# System zPDT™

## Overview and Update

VM Workshop: 2012

C.M. (Mike) Hammock

Information Technology Company



Business Partner IBM

# Overview: What is it?

- From IBM® (z1090 amd z1091)
- Software based System z®
- Runs on Intel architecture processors (such as IBM System x®)
- Provides almost all System z processor functions (z196™ level)
- Currently aimed at development/testing

# zPDT History

- Descendent of P/390
- Developed within IBM since approx. mid 2000s
- Internal Redbooks® in fall of 2006
- Used internally at IBM since early 2007
- Announced to developers fall of 2009
  - GA – Oct 2009
- ITC shipped first uPDT system Nov 2009

# Availability: Who can use it

- ISVs: Approved members of IBM PartnerWorld® for Developers developing products for use on System z
  - Similar to FLEX-ES® program for ISVs
- Normal in-house developers ← NEW!
  - Use "Rational Develop & Test" (RD&T)
  - Must have "Traditional System z" installed
  - Only use RD&T for development & test, no "Production"

# Availability: Where can you get it?

- zPDT:
  - ITC is worldwide exclusive distributor for zPDT – z1090
  - zPDT is available in two modes:
    - Z1090 token and code only (DIY)
    - Complete integrated system: uPDT
- RD&T (z1091)
  - RD&T is available from IBM and authorized Business Partners
    - Most provide only as DIY mode
    - ITC offers integrated "System ReDD"

# Licensing & Pricing: zPDT

- zPDT (z1090)
  - Token is $299 (OTC)
  - Each enabled processors is $3750 / yr
    - DIY users provide hardware, additional software, and time/effort to build/integrate
- uPDT
  - Fully integrated and configured, preloaded System z, with productivity tools, and full ITC support.
    - Range from ~$16K (mobile) - $35K (large Enterprise server)
- Z1090 – zPDT requires annual renewal

# Licensing & Pricing: RD&T

- Licensing / pricing not straightforward
  - Licenses are per user:
  - Can be "Named User" or "Floating"
    - "Floating"" is more expensive
  - Can be one year term, or "Forever"
    - "Forever" is about 3x more expensive
  - For "Forever" licenses Yearly S&S is available
  - Each "site" gets a z1091 token
    - Additional are available
  - Includes access to "ADCD-Like" systems

# zPDT Features

- Most System z processor features
  - z196 level
  - CP, IFL, zAAP, zIIP, and Crypto processors
- Improved performance & capacity
  - About 3x fastest FLEX-ES systems (Opteron® based)
  - 16 – 32+ GB memory feasible and practical
  - about 1 TB of disk (server base) is starting point
- More advanced I/O features
  - Emulated OSA adapters, QDIO, z/VM® Vswitch
- Future features
  - What does the future hold for emulation?
  - Example: Parallel Sysplex® support for z/OS® recently available

# Processor Details

- Interpretative plus cached JIT compiler processing
- 64 bit mode only
- 1 to 3 processors per token
  - Some ways around the 3 processor limit
  - Processors cannot be shared across instances
- Each processor can be defined as CP, IFL, zIIP, or zAAP
  - No performance advantage, but useful for testing
- Adjunct processors (Crypto)
  - do not count as licensed processors

# System Memory

- Storage size defined in activation profile (devmap):
  - memory 8192M
- Can define Expanded Storage:
  - expand 2048M
- Large (>32G) memory sizes practical and affordable
- Leave enough memory for Linux® & zPDT
  - Do not over-allocate memory and force Linux to page.
  - Excess memory may be used for filesystem cache

# I/O Devices

- Emulated disks use P/390 AWSCKD/AWSFBA format
  - Old P/390 files can be migrated and used
  - Use of the versioning feature would break compatibility
  - Uses the Linux file system & cache. (caution!)
- OSA devices (QSD and OSE modes) are available
- 3270 support via aws3274 and IP
- awstape and awsscsi are available for tape
  - caution with awsscsi: limited device testing/support
  - We heve tested SCSI 3490 & FCP 3592
- I/O operations cost more processor cycles than with FLEX-ES

# Sample Activation Profile

```
[system]
memory   8192m
expand   2048m

3270port 3270
processors 2

[adjunct-processors]
crypto  0

[manager]
name aws3274 0002
device 0200 3279 3274
device 0201 3279 3274
device 0202 3279 3274 cms
device 0203 3279 3274 cms
device 0204 3270 3274

[manager]
name awsckd 0001
#  base zVM 6.1 system
device 0120 3390 3990 /zdisk/610res.ckd
device 0121 3390 3990 /zdisk/610w01.ckd
device 0122 3390 3990 /zdisk/610w02.ckd
device 0123 3390 3990 /zdisk/610spl.ckd
device 0124 3390 3990 /zdisk/610pag.ckd
device 0125 3390 3990 /zdisk/610pg2.ckd
device 0126 3390 3990 /zdisk/610pg3.ckd
device 0127 3390 3990 /zdisk/610us1.ckd

[manager]
name awsosa 0009 --path=f0 --pathtype=OSD
device 500 osa osa --unitadd=0
device 501 osa osa --unitadd=1
device 502 osa osa --unitadd=2

[manager]
name awsosa 0019 --path=A0 --pathtype=OSD      --
tunnel_intf=y --tunnel_ip=10.1.9.1 --
tunnel_mask=255.0.0.0
device 504 osa osa --unitadd=0
device 505 osa osa --unitadd=1
device 506 osa osa --unitadd=2

[manager]
name awstape 004
Device 590 3490 3490
Device 591 3490 3490
[manager]
name awscmd 3004
device 580 3490 3490
```

# Performance Factors

- Processor/CPU: MIPS are meaningless, but…
  - Think in terms of 200 MIPS (per processor) range
  - Specialty processors same speed as CPs
  - Not all performance features available (AES-256)
- Disk performance **can** be very good
  - 10K or 15K rpm, 6 Gbps SAS drives are available
  - Hardware RAID-5 with "Write through" cache is very quick
  - Linux filesystem buffer and no "channel transfer" time
- Memory:
  - At about $25/GB (IBM price) you should not let memory size be a performance constraint/issue.

# Planning guidelines: 1

- Think of each zPDT instance as a separate single LPAR, or CEC; not LPARs on a CEC
- Use z/VM with multiple guests rather than multiple zPDT instances
  - Allows processor sharing
  - Less complex operation
  - Use z/VM Vswitch to simplify networking

# Planning guidelines: 2

- Memory: plan 1 – 2+ GB memory for Linux, zPDT, and disk cache
  - More memory for disk cache improves disk performance, but may impact data integrity
  - z/VM systems may want to use expanded storage
- Disks: Use SATA (7200 rpm) for cost/capacity, SAS (10K or 15K rpm) for performance
- Use (hardware) RAID whenever possible
  - Hot spare well worth the cost
  - RAID-5 performance penalty is minimal these days

# Watch out for…

- Networking
  - Configuration can be complex
  - Significant limitations, some not obvious
  - awsosa is still a bit "fussy", but getting better
- Sharing resources is difficult
  - z/VM helps this
- Installing and Preparing Linux for zPDT can be tedious

# uPDT Product Philosophy

- Complete, packaged, ready-to-run systems
- Optimized for zPDT use
  - Based on extensive experience
- Multiple Ease-of-Use features
- Configured to user specifications
- Customized user documentation
- Ongoing support
- Same features for uPDT or ReDD

System uPDT™

# Mobile System

- Mobile/Laptop currently based on a Lenovo® W520:
  - Quad Core processor,
  - 8 – 16 GB memory,
  - 500 GB disk
  - eSATA, USB-2 and -3 ports
  - openSUSE 11.4 Linux base

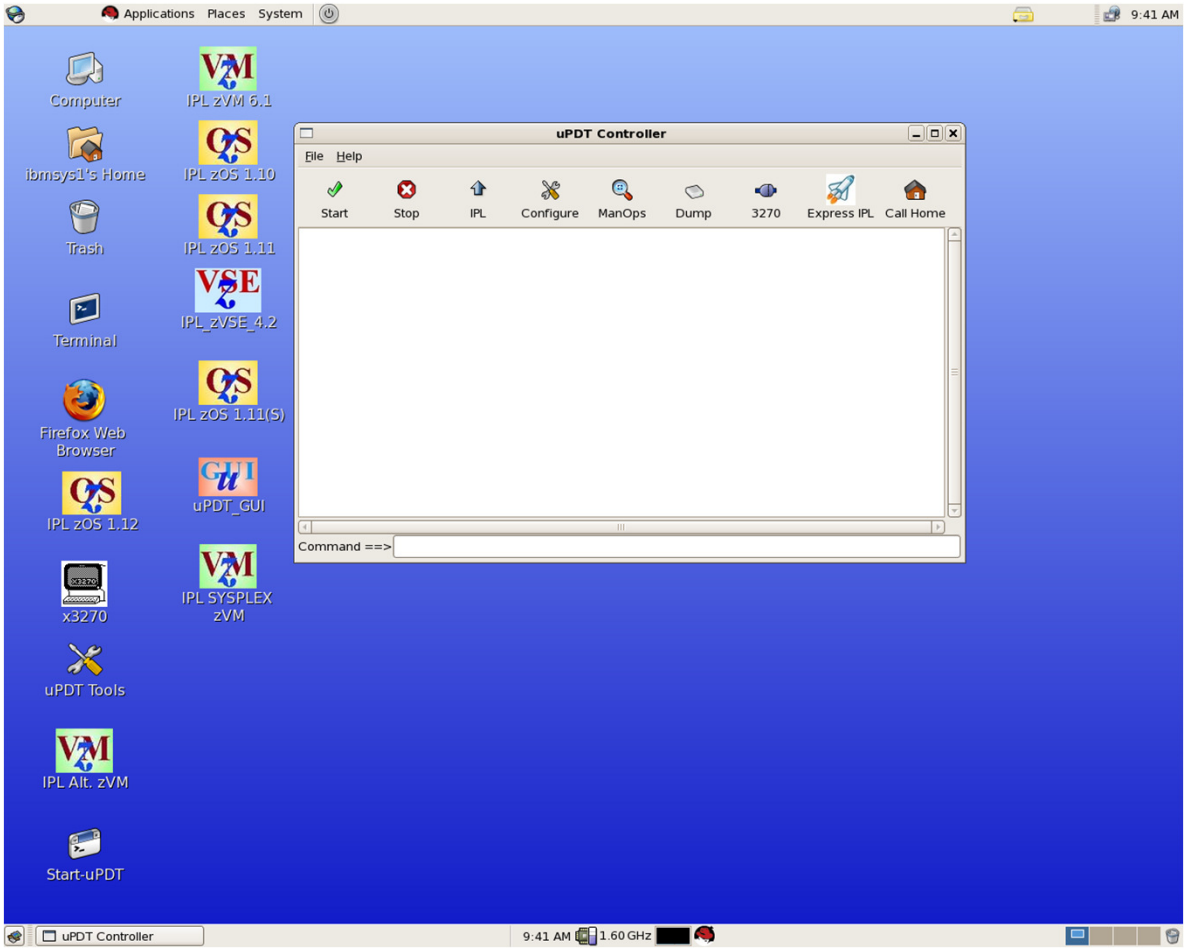
# Midrange and Enterprise Systems

- 6 & 8-core processors up to
- Very large memory capacities
  - Up to 24 DIMM slots, up to 16 GB/DIMM
- 8, 16, or 24 disk drive capacity (146, 300, 500, 600 & 1000 GB disks; SATA or SAS)
- RAID adapter: 6 Gbps SAS/SATA, 1 GB cache (flash memory backed up)
- Internal tape drives (LTO/SAS) optional
- RHEL 6.x or openSUSE 12.1 Linux

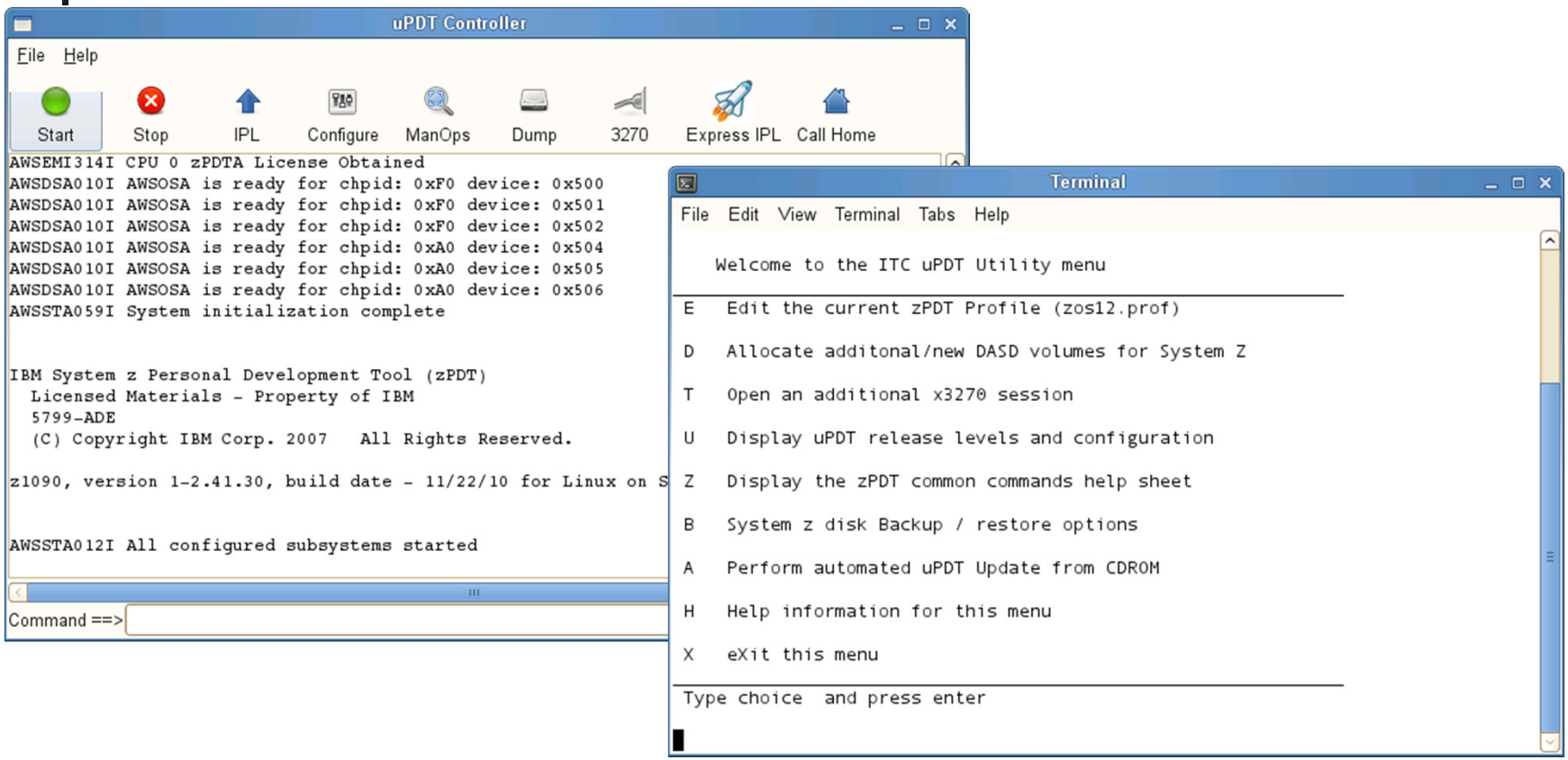
# All uPDT Systems

- Custom backup/restore function to external USB disk (Linux and System z environments)
- Ease of use features
  - Full function GUI with "express IPL"
  - "One-click-IPL" programs
  - Tools: 3270 sessions, allocate disks, backup, etc.
- CallHome program sends Config data to ITC
- ITC support & assistance

# uPDT Desktop



# GUI & Tools


uPDT Controller
File Help
Start
Stop
IPL
Configure
ManOps
Dump
3270
Express IPL
Call Home
AWSEMI314I CPU 0 zPDTA License Obtained
AWSDSA010I AWSOSA is ready for chpid: 0xF0 device: 0x500
AWSDSA010I AWSOSA is ready for chpid: 0xF0 device: 0x501
AWSDSA010I AWSOSA is ready for chpid: 0xF0 device: 0x502
AWSDSA010I AWSOSA is ready for chpid: 0xA0 device: 0x504
AWSDSA010I AWSOSA is ready for chpid: 0xA0 device: 0x505
AWSDSA010I AWSOSA is ready for chpid: 0xA0 device: 0x506
AWSSTA059I System initialization complete
IBM System z Personal Development Tool (zPDT)
Licensed Materials - Property of IBM
5799-ADE
(C) Copyright IBM Corp. 2007 All Rights Reserved.
z1090, version 1-2.41.30, build date - 11/22/10 for Linux on S
AWSSTA012I All configured subsystems started
Command ==>
Terminal
File Edit View Terminal Tabs Help
Welcome to the ITC uPDT Utility menu
E Edit the current zPDT Profile (zos12.prof)
D Allocate additonal/new DASD volumes for System Z
T Open an additional x3270 session
U Display uPDT release levels and configuration
Z Display the zPDT common commands help sheet
B System z disk Backup / restore options
A Perform automated uPDT Update from CDROM
H Help information for this menu
X eXit this menu
Type choice and press enter

# References

ITC's uPDT & ReDD Information pages:

www.p390.com/updt/ http://www.p390.com/redd/

zPDT Overview/Comparison whitepaper (M. Hammock)

www.hammocktree.us/zpdt/zpdt_whitepaper.pdf (a bit outdated now)

IBM's zPDT "Home page"

www-304.ibm.com/partnerworld/wps/servlet/ContentHandler/pw_com_zpdt

IBM zPDT Redbooks: (www.ibm.com/redbooks)

SG24-7721: System z Personal Development Tool Volume 1: Intro. and Reference

SG24-7722: System z Personal Development Tool Volume 2: Installation and Basic Use

SG24-7723: System z Personal Development Tool Volume 3: Additional Topics

SG24-7859: System z Personal Development Tool: Coupling & Parallel Sysplex

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# zPDT Wrap-Up

**Questions ?**

**Comments ?**

**Discussion ?**

**Demo?**