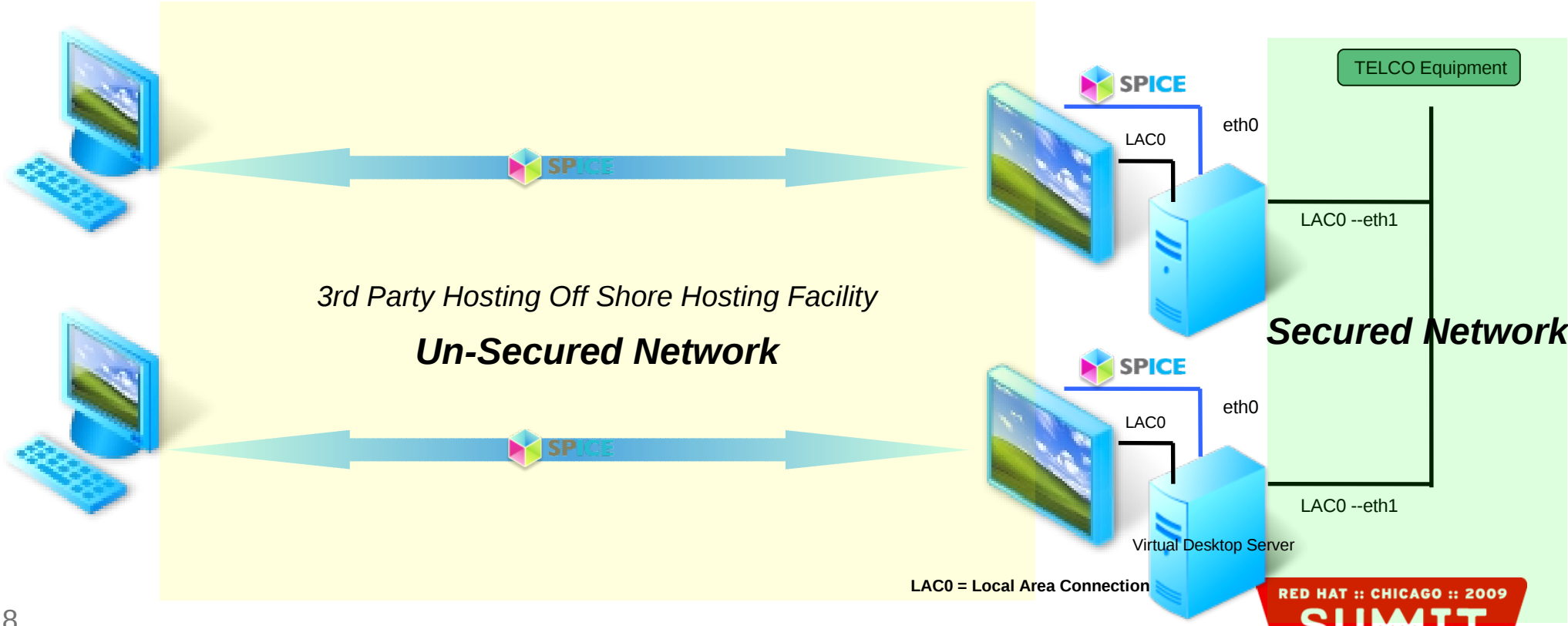
Red Hat SPICE – TCO of Remote, Secure Data

Separate, physical network isolation for user console access

Encrypted Data Stream

Pass-Through USB (*if desired*)

Bi-Directional Audio and Support for Web Cams



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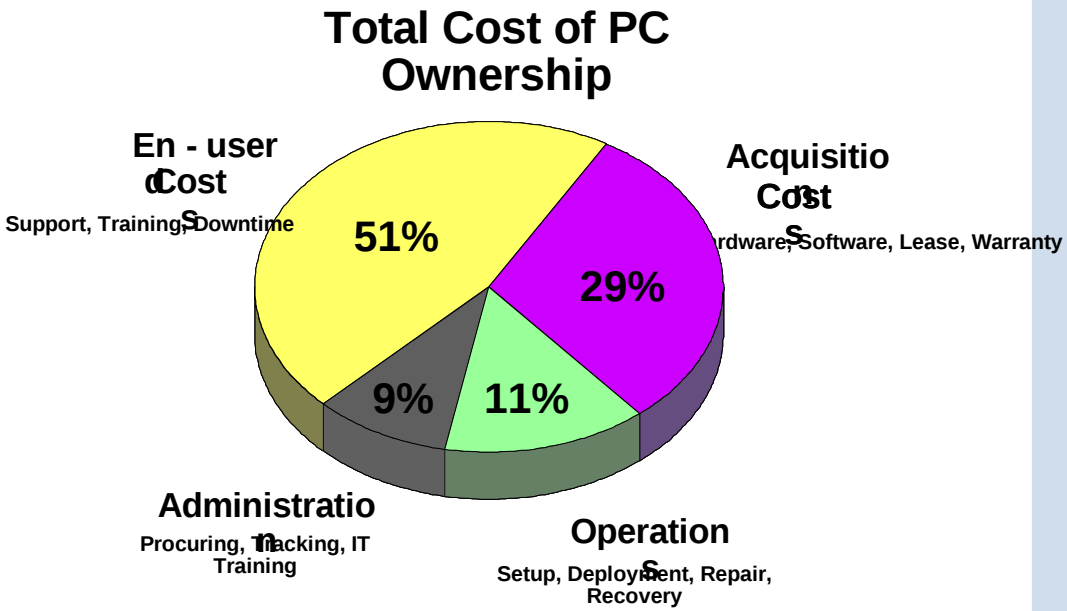
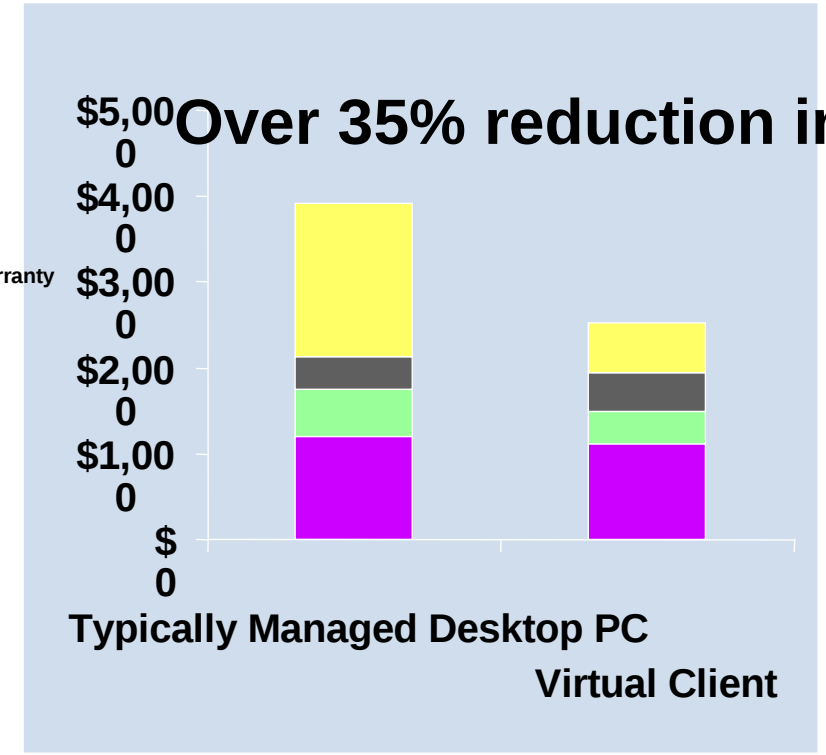
Virtual Desktop Infrastructure





VDI reduces end-user costs by *65%* vs. typically managed PC environment

VDI reduces operations costs by *30%* vs. typically managed PC environment

Ex. Virtual Desktops can reduce Setup & Deployment by 50% (4 hours per PC to less than 2 hours per thin client)

Virtual Client can lower TCO by reducing cost of operations and end-user support.

(Source: Gartner Research)

$4000 TCO per desktop ($1000 avg acquisition cost)
$7600 TCO per laptop ($1900 avg acquisition cost)

Summary

- Hard and Soft Costs should be considered when evaluating
  - Your mileage will vary depending on
    - Use-case
    - Architecture
    - Requirements
- Hosted Virtual Desktop Solutions should leverage
  - Best in Breed, Open Source virtualization frameworks
  - Best in Breed, Remote Rendering Protocols

QUESTIONS?

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