



# Qumranet

Torino, May 20, 2008

---

# AGENDA AND OUTLINE

## Company Overview, Qumranet background

### Industry Pain Points

### Solid ICE – Product Overview

### Solid ICE – Use Cases

### Solid ICE – Relative Economics (Vs. Physical Desktops)

### Solid ICE Differentiators Vs. Other Retrofitted Server Virtualization Solutions

### Customer Success Stories

# ABOUT QUMRANET

- ◆ Founded 2006 specifically to target desktop virtualization
- ◆ Funded by industries best in class venture funds: Sequoia (Google, Youtube, AOL, Apple, Cisco, etc.), Norwest Venture Partners (Wells Fargo Bank), and founders
- ◆ Experienced founder team: CEO and GM USA (sold 2 companies to Cisco), Chairman (Indigo, Mercury Interactive), CTO (Toptier, Qlusters, Xensource)
- ◆ Very solid capital base
- ◆ Leader in desktop virtualization market by marketshare in some markets (incl. Benelux and Southern Europe)
- ◆ Roughly 80 employees
- ◆ Engineering in Israel
- ◆ Head office in California
- ◆ Sales offices in New York, Amsterdam, Milan, Tel Aviv
- ◆ Reference customers: several major investment banks in NYC, IAI aerospace, several leading funds
- ◆

# COMPANY OVERVIEW – QUMRANET BACKGROUND

- ♦ **Solid ICE – industry’s highest performing and most scalable hosted desktop virtualization product**
  - ♦ Centrally hosted desktops & user-experience indistinguishable from physical PC.
  - ♦ Specifically designed for virtual desktops
  - ♦ Global 2000 companies use Solid ICE in production environments
  
- ♦ **Inventor and maintainer of the industry’s leading virtualization solution KVM (Kernel-based Virtual Machine)**
  - ♦ Approximately 10 million machines worldwide
  - ♦ Open sourced in 2006. Included in all major Linux distributions
  - ♦ Advancing KVM with industry consortium (IBM, Intel, Red Hat, etc.)

# AGENDA AND OUTLINE

**Company Overview, Qumranet background**

**Industry Pain Points**

**Solid ICE – Product Overview**

**Solid ICE – Use Cases**

**Solid ICE – Relative Economics (Vs. Physical Desktops)**

**Solid ICE Differentiators Vs. Other Retrofitted Server Virtualization Solutions**

**Customer Success Stories**

# INDUSTRY PAIN POINTS: DESKTOP MANAGEMENT IS AN ECONOMIC DRAIN

## PROVISIONING

Provisioning new machines  
Supporting new hardware

## SUPPORT AND MAINTENANCE

Desk-side visits  
Patches and updates

## FAILURES

Desktop backups  
Failures (HD, PS, fans etc)  
Disaster Recovery

## SECURITY AND COMPLIANCE

Enforcing security policies  
Compliance and audit trails

## POWER

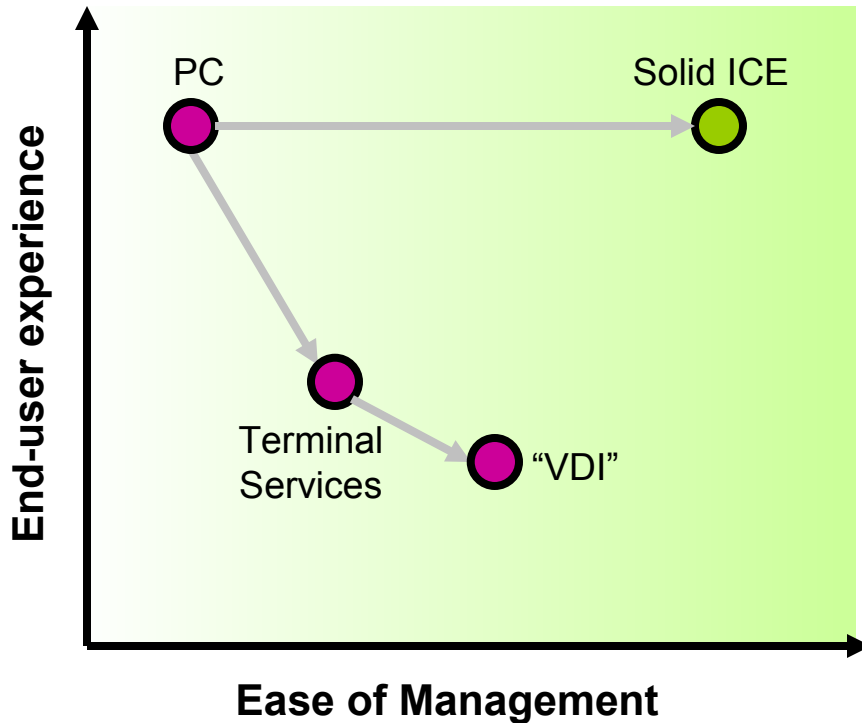
Increasing power costs

- **Total cost of maintaining and managing a PC environment is \$3,000 - \$5,000 +\***
- **Complexity increases with multiple sites and lack of trained desktop personnel.**

\* Gartner 2007

# DEFINED MANAGEMENT AND END-USER ... EXPERIENCE FRONTIER IS CHANGING

## Approaches to solve desktop delivery challenges



### Terminal Services Drawbacks

- Not enough isolation
- Apps need to be multi-user enabled
- Complex to roll out new applications

### VDI Drawbacks

- End-user experience is not sufficient
- System cost is prohibitive
- Not built/ready for desktops

# AGENDA AND OUTLINE

**Company Overview, Qumranet background**

**Industry Pain Points**

**Solid ICE – Product Overview**

**Solid ICE – Use Cases**

**Solid ICE – Relative Economics (Vs. Physical Desktops)**

**Solid ICE Differentiators Vs. Other Retrofitted Server Virtualization Solutions**

**Customer Success Stories**

# SOLID ICE: CONCEPTUAL OVERVIEW

- User's desktop runs inside a KVM Virtual Machine in the data center
- User connects to virtual desktop using SPICE



3

Thin Client or repurposed PC

SPICE Remote rendering technology

1

Virtual Desktop Server (VDS) Cluster

2

Virtual Desktop Controller (VDC)

# SOLID ICE: VIRTUAL DESKTOP SERVER

1



Virtual Desktops



Desktop Optimization



Linux

KVM



Virtual Desktop Server (VDS)  
Cluster

- ◆ **Leverages KVM (Kernel-based Virtual Machine)**

- ◆ Runs Linux as a host with KVM enabled
- ◆ Desktops run inside virtual machines
- ◆ WinXP, Win2K, Linux

- ◆ **Optimized for desktop performance**

- ◆ Scheduling and interactivity
- ◆ Contains SPICE component
- ◆ Performance - Page-sharing, ballooning, swapping

- ◆ **High Availability: Operates in clustered model**

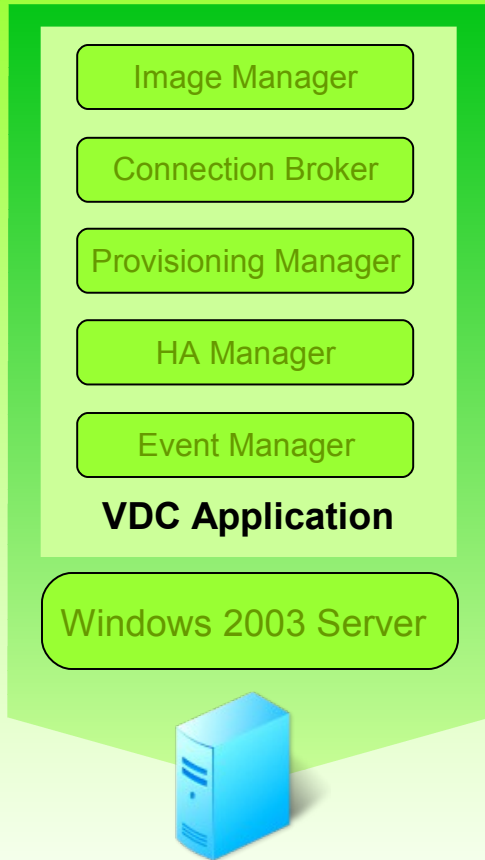
- ◆ **High Density of Virtual Machines/Desktops**

- ◆ 2-5x other solutions (workload dependent)

- ◆ **Scalable Architecture: Thousands of virtual desktops**

# SOLID ICE: VIRTUAL DESKTOP CONTROLLER

2

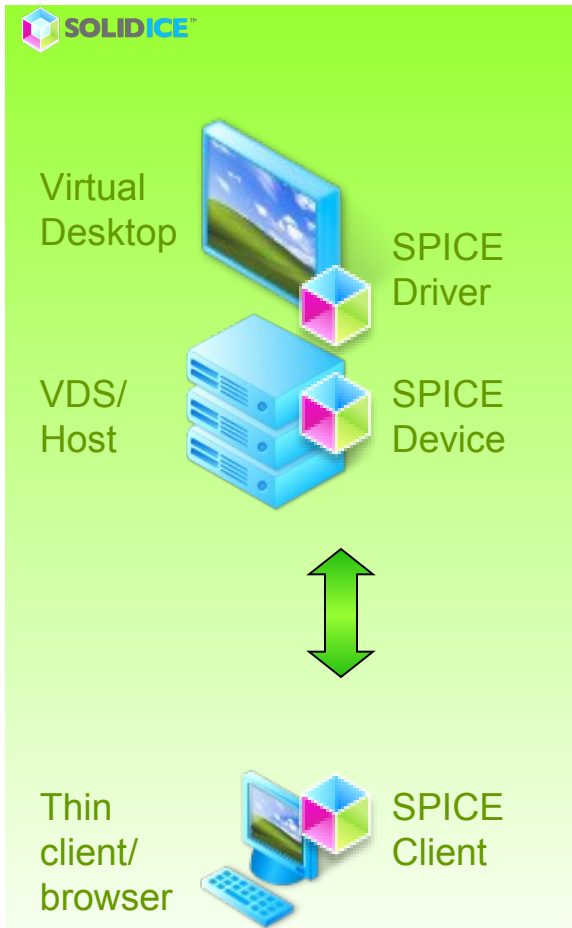


Virtual Desktop Controller  
(VDC)

- ◆ **Built from the ground-up for desktops.**
  - ◆ 90% reduction in storage
  - ◆ AD/LDAP integration, multiple domains
  - ◆ Integrates with desktop build process
  - ◆ HA Monitoring of VDSs.
  - ◆ Audit trails, reports and more
- ◆ **Manage every aspect of the virtual desktop infrastructure from one central location**
- ◆ **Search driven User Interface**
  - ◆ Cross-correlate information instantly (virtual desktops, servers, users etc)
- ◆ **Power-shell based scripting API**

# SOLID ICE: SPICE – ADAPTIVE REMOTE RENDERING TECHNOLOGY

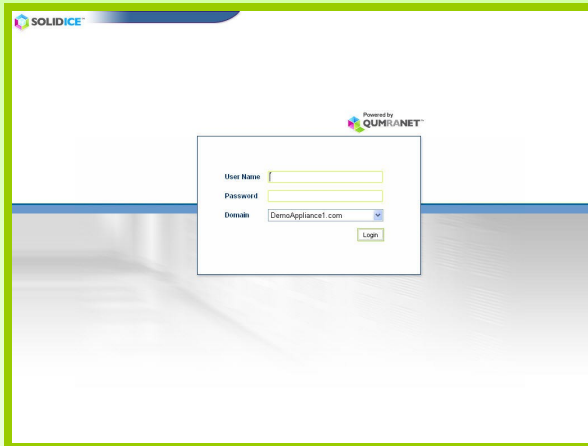
3



- ◆ **User-experience indistinguishable from physical PC**
  - ◆ 30+ frames per second video
  - ◆ Native color, full resolution
  - ◆ Bi-directional audio and video for video-conferencing/VoIP
  - ◆ Multi-monitor support (4+ monitors)
  - ◆ USB 1.1 and 2.0 support
- ◆ **SPICE is an adaptive remote rendering solution**
  - ◆ Utilizes graphics processing capabilities wherever they exist
  - ◆ Offloads graphics processing/rendering to client (if powerful) **and/or server**
- ◆ **Improves desktop density on the server**
  - ◆ Minimizes server CPU intensive memory copy operations
  - ◆ Minimizes rendering on the server side (adaptive)

# HOW SOLID ICE WORKS

## USER VIEW



## SYSTEM FUNCTIONING



AD



Thin-client



VDC



VDS

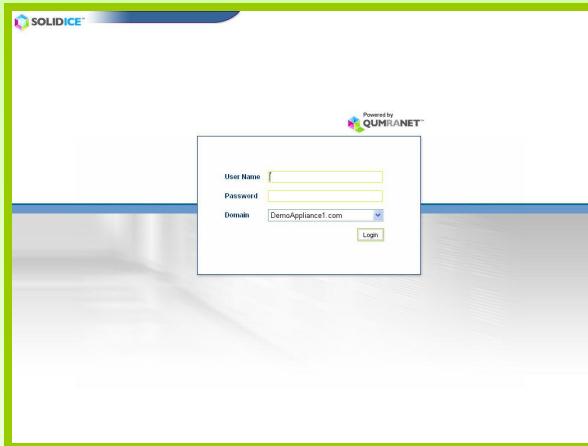


Storage

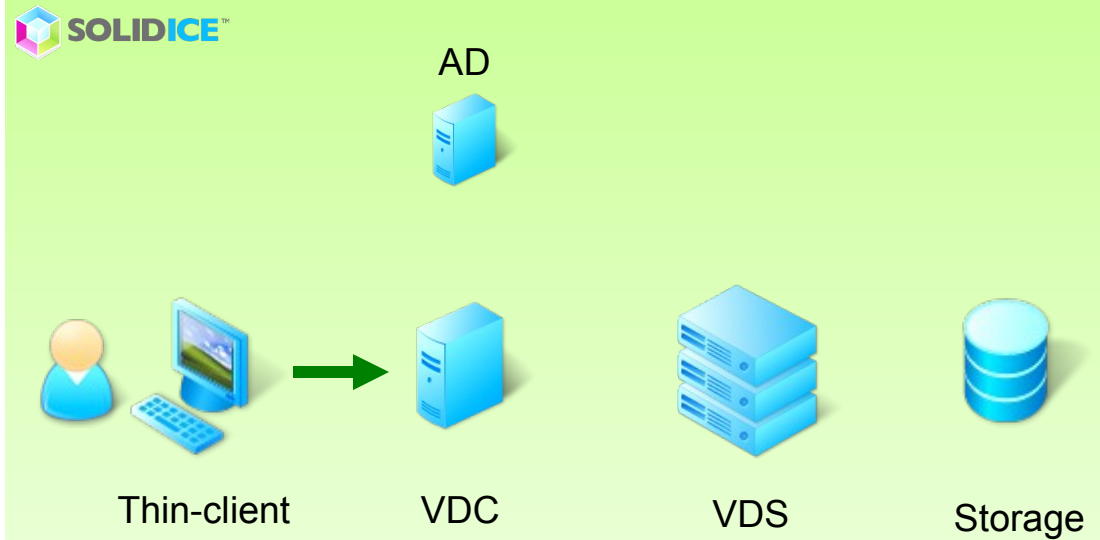
User powers on the thin-client, and sees the log-in screen

# HOW SOLID ICE WORKS

## USER VIEW



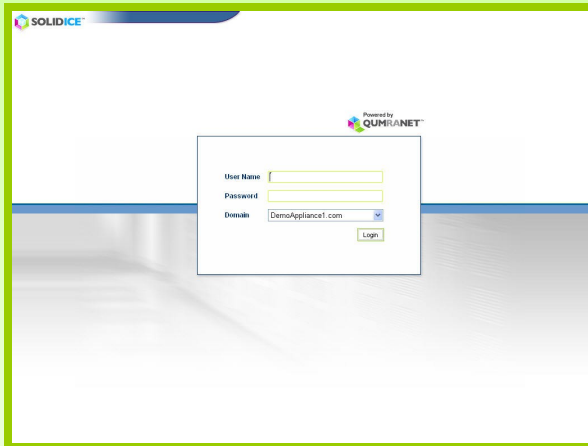
## SYSTEM FUNCTIONING



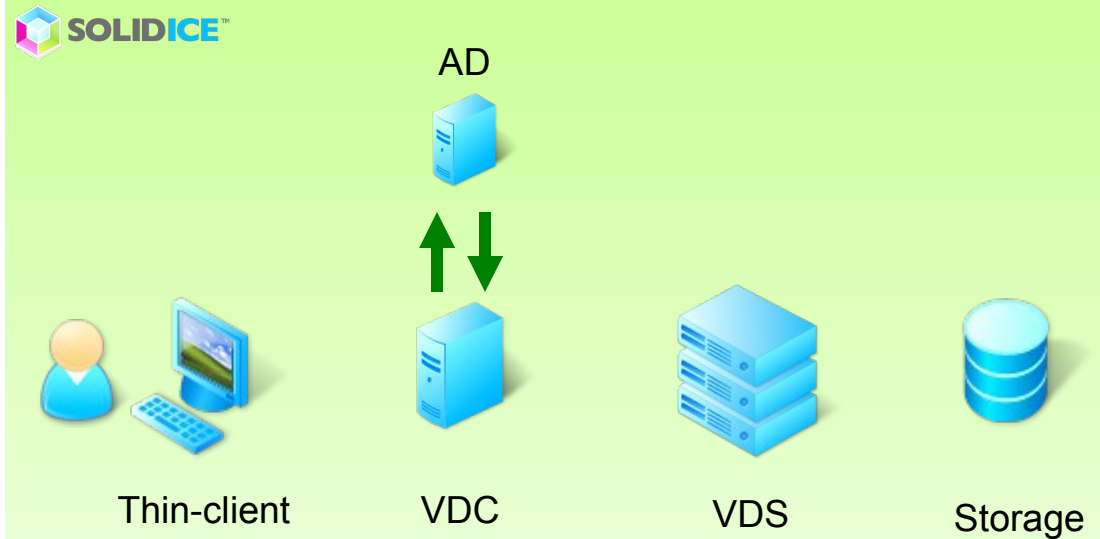
User logs in with AD username and password

# HOW SOLID ICE WORKS

## USER VIEW



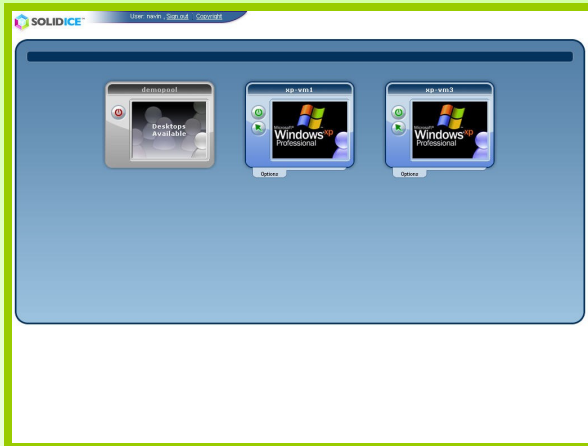
## SYSTEM FUNCTIONING



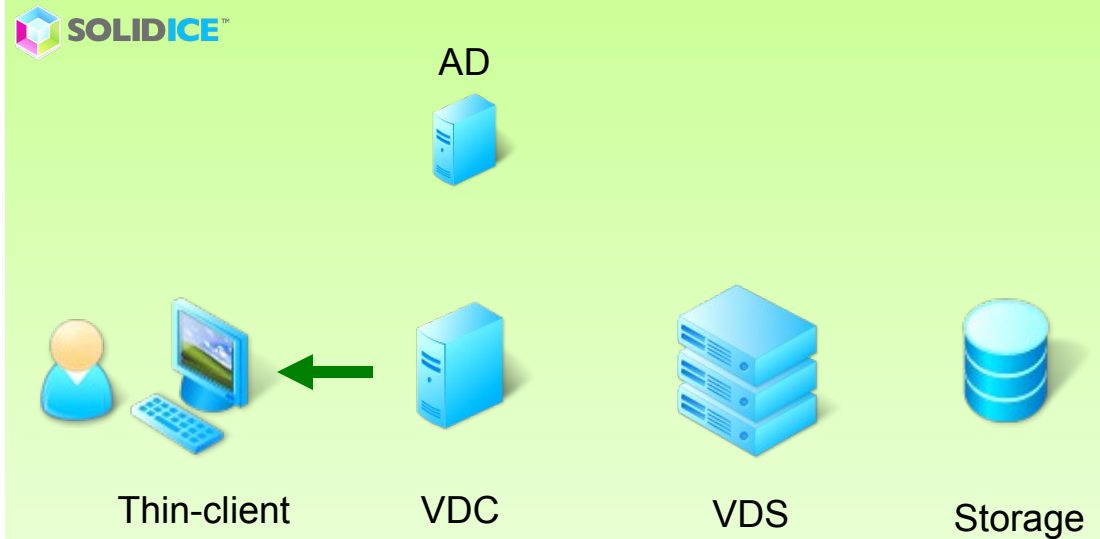
VDC authenticates the user against AD

# HOW SOLID ICE WORKS

## USER VIEW



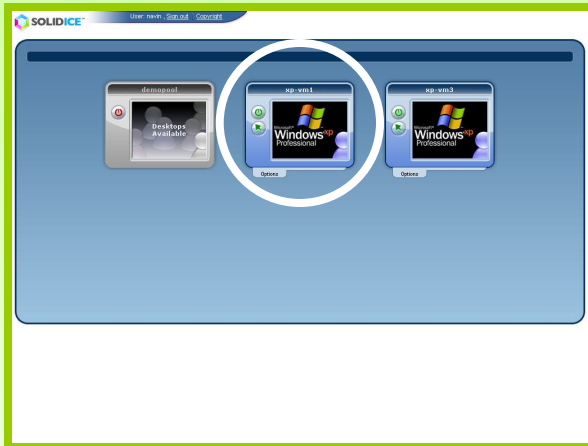
## SYSTEM FUNCTIONING



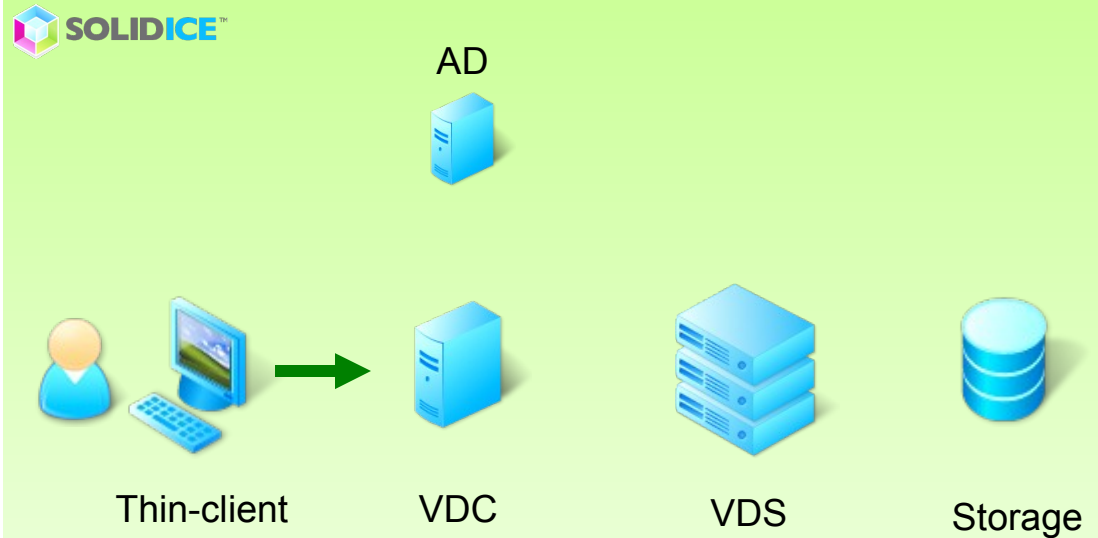
VDC presents the user with a list of virtual desktops he/she is allowed to log into (in case of multiple)

# HOW SOLID ICE WORKS

## USER VIEW



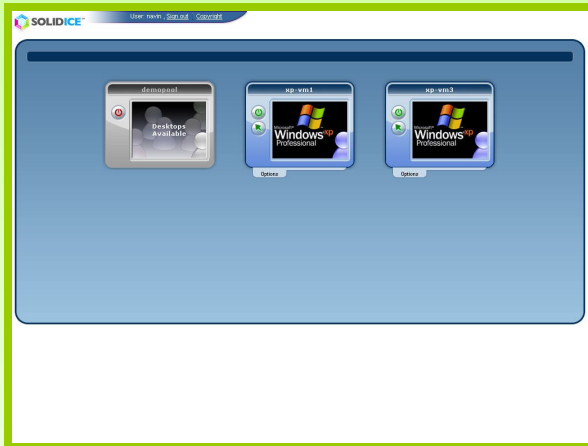
## SYSTEM FUNCTIONING



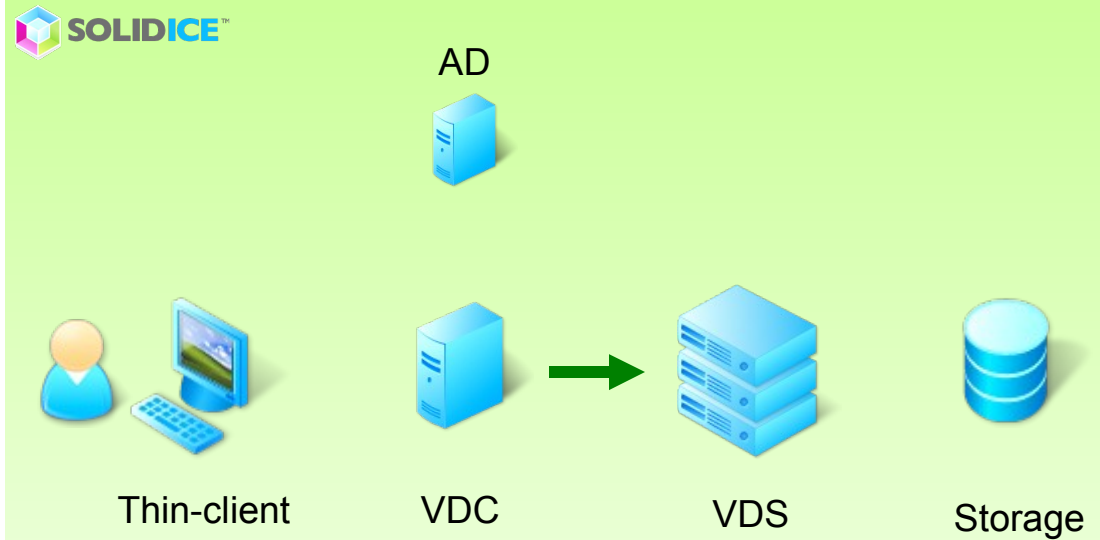
User selects the desktop that he/she wants to log into (if they have multiple desktops)

# HOW SOLID ICE WORKS

## USER VIEW



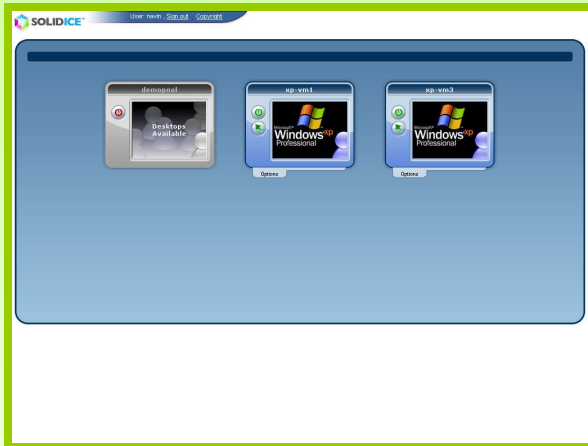
## SYSTEM FUNCTIONING



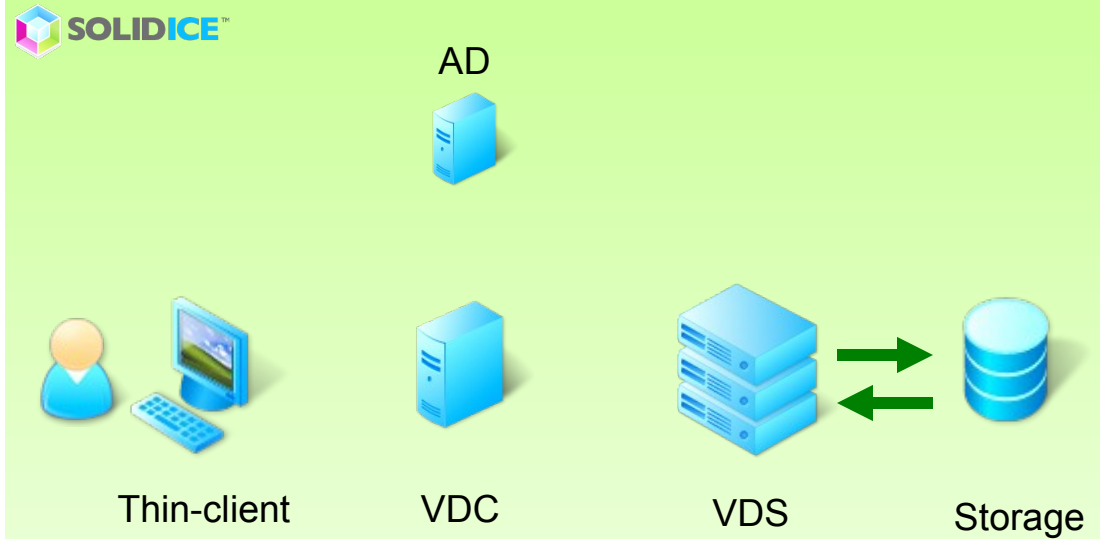
VDC tells the appropriate VDS to run the desired virtual desktop

# HOW SOLID ICE WORKS

## USER VIEW



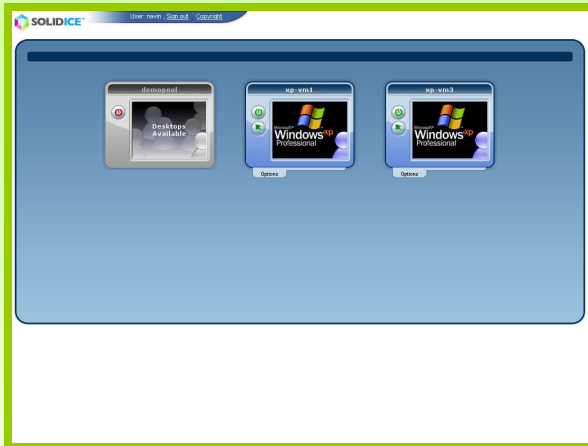
## SYSTEM FUNCTIONING



The VDS gets the required virtual desktop from storage

# HOW SOLID ICE WORKS

## USER VIEW



## SYSTEM FUNCTIONING



AD



Thin-client



VDC



VDS



Storage

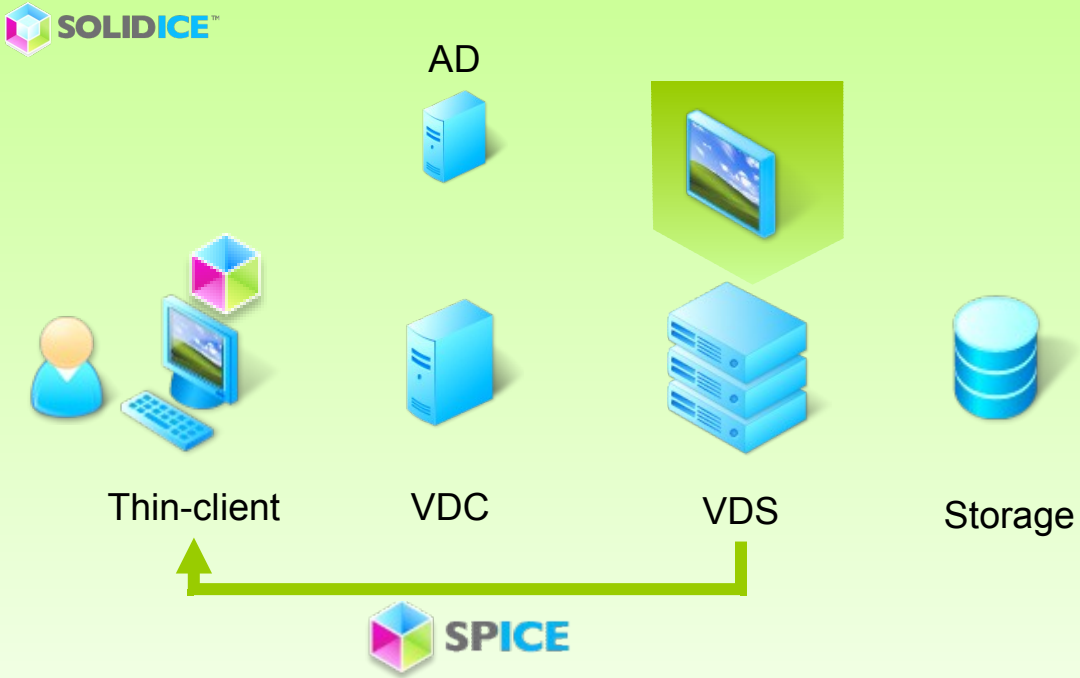
The VDS runs the virtual desktop

# HOW SOLID ICE WORKS

## USER VIEW



## SYSTEM FUNCTIONING



The VDS establishes a SPICE session for the user, and the user uses the desktop

# SOLID ICE SOLVES DESKTOP MANAGEMENT CHALLENGES

## PROVISIONING

Maintain one hardware version – “virtual hardware” Vs. multiple classes



## SUPPORT AND MAINTENANCE

Instantly re-image machines without desk-side visits



## FAILURES

Stateless client results in minimal downtime. No desk-side visits needed. Natural DR architecture



## SECURITY AND COMPLIANCE

Control security policies for virtual desktops – USB, copy/paste etc. Every action is logged



## POWER

1/3<sup>rd</sup> the power requirements compared to physical desktops



# BENEFITS OF SOLID ICE FOR ALL STAKEHOLDERS

## End-users

- ◆ User experience indistinguishable from physical PC
- ◆ Non-intrusive to user
- ◆ Access work PC from anywhere
- ◆ Computing power on demand

## IT administrators

- ◆ Centralized management
- ◆ Fully integrated system built for virtual desktops
- ◆ Open, architecture (no high-end servers, proprietary file systems etc)
- ◆ Non intrusive to IT
- ◆ Significantly reduced storage requirements

## Enterprise

- ◆ Full control over costs of desktops
- ◆ TCO savings of >50%
- ◆ IRR >100%
- ◆ Improved auditing ability/compliance
- ◆ Power saving approach, green enterprise initiative

# AGENDA AND OUTLINE

**Company Overview, Qumranet background**

**Industry Pain Points**

**Solid ICE – Product Overview**

**Solid ICE – Use Cases**

**Solid ICE – Relative Economics (Vs. Physical Desktops)**

**Solid ICE Differentiators Vs. Other Retrofitted Server Virtualization Solutions**

**Customer Success Stories**

# SOLID ICE POTENTIAL USE-CASES

| Use-case                             | Customer Benefits                                  |
|--------------------------------------|--|
| <b>IT Training/Class Rooms</b>       | Eliminate provisioning and re-provisioning time    |
| <b>Consultants &amp; Contractors</b> | Security, provisioning time, capex                 |
| <b>Developer Desktops</b>            | Linux PC to WinXP VM, or vice-versa, on-demand     |
| <b>Outsourcing</b>                   | Intellectual property and data security            |
| <b>Primary Desktop</b>               | Significant manageability benefits, ROI            |
| <b>Work-from-home</b>                | Access work PC (virtual desktop) from home, capex. |
| <b>Disaster Recovery</b>             | Pool of DR desktops, or individual desktops        |

# AGENDA AND OUTLINE

**Company Overview, Qumranet background**

**Industry Pain Points**

**Solid ICE – Product Overview**

**Solid ICE – Use Cases**

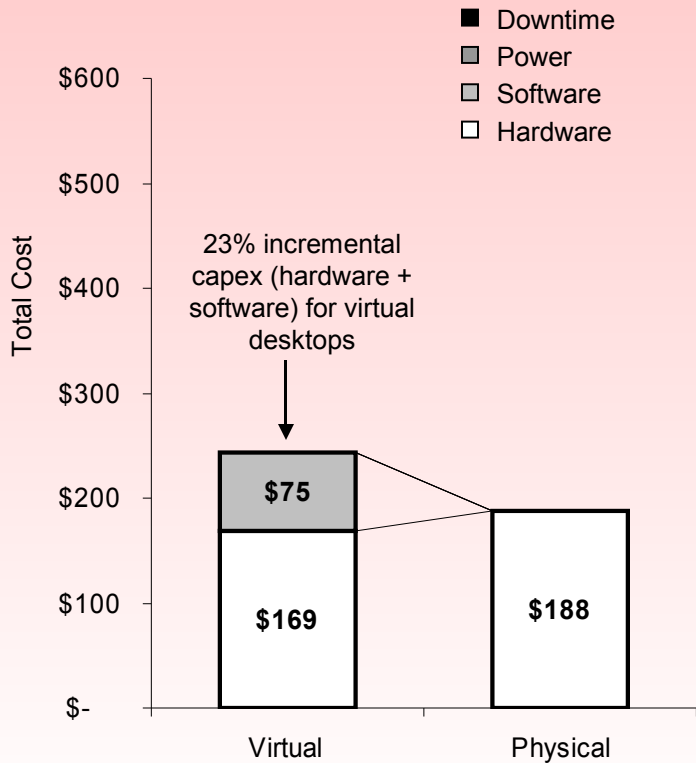
**Solid ICE – Relative Economics (Vs. Physical Desktops)**

**Solid ICE Differentiators Vs. Other Retrofitted Server Virtualization Solutions**

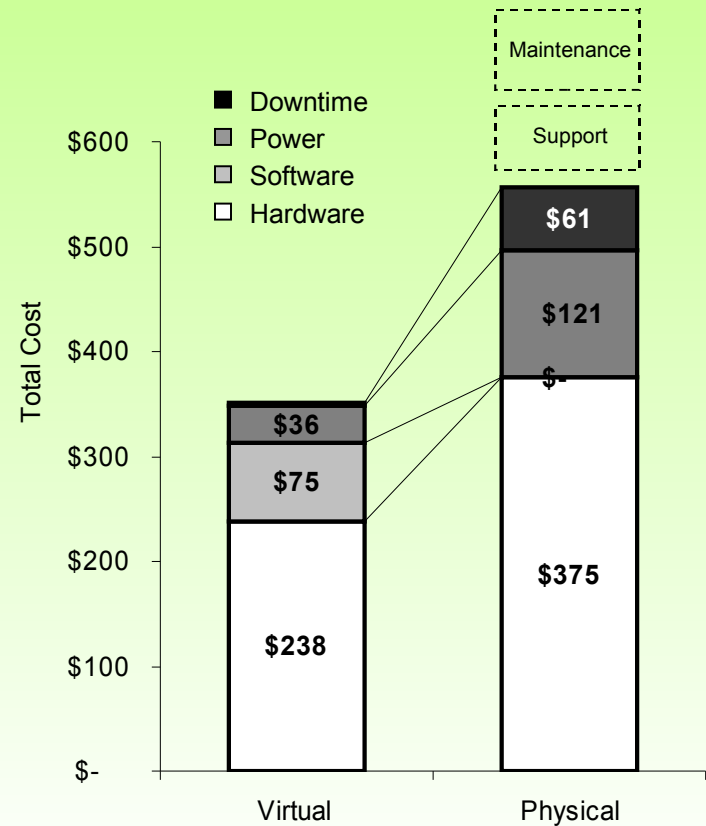
**Customer Success Stories**

# SOLID ICE = SIGNIFICANT COST SAVINGS: >37% REDUCTION OF HARD COSTS, >94% (IRR (ANNUALIZED

## Initial Cost (Capex – hardware and software)



## 3-Year Cost (Capex, power and downtime)



Source: Gartner, Qumranet analysis

# AGENDA AND OUTLINE

**Company Overview, Qumranet background**

**Industry Pain Points**

**Solid ICE – Product Overview**

**Solid ICE – Use Cases**

**Solid ICE – Relative Economics (Vs. Physical Desktops)**

**Solid ICE Differentiators Vs. Other Retrofitted Server Virtualization Solutions**

**Customer Success Stories**

# WHY IS DESKTOP VIRTUALIZATION ?DIFFERENT

| Comparison Area               | Server Virtualization   | Desktop Virtualization   |
|-------------------------------|---|--|
| Operating System Behavior     | <ul style="list-style-type: none"> <li>• Typically batch oriented applications</li> </ul>                   | <ul style="list-style-type: none"> <li>• Interactive workloads</li> <li>• Human user using the PC</li> <li>• Responsiveness is critical</li> </ul> |
| Management System Scalability | <ul style="list-style-type: none"> <li>• 100 virtual servers may be mid-large deployment</li> </ul>         | <ul style="list-style-type: none"> <li>• 5,000 desktops (45-50:1 ratio)</li> <li>• Images, clients, users – 2x order of magnitude</li> </ul>       |
| IT Manager users              | <ul style="list-style-type: none"> <li>• Deal with virtual server end-users – more sophisticated</li> </ul> | <ul style="list-style-type: none"> <li>• Deal with end-users that may be much less sophisticated</li> </ul>  |
| System Integration            | <ul style="list-style-type: none"> <li>• Integrates with server management systems</li> </ul>               | <ul style="list-style-type: none"> <li>• Integrates with Active Directory, enterprise build process</li> </ul>                                     |

# HOW IS QUMRANET SOLID-ICE DIFFERENT ?RELATIVE TO VMWARE VDI

## USER EXPERIENCE

- User-experience indistinguishable from a physical PC
- Bi-directional audio/video, IP phones, video conferencing, multi-monitor, USB capable

## > 3x COST - PERFORMANCE

- >2x performance and 50% of the total infrastructure cost
- 90% less storage requirements for virtual desktops.
- Open architecture – servers, storage etc.

## MANAGEABILITY

- Fully integrated image/storage management , connection/ session management, provisioning, HA etc
- Scales to thousands of desktops

# AGENDA AND OUTLINE

**Company Overview, Qumranet background**

**Industry Pain Points**

**Solid ICE – Product Overview**

**Solid ICE – Use Cases**

**Solid ICE – Relative Economics (Vs. Physical Desktops)**

**Solid ICE Differentiators Vs. Other Retrofitted Server Virtualization Solutions**

**Customer Success Stories**

# GLOBAL AEROSPACE COMPANY COMPANY USES SOLID ICE IN PRODUCTION – PRIMARY DESKTOP REPLACEMENT

## Pain-point

- Users needed multiple desktops (Win XP, Win 2K, Linux).
- Management, compliance costs out of control, TCO was very high

## Solid ICE Benefits

- Provisioning time down to minutes from average of 10 (ten) days
- Users can now run legacy Win 2000 desktops next to Win XP
- Storage is now centralized: backup and compliance issues are solved
- TCO for desktops: >50% reduction

## Why Qumranet?

- Tried Vmware VDI. Lacks in user-experience, expensive and complex to maintain and scale

## Future direction

- In process of rolling out to 12,000 desktops

# MAJOR EUROPEAN BANK USES SOLID ICE IN PRODUCTION – PRIMARY DESKTOP REPLACEMENT

## Pain-point

- Rapid growth. Expensive solution (blade-PCs) was being rolled out.
- Desktop management / TCO out of control.
- Regulatory compliance - increasing burden

## Solid ICE Benefits

- Significant TCO reduction of >50%
- Cost effective to scale work-force rapidly
- Multi-monitor, USB, bi-directional audio/video, PC-like experience
- Natural DR (Disaster Recovery) architecture

## Why Qumranet?

- Tried VMware VDI. No multi-monitor. No video.
- Solid ICE provides a “superior user-experience”.

## Future direction

- In process of designing a trader workstation solution with Qumranet
- Roll-out to 100% of employees



**Thank You**

**[www.qumranet.com](http://www.qumranet.com)**