Optimizing Device Drivers For Terminal Server's Plug And Play Device Redirection Framework

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Agenda

- Introduction
- Architecture
- How to make your device Terminal Server redirection ready
- Call to action

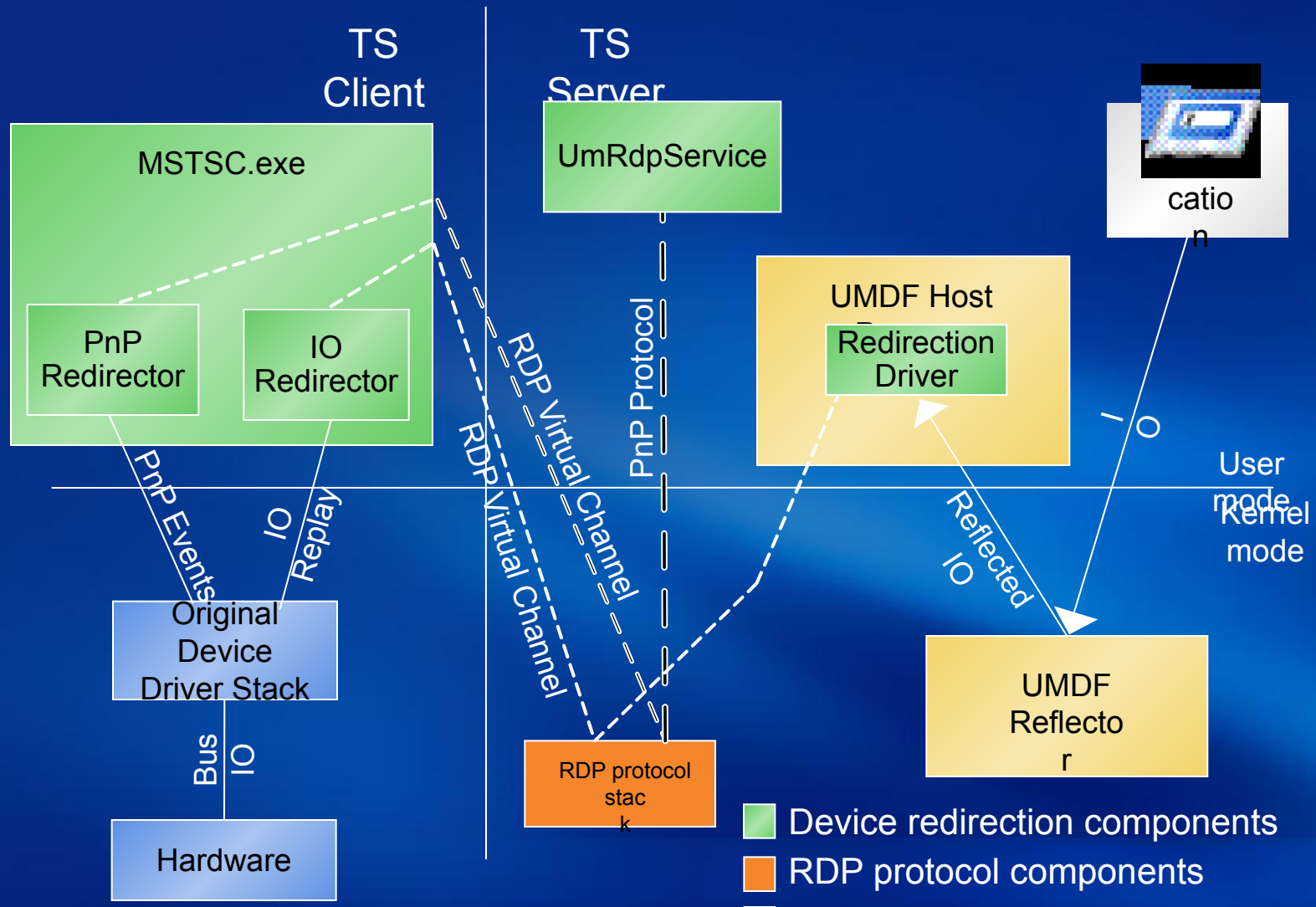
Introduction
Terminal Server PnP device redirection framework

- New feature introduced in Windows Vista and Windows Server codenamed “Longhorn”
  - Aligned with Terminal Server vision of providing rich remote experiences
- Ability to redirect certain types of PnP devices over Remote Desktop Connection or using Remote Programs
  - Applications access PnP devices seamlessly regardless of whether they run locally or remotely
  - Redirected devices scoped per session

Introduction
Terminal Server PnP device redirection framework

- Generic infrastructure lets potentially any type of PnP device to be redirected
  - Certain set of rules to be followed to write supported device drivers
    - All rules required to write drivers based on new User-Mode Driver Framework (UMDF) apply
  - Windows Logo Program for devices ascertains Terminal Server redirection readiness of device

Architecture



- Device redirection components
- RDP protocol components
- User - Mode Driver Framework (UMDF)
- Real device components

How It Works?
Terminal Server PnP Device Redirection Framework

- No actual device driver required on server
  - Use Terminal Server redirection driver on server
    - Takes care of I/O and PnP traffic between actual device driver on client and application on server
    - PnP and I/O notifications sent only to appropriate device in correct session
- Support for dynamically adding or removing devices while session is active

Inbox Supported Device Categories
For Windows Vista

- Windows Portable Devices (WPD)
  - MTP (Media Transfer Protocol) and PTP (Picture Transfer Protocol)-based devices
- Windows Embedded for POS (Point of Service) Devices
  - Using Microsoft POS for .NET 1.1

Terminal Server PnP Device Redirection

demo

Requirements

Make your device Terminal Server redirection compliant

- Follow UMDF guidelines
- Follow Terminal Server redirection guidelines
- Modify your driver INF
- Get Logo
  - Depends on whether your device category in WDK includes the Terminal Server redirection Logo test

Requirements
UMDF guidelines

- Do use only I/O manager APIs to communicate between driver and application
- Do not pass kernel objects between driver and application
- Do not pass data pointers for pre-allocated shared kernel buffers

Requirements
Terminal Server redirection guidelines

- Do not assume any kind of locality of reference
  - Do not use shared memory
  - Do not use registry
- Do allow your 32-bit driver to be able to talk to your 64-bit application and vice-versa
- Do not have strict timing expectations in responses
- Do allow multiple simultaneous access to device
- Do allow normal user context access to device

Requirements
Modify your driver INF

- On the server, the driver INF should load the TS redirection driver instead of the actual device driver
- On the client, the driver INF should register the device as being available for redirection
  - Only then the TS Client UI will enumerate it in the list of supported PnP devices for redirection

Modifying Driver INF

demo

Requirements
Get logo

- Applicable only to Windows Portable Devices for Windows Vista
- Requires two machine logical client/server setup
- Client/Server can both be Windows Vista
  - Require modified driver INF
- WDK lab at room 617 tomorrow at 9 am

Future Technology

Future Technology
Terminal Server PnP Device Redirection Framework

- Inbox support for more categories of PnP devices
  - Windows Mobile devices, scanners, etc.
- Generalization of Windows Driver Kit Terminal Server redirection Logo test
  - More device categories to be added
- Inclusion of checks in driver development tools like PREfast for drivers

Call To Action

- For your device drivers on Windows Vista and beyond
  - Follow UMDF guidelines
  - Follow TS redirection guidelines
  - Modify your driver INF
  - Get Logo (if applicable)

Additional Resources

- Web Resources
  - DEVFUND-0010 in Windows Logo Program Device Requirements for Windows Vista and Windows Server codenamed “Longhorn”:

http://www.microsoft.com/whdc/winlogo/hwrequirements.mspx

  - White paper on Device Driver INF Changes for Plug and Play Device Redirection on Terminal Server: http://www.microsoft.com/whdc/driver/install/ts_redirect.mspx
- Related Sessions
  - Ask The Experts session at noon tomorrow
  - Windows Driver Kit Lab: Room 617 at 9 am on 05/25/2006
  - User-Mode Driver Framework: Introduction and Overview
  - User-Mode Driver Framework: Technical Synopsis
  - User-Mode Driver Framework Lab
- For further questions on the Terminal Server PnP Device Redirection Framework, please send e-mail to:

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