



## 2009 System x and BladeCenter Technical Conference

*July 27 – July 31, 2009 – Chicago, Illinois*



# Use RapidFlash to automatically update ALL firmware in a full IBM BladeCenter chassis

**Session ID: XII52**

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Authorized



**Training**

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- Accelerator! Services for Altiris Deployment on System x®
- Accelerator! Services for IBM BladeCenter® Open Fabric Manager
- Accelerator! Services for IBM RapidFlash! for BladeCenter
- Deep Computing Collaboration Services
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## Intent/Goal

- Use RapidFlash, to get out of your maintenance window “pit stop” quickly. Steer your BladeCenter infrastructure into production, properly equipped with new firmware.
- Imagine having an IBM preconfigured “appliance” that takes care of all BladeCenter firmware flash duties typically required for new deployments. This can be an in open virtual machine format, run from VMware, Sun, or Microsoft virtualizations solutions, even from a small workstation or laptop.
- Once initiated, you can walk away while the RapidFlash appliance works for you, even on new blades with no operating system yet present. All blade firmware, including BIOS, Diags, BMC, Broadcom, QLogic. All the management module(s), as well as the added BladeCenter chassis switch modules, including Nortel, Cisco, and QLogic. Uses ftp or tftp behind the scenes as needed, automatically, all pre-configured for you.
- Think of RapidFlash as a scripted toolset that pulls together the best of both IBM UpdateXpress System Pack Installer and IBM Boot Media Creator. But now with greatly reduced setup. Minimal configuration or training required, with a simple UI. Most importantly, it gets the entire job done 5x to 10x faster than all previously available methods: reliably, automatically, and most of all, easily.

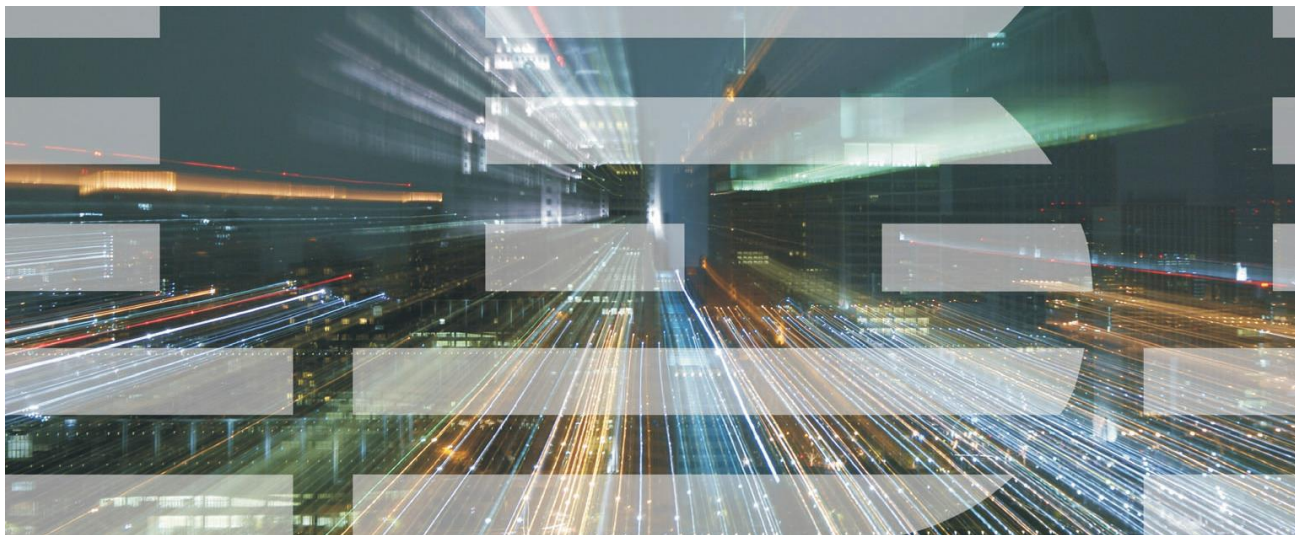


Helping our clients **WIN the race**



# IBM's smarter planet – Dynamic Infrastructure

Where does RapidFlash fit?



- Improve Service
- Reduce Cost
- Manage Risk

## Seven primary initiatives:

- Service Management
- Asset Management
  - Virtualization
  - Energy efficiency
- Business Resiliency
  - Security
- Information Infrastructure

## Rear View (2 AMMs and 10 Switches)



There's roughly 10 firmware items to flash on each blade, and up to 10 switch modules in back of the chassis to also flash, that's a lot to handle!



# The Current Workflow for using RapidFlash

## Step 1

### PREPARATION/DOWNLOAD

Attach virtual machine to a network with high bandwidth, eg, NAT from hotel room, or bridged to wired home LAN with broadband. Run Bootable Media Creator to create DVD ISO and PXE images of the chosen BladeCenter/System x models, and choose models and types of machines customer has, and firmware bundle preference, OFM or latest, for example.

Also, download AMM and BladeCenter switch module firmware to the right places (eg, Cisco code to tftp root directory).

Tweak underlying flashing scripts if needed, for example, factory default Cisco password has already been changed.

## Step 2

### CUSTOMIZATION

Customer may request that we tweak start.sh in ISO and PXE bundles to forcibly flash all firmware, allowing backleveling of firmware at a later date. This can be risky in certain situations, however.

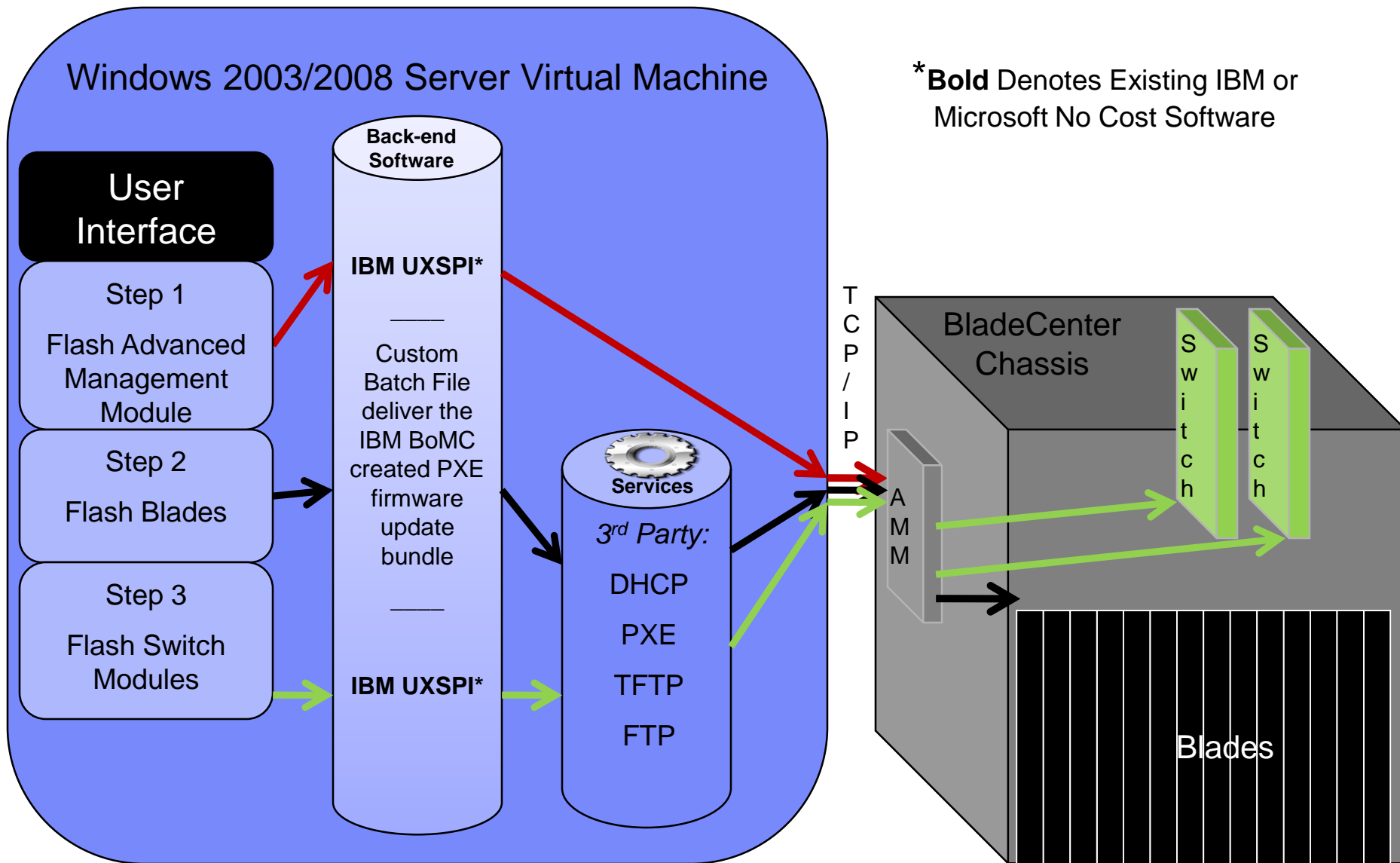
## Step 3

### DEPLOYMENT

Travel onsite, attach VM to AMM or isolated network, begin RapidFlash which flashes servers, AMMs, RSALLs, blades, and switch modules.

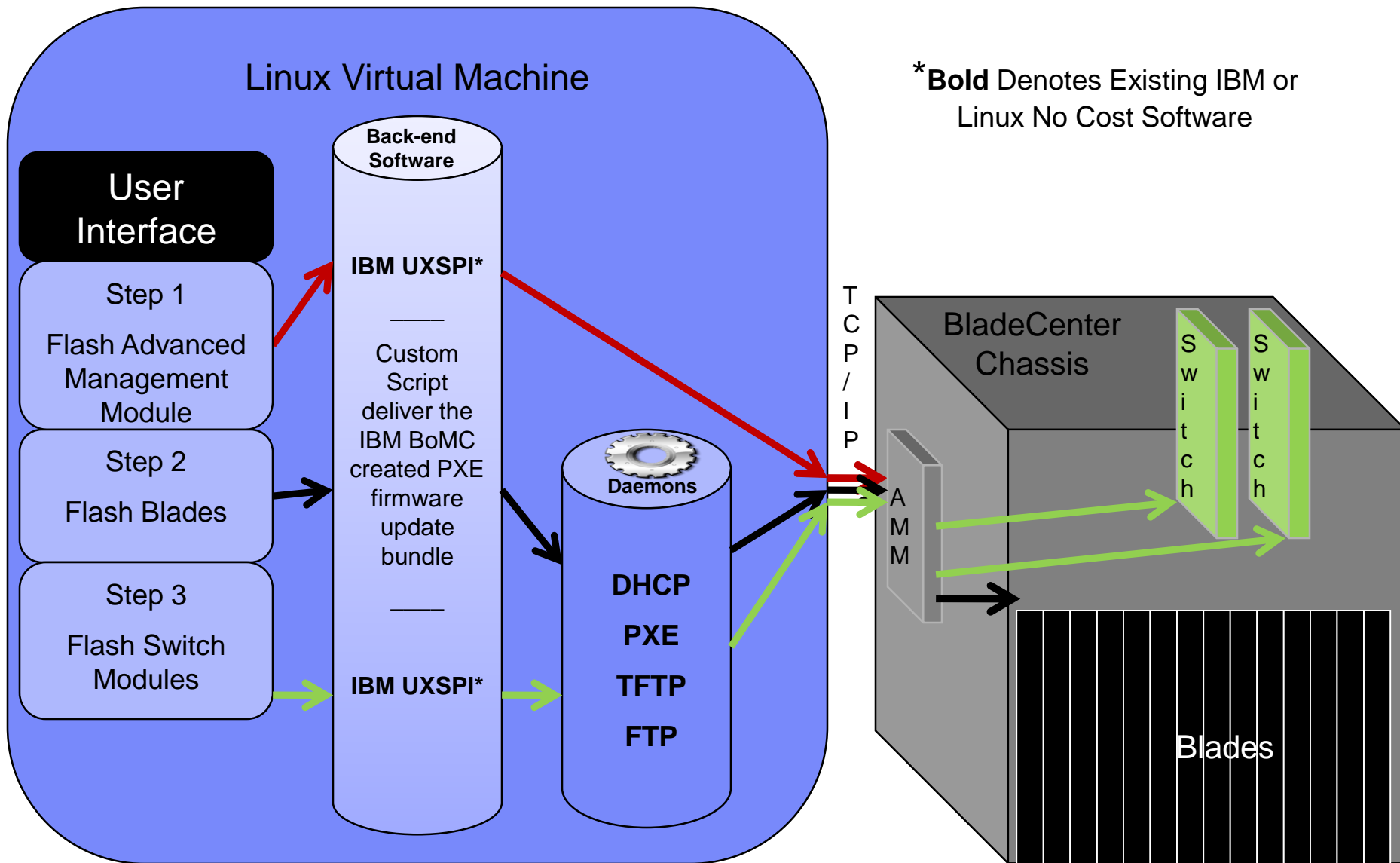
Deliver ISO as burned DVD to customer, as a leave-behind for later firmware flashing for replaced hardware.

# Functional Overview (Existing Windows Prototype)





# Functional Overview (Linux Prototype Concept)





## Background: let's compare IBM's Start Now Advisor with Lab Services' RapidFlash

- ✓ **Start Now Advisor** is a tool that simplifies deployment of the BC-S chassis
  - ✓ Version 1 became available July 2008
  - ✓ Version 2.0.1 became available June 2009
- ✓ **RapidFlash** is a tool (bundled with service) that simplifies deployment of the BladeCenter H chassis, and System x systems.
  - ✓ March 2008 prototype entered production June 2008, based on Windows and Linux laptops
  - ✓ Windows 2003 Standard Edition R2 SP2 x86 VM version deployed to internal team Feb 2009
  - ✓ Linux based RPM version deployed at customer site April 2009
  - ✓ Windows 2008 Web Edition SP1 x86 based version under development now, using for potential use at customer sites beginning in August 2009. Allows full use during 120 days grace period, and can then be activated using Volume License or Retail keys.

### *Important additions...*

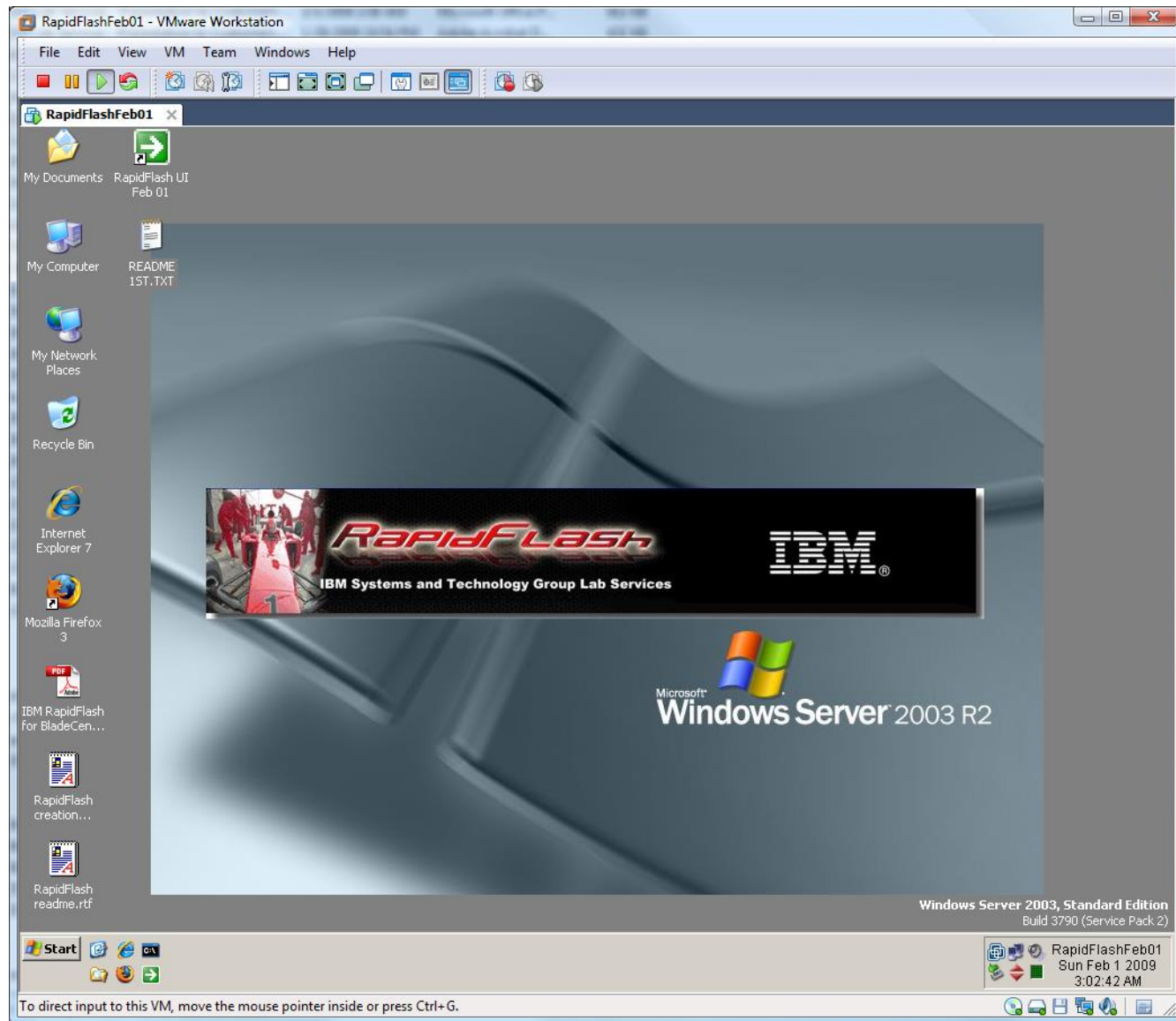
- ✓ Bootable Media Creator automatically pulls latest or tested bundles of firmware, used to prepare PXE or DVD images
- ✓ Helps deploy the entire chassis, using "wrapper" scripts we wrote to handle chassis switch modules

### *Who are we targeting...*

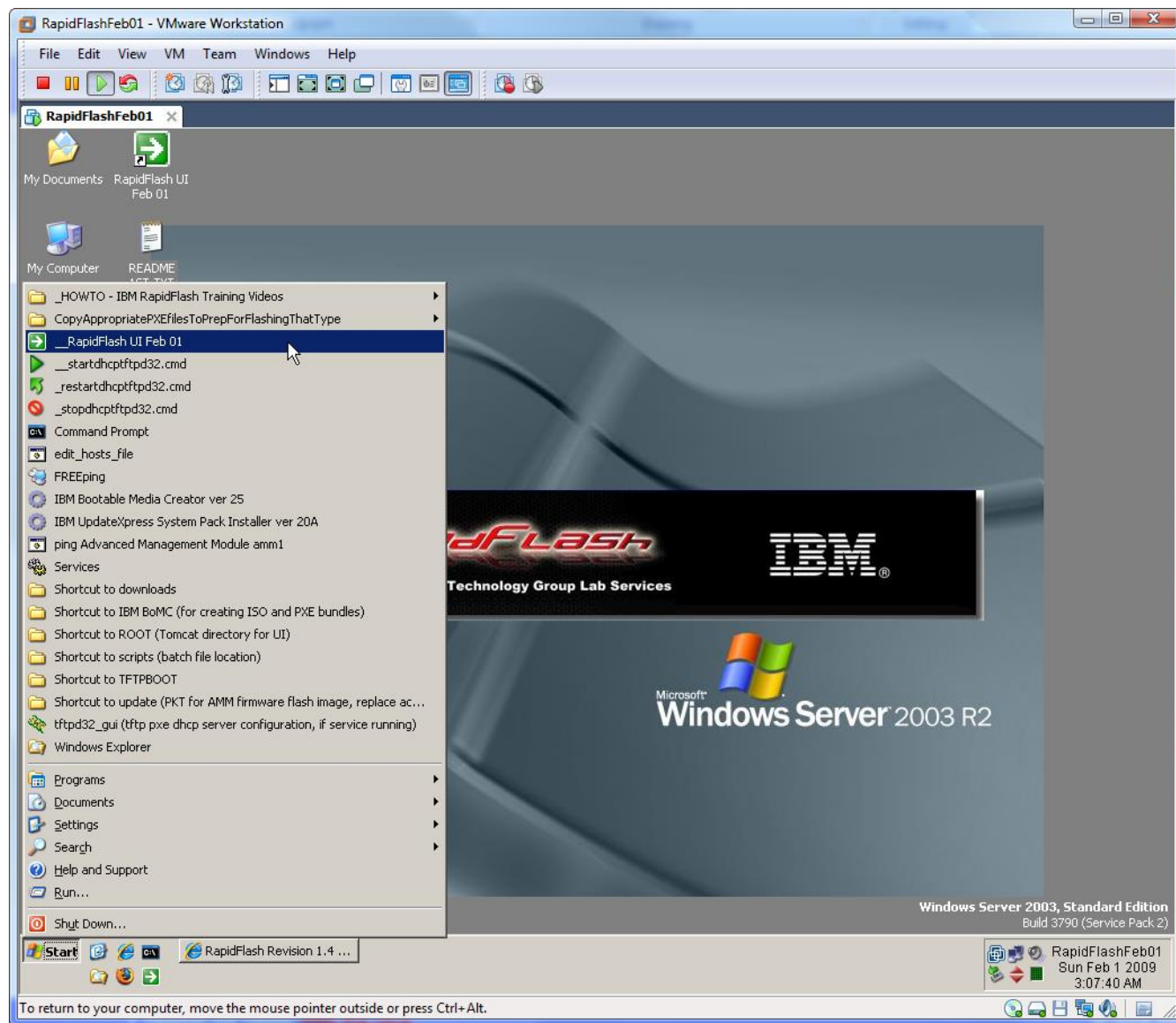
- ✓ Business Partners
- ✓ Customers

- Very modest training and system resource requirements (300MB RAM/32GB USB key) can allow an entire chassis full of switches, and 14 blades, to be completely flashed in under an hour, kicked off with a simple button-click user interface.
- Similar techniques can be used for System x flashing as well. Witness how easy it can be to overcome obstacles when dealing with firmware flashing, particularly in new datacenter deployments, where the only tool you may have is a laptop.
- A BladeCenter chassis filled with 14 blades has up to ~140 blade firmware elements to flash, in addition to management and switch modules.
- While IBM tools can create bootable IBM UpdateXpress System Pack firmware bundles, RapidFlash is a field-tested prototype IBM Systems Lab Services & Training offering that uses a pre-configured deployment mechanism for those bundles, for delivering repeated, automated, and reliable results.
- Especially suited for IBM Open Fabric Manager deployments, which require AMM, BIOS, BMC, NIC, and HBA OFM-compatible firmware updates.

# User Interface Prototypes

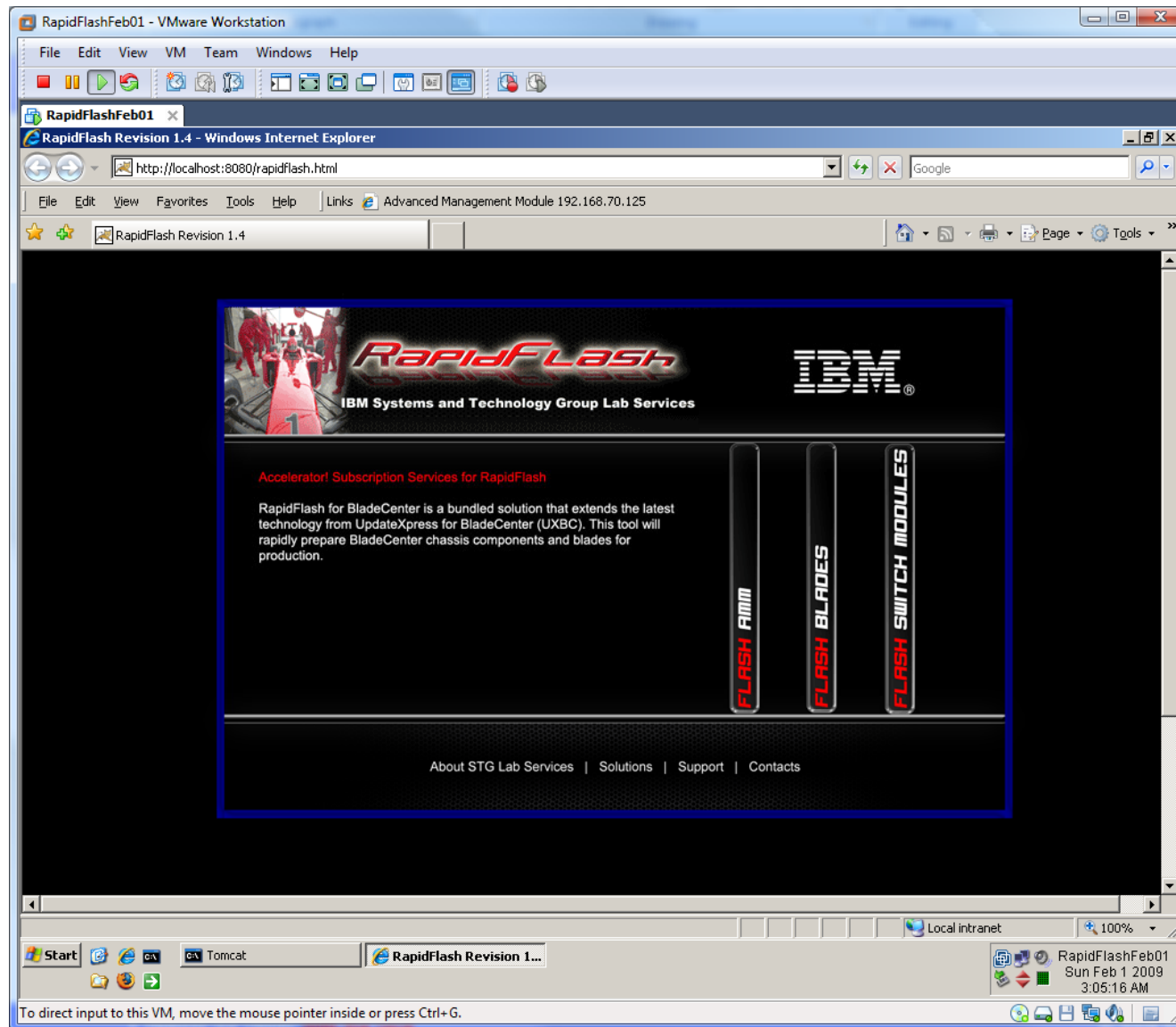


# User Interface Prototypes

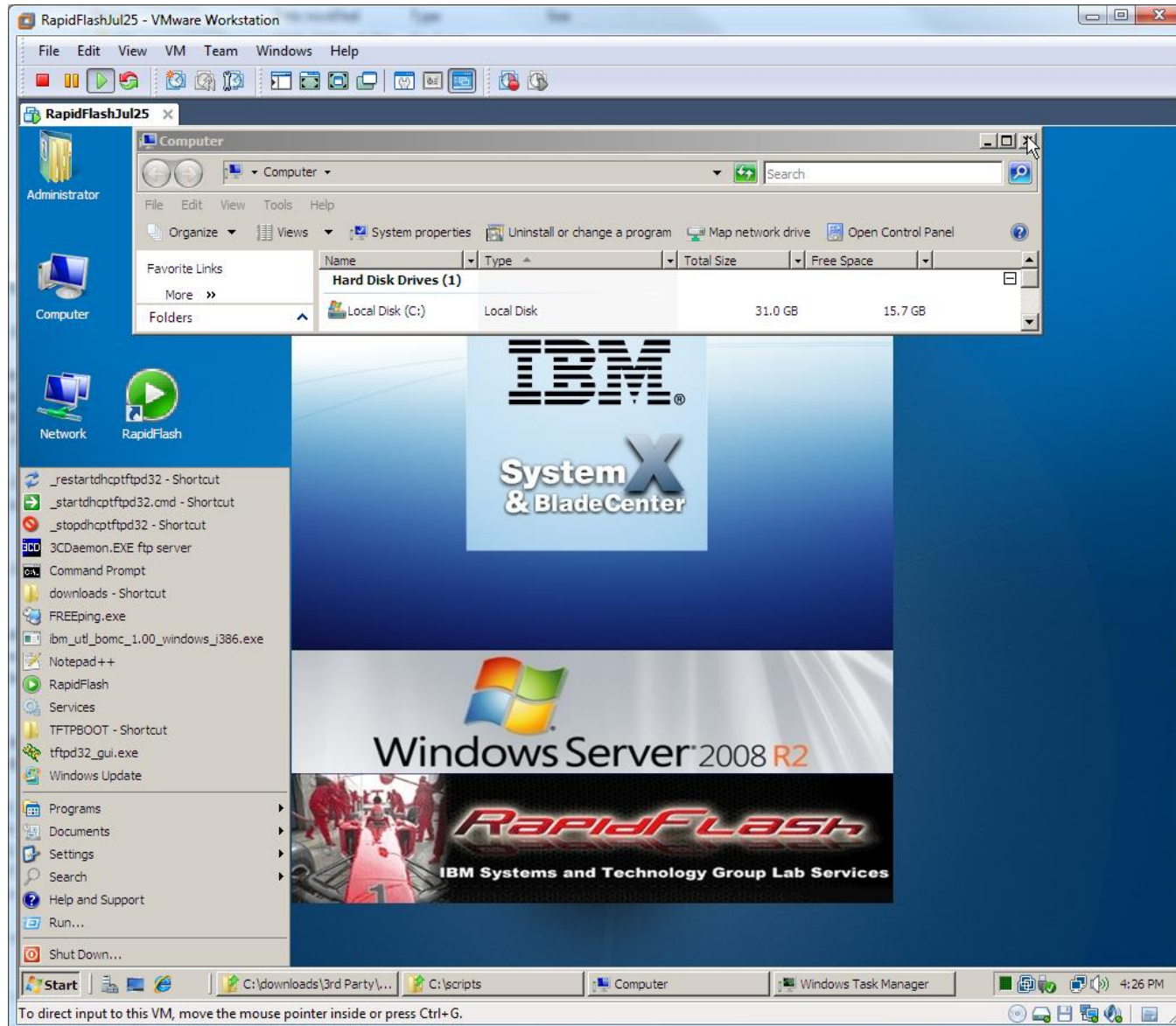




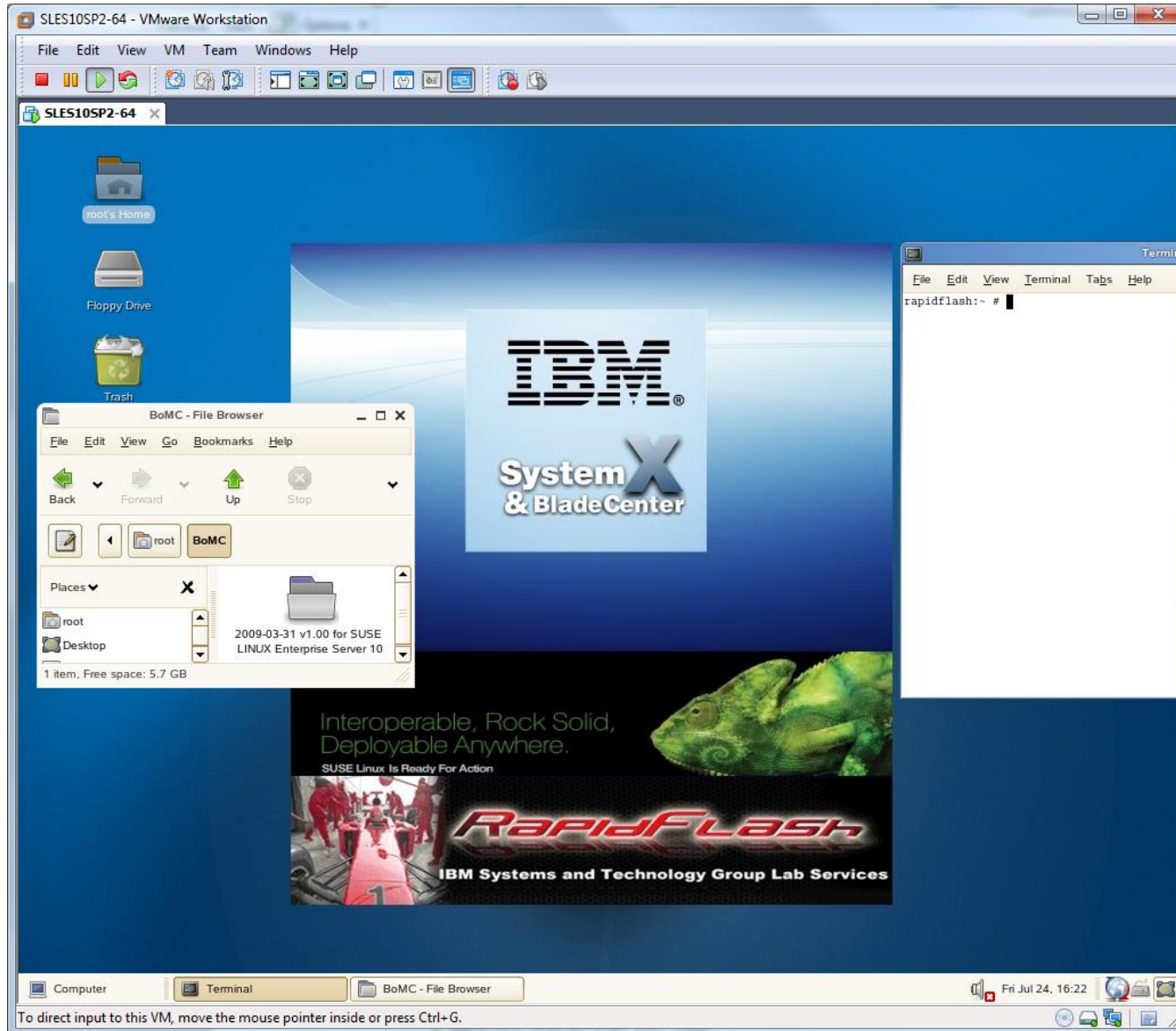
# User Interface Prototypes



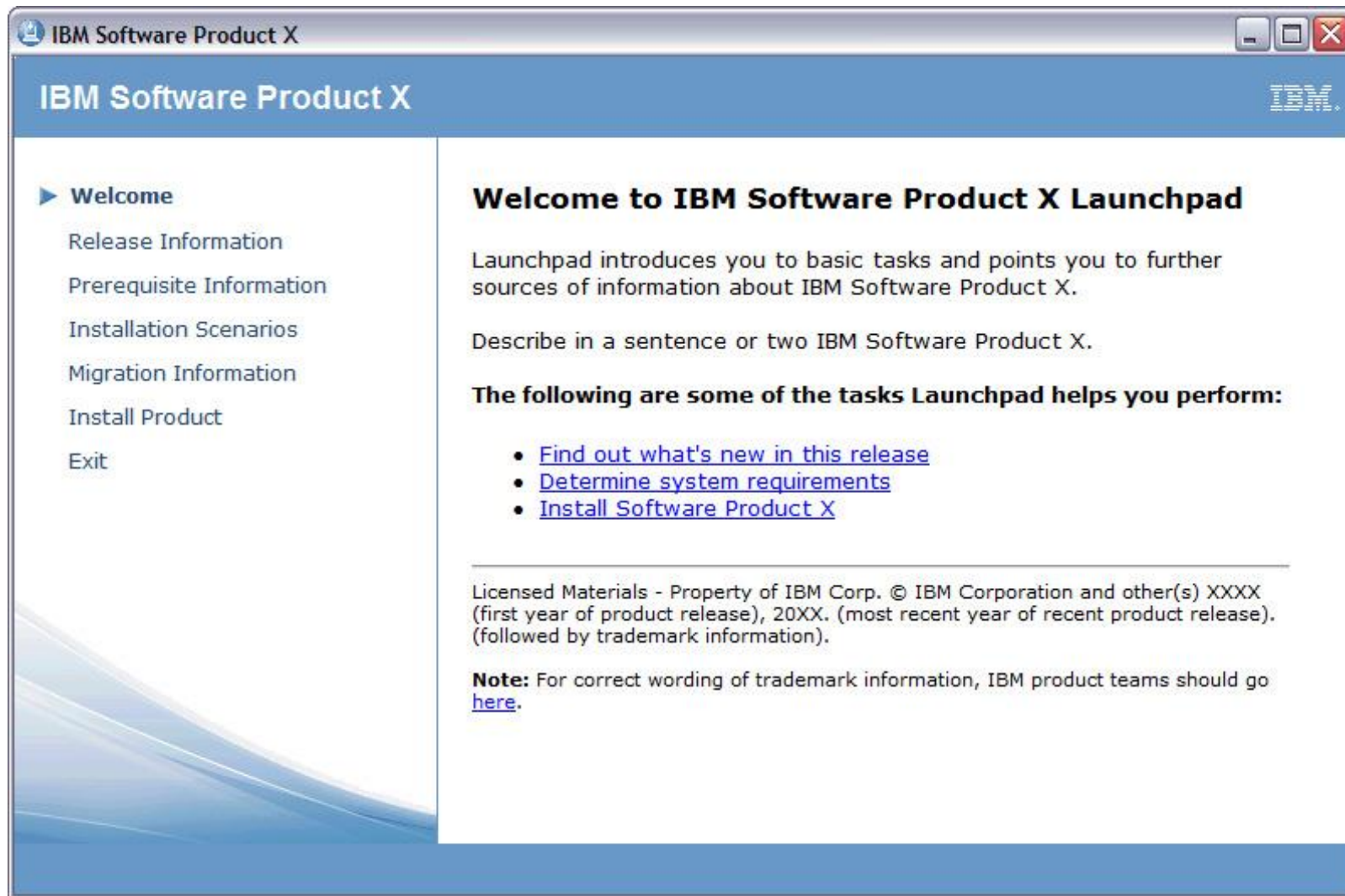
# User Interface Prototypes



# User Interface Prototypes



# User Interface Concepts (UI framework of existing IBM tools)





# A Look Under the Hood

## ■ 1) Flash Advanced Management Module

- The UI invokes a batch file that invokes UpdateXpress System Pack Installer, to send the pkt firmware image to the Advanced Management Module(s), and reboots when complete.

## ■ 2) Flash Blades

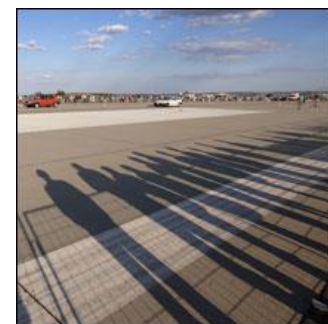
- The firmware update bundle is authored using IBM Bootable Media Creator, which bundles SLES10-based firmware images in a boot-from-LAN compatible format and an ISO format. A script powers off the blades, starts the DHCP/PXE service, then sequentially instructs blades to power up, to attempt their network boot sequence. This results in rapid boot-from-LAN of the SLES10 firmware update image, in temporary RAM disk. This automatically flashes all firmware elements in the blade, with no reboots between flash steps required. This method greatly exceeds the load speed of traditional one-at-a-time USB, mounted ISO image, or CDROM/DVD physical media methods of flashing firmware, with a completely automated, hands-off approach. The time savings overall is 5x-10x. Once the process is completed, firmware levels are verified, and success or failure status is reported to the user.

## ■ 3) Flash Switch Modules

- The UI invokes a batch file that invokes UpdateXpress System Pack Installer, to send the pkt firmware image to the switch modules (Cisco, QLogic, etc), and reboots when complete. The underlying mechanism is tftp or ftp, all preconfigured and conveniently contained within the appliance itself.

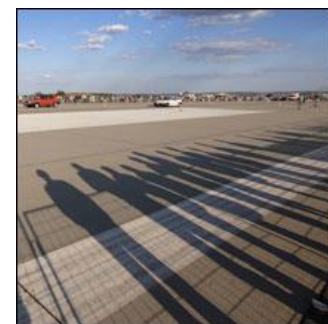
# Versatility, Extensibility, Advantage

- The design allows for the creation of an appliance based on Windows or Linux. Most of the software is readily available at no cost to customers already. What's unique is the preconfigured software, bundled with custom scripts to tie disparate procedures into one cohesive approach to getting the work done.
- A simple interface, and an easy adaptability, could allow easy integration into future IBM products, including Start Now Advisor.
- The virtual machine only requires ~300MB of available RAM and 15GB of disk space.
- There is no code left behind on any server operating systems, as the technique uses just RAM disk based firmware flashing for the blades.
- Many customer shops are Windows only or Linux only, and RapidFlash could readily be adapted to either customer set, with rewrites of very basic batch files/scripts, and associated configuration of related services/daemons.
- Proven to work very well in BOFM (BladeCenter Open Fabric Manager) situations, where virtualizing HBA WWPNS and NIC MAC addresses requires a very controlled set of BIOS/BMC/HBA/NIC firmware with matching, tested AMM code to go with it.
- Allows very smooth NEW deployments, particularly when the first item of its kind has been flashed and tested, allowing economies of scale to kick in.



## Thoughts for the future...

- better integration with other IBM products, with full UI
- integration with a royalty free Linux distribution, perhaps the IBM SLES10
- more automated initial configuration, as right now, there are still some manual steps involved with setting up switch module flashing
- more assurance for the customer that a particular firmware drop has been fully tested prior to coming onsite
- perhaps subscription to managing an enterprises firmware levels with out of band techniques used in RapidFlash, especially in environments that can't make use of IBM Systems Director
- enhance logging and error checking, looping back and repeating any failed firmware update attempts automatically
- take out of band techniques to the next level, avoiding PXE/DHCP/ftp/tftp entirely
- robust and easy to review firmware flash logging, including 3<sup>rd</sup> party switch modules for BladeCenter



## Thoughts for the future...

- complete automation of networking config for blades, for example, Chassis Internal Network setting, that allows all firmware traffic to the blades pass thru the one cable to the AMM's 10/100 ethernet interface
- robust mechanism to repeat firmware update attempts to handle any failures in an unattended manner
- handling of the wide variety of switch modules, right now, still relying on UpdateXpress System Pack Installer and whatever modules it supports
- handling of UEFI (next-gen-BIOS) on HS22, untested so far
- better automation during download and “tweaking” preparation phases, including “wrapper scripts”, allowing this to be more like a leave-behind deliverable. It's current state is primarily a Lab Services service, usually run from by an IBMer, on an IBM owned laptop.
- automated overnight burn-in, handling multiple cores makes this tougher, but prototype on 1 core has worked well





## Conclusion

- RapidFlash has already been proven at several large accounts, and successfully used on hundreds of blades. Dozens of BPs and customers have an expressed interest.
- This tool has enabled Lab Services & Training to deliver rapid flashing services, even well before the release of Bootable Media Creator publically earlier this year.
- One customer has licensed a custom Linux variant with great success, as an integral part of their bundled server deployment procedures. Hoping to leverage field experiences and direct customer feedback to help IBM's tools and offerings in the future.

## Customer Testimonial

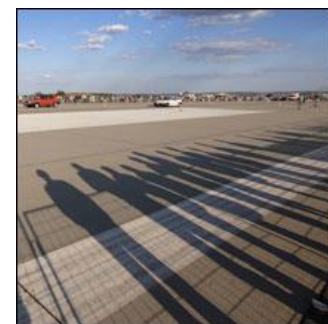
- Worked with Lighthouse Computer Services in Lincoln, RI, to test out function of RapidFlash at their Business Partner Innovation Center. Gathered critical feedback on this early prototype.
- Lighthouse Computer Services BladeCenter Engineer simply said,

***“Outstanding is the only word I can think of”***



## The Volunteer “Pit Crew”

- James Boland      STG Lab Services System x, Manager
  - Paul Braren      STG Lab Services System x, Project Starter and Manager
  - Robert Fenoglio      STG Lab Services System x
  - Eric Kern      STG Lab Services System x, Project Manager
  - Vinnie Hennessey      STG Lab Services System x
  - Bobby Stark      STG Lab Services System x
  - Ben Wang      STG Lab Services System x
- 
- Robert Barrett      STG, Systems Software Development
  - Lydia Do      STG, Deployment Group
  - Rodney Palmer      S&D, Field Technical Sales Specialist
  - Steve Sherman      STG, Modular Systems Development



# Reference Materials

## **IBM Bootable Media Creator Downloads**

<http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=TOOL-BOMC&brandind=5000016>

## **IBM UpdateXpress System Pack Installer 3.00 for Microsoft Windows**

<http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5069491&brandind=5000020>

## **IBM UpdateXpress System Pack Installer Scenarios**

[http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=/uxspi/uspi\\_t\\_scenarios.html](http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=/uxspi/uspi_t_scenarios.html)

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[http://www-03.ibm.com/systems/services/labservices/platforms/labservices\\_x.html](http://www-03.ibm.com/systems/services/labservices/platforms/labservices_x.html)



## Demonstration

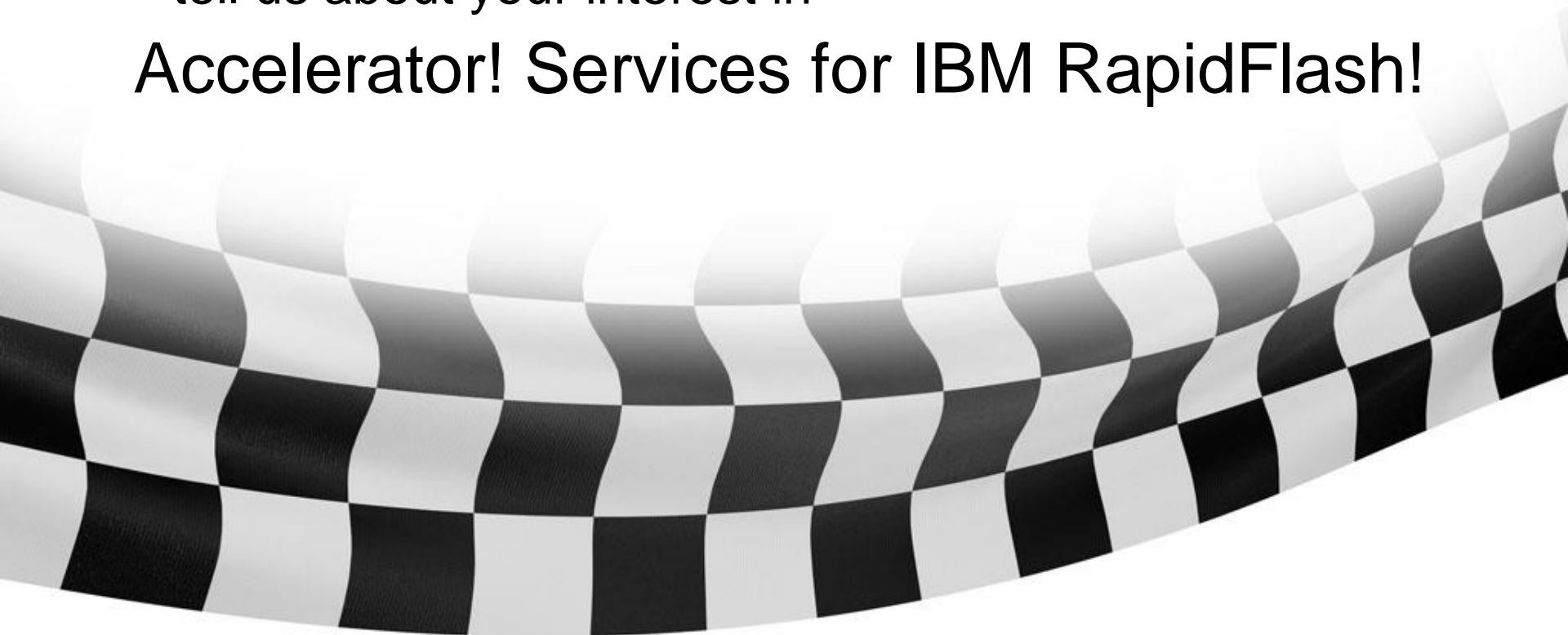
- Will I ever stop presenting, and finally start showing you stuff? Yes!

# Questions?

## Need more information?

- Email us at [stgls@us.ibm.com](mailto:stgls@us.ibm.com)
- tell us about your interest in

**Accelerator! Services for IBM RapidFlash!**



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