# IBM zPDT Technology – Present and Future Changes are coming!
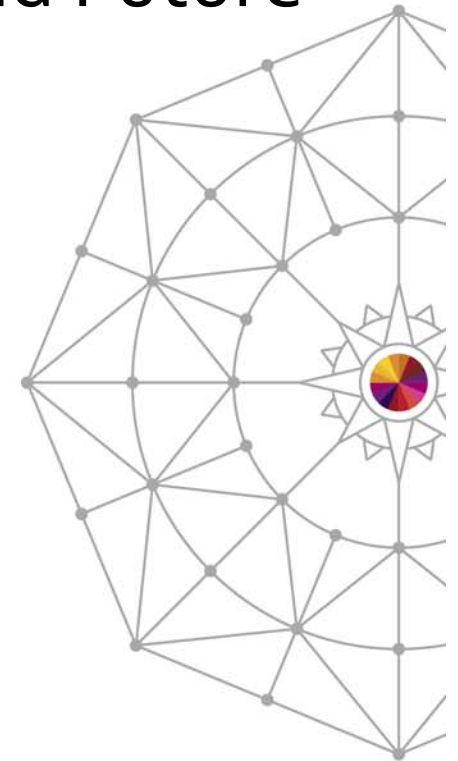
*by*

*C. Mike Hammock  and  Stan H. King*
*Information Technology Company*

*August 4, 2014*
*David L. Lawrence Convention Center*
*Room 316*

SHARE
in Pittsburgh 2014

# Trademarks

- SystemRedd, uPDT, Ultimate Personal Development Tool and zData Appliance are trademarks of Information Technology Company, LLC.

- zOS, Rational, PartnerWorld, IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. These and other IBM trademarked terms are marked on their first occurrence in this information with the appropriate symbol (® or ™), indicating US registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at http://www.ibm.com/legal/copytrade.shtml.

# Disclaimer

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion.



Photo of IBM 1090 and 1091 Tokens

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

# Technology Types (zPDT)

## 1090-Lxx

- Independent Software Vendors / Commercial Software Developers
- Must develop products for sale using System z technology targeted for System z platforms
- Must be vetted by IBM in advance and recertified annually
- Must become members of IBM Partners In Development and signatory to zDD terms and conditions
- Maximum of eight (8) CPs can be configured (CP, IFL, zIIP, zAAP)
- Can run Sysplex configurations
- Can run multiple guests under zVM
- Access to zOS (via ADCD media or LT media)
- Access to zVM and zVSE (via FTP download from IBM Dallas)
- For development, testing and training activities only; No production!

# Technology Types (RD&T)

## 1091-Lxx

- Rational product targeted towards corporate or in-house development

- Available to anyone wanting to program for System z

- No qualification requirements

- Maximum of 99 processor licenses per token and 8 CPs per instance can be configured but impractical

- Access to zOS (via ADCD media)

- Not available with zVSE or zVM (yet!)

- Can run Sysplex configurations (only situation with zVM – special!)

- Different cost factor metrics based on user seats or capacity; generally more expensive than zPDT

- For development, testing and training activities only; No production!

# State of the Technology

## IBM zPDT 1090 Status

- Latest release: 1.5-47.14 (Driver 47.14.01)
- Architecture Set: EC12 equivalent
- Additional security for ADCD: "fingerprints"
- Future z360 compatibility

## IBM Rational RD&T 1091 Status

- Latest release: 1.4-45.26 (Driver 45.26)
- Architecture Set: EC12 equivalent
- At least one release behind 1090

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

# zPDT V1 R5 Enhancements – GA5

- **zEC12 Crypto Emulation Enhancements**
  - Export Triple Date Encryption Standard (TDES) key under Advanced Encryption Standard (AES) transport key
  - Diversified Key Generation Cipher Block Chaining (CBC) support
  - Initial PIN Encrypting KEY (IPEK) support
  - Remote Key Export (RKX) key wrapping method support
  - Integration of User Defined Extensions (UDX) into CCA

- **I/O Enhancements**
  - 3592 Tape Support

- **Coupling (CFLevel 19 SL30)**
  - Improved resilience and performance for exploitation of Thin Interrupts

- **Performance Updates**
  - Instruction execution

- **ADCD Security**
  - Media encryption and OS fingerprinting

# Acquiring the Technology

- For zPDT (1090), customers can DIY or purchase a complete solution directly from the authorized IBM distributor. Technology delivery is worldwide:

  ➢ 67% of customers select the DIY approach;
  ➢ 33% select a total solution.

- Rational RD&T (1091) customers can DIY or purchase a complete solution directly from an IBM authorized Business Partner:

  ➢ 25% of customers select the DIY approach;
  ➢ 75% select a total solution.

# Customer Requirements – Experiences Factoid

- 25% : wanted a replicated production environment (subset or complete) dedicated to development and under their control;

- 41% : were satisfied with the ADCD environment as installed from DVD media, and only required minimal changes before taking over administration;

- 35% : required extensive customization of the ADCD environment to conform to corporate standards or project needs;

- 22% : require the use of DB2 and need additional configuration including product enablement such as SMS, IOCDS, and DB2 LOG MGMT;

- 100% : request basic configuration of the networking essentials including the underlying Linux TCPIP and OS TCPIP (VM, VSE, MVS), as well as TSO and OMVS.

# *Using the Technology*

## DIY Implementations

- Consider it an appliance;

- Do not host other "apps" within the server Linux environment;

- As an appliance the version/flavor of Linux should not be a factor or a decision element;

  - ➤ Problems can occur when supporting anything other than Red Hat or SuSE;

  - ➤ Only Specific Linux versions tested by IBM and ITC;

  - ➤ IBM support limited to versions tested;

## Why not to diverge

- Commonality aids support;

- No real benefit with alternate Linux flavors.

# *Implementation Notes*

- **3590 & 3592 tape support NOW finally works.  Recently certified by ITC**;

- **Going beyond 3-Way:**
  - ➢ Some of the large ones: 5-Way, 6-Way, More!

- **Trials and tribulations:**
  - ➢ Performance and configuration issues;
  - ➢ Token update issues;
  - ➢ It is problematic trying to make your zPDT exactly like your heavy-metal big box, too much is sometimes too much.

# *Implementation Notes*

- **VMWare and KVM Testing Status**
  - ➢ VMWare vSphere 5;
  - ➢ Red Hat Enterprise Virtualization (KVM/ RHEV-h) 6.1;
  - ➢ IBM HX5 blades for use with the zEnterprise BladeCenter Extension (zBX) Model 003

- **Benefits - Is there one?**
  - ➢ No performance benefit
  - ➢ Marginal administrative benefit

- **Drawbacks**
  - ➢ Resource allocation and processing priority are major factors to good performance; more is always better
  - ➢ Networking performance

# Recent Problems Encountered

- **GA4**
  - Innovation FDR Software – LRE CCW   (fixed in GA5+)
  - SSI, zVM 6.3                              (fixed)
  - ALCFBA non-standard size FBA unusable  (fixed in GA5)

- **GA5**
  - zOS V1.11 Nucleus ABEND      (fixed in 47.14)
  - zVSE no work!!                      (fixed in 47.14)
  - High volume FTP                     (Linux config resolution)
  - ALCFBA non-standard size FBA unusable  (fixed in 47.14)
  - Locate Record data chaining problem  (fixed via patch and 47.14.01)

# *ADCD & 1090/1091 Changes*

- **zOS, zVM, zVSE Encrypted Delivery for Optical Media**
  - ➤ CustomPak and ServerPac installs not affected;
  - ➤ Decryption key will unlock specific volumes;
  - ➤ Decryption process will also "fingerprint" key files;
  - ➤ ADCD distribution will not run on real metal.


- **New process for token authentication & processing**
  - ➤ Multi-part response from update request


- **Apparent changes in AWSCKD format**

# *New Token Update Process*

**How, why, what!**

The following pages document the steps and variations between the GA4 and GA5 1090 code authentication requests and update processing. A similar process will be forthcoming for RD&T 1091.

Also included is a verification step that you can use to verify proper update of the 1090/1091 token.

The decryption of ADCD content will be discussed. Currently all zOS ADCD media starting with V2.1 must be processed in this fashion. zVM and zVSE will be next to embrace this method.

# Steps to Install & Run z/OS 2.1

| Action to accomplish | zPDT Running? | As root? | Command to use |
|---|---|---|---|
| Get zPDT Driver 47.14.01 | Either | N/A | Download from p390store.com |
| Move install file to /tmp and make executable | Either | Either | Move file to /tmp<br>chmod 775 z1090-1-5.47.14.01.x86_64 |
| Execute the install program | No | Root | In /tmp<br>./z1090-1-5.47.14.01.x86_64 |
| Request a license update file and send it to support@p390store.com | Either | Root | In /usr/z1090/bin<br>./Z1090_token_update –r<br>/path/company-name_token-serial.req |
| Receive and apply the license update. Remove the token for 30 seconds and reinsert. | No | Root | In /usr/z1090/bin<br>./Z1090_token_update –u<br>/path/company-name_token-serial.zip |
| Install the z/OS 2.1 RES volumes | No | Non-root | Z1090_ADCD_install /scratch/z1res1.zPDT<br>/zdisk/z1res1.ckd |
| Check status of token | Yes | Non-root | token |
| Check license availability | No | Root | In /usr/z1090/bin<br>Z1090_token_update -- status |

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

# *Multi – Token Considerations #1*

More zPDT users are implementing multiple processors utilizing multiple tokens. This is valid, but there are some significant considerations.

- Any token/license processing must be done with only a single token inserted;

- Having more than one token installed will cause unpredictable problems and may invalidate your token;

- When generating license request files:  only have one token inserted;

- When updating tokens: only have one token inserted;

- For most users this will mean having your zPDT system shut down when doing token processing

# Multi – Token Considerations #2

- After unplugging/plugging multiple tokens they may be detected in a different order;

- Plan on resetting the uim serial number:  (as root)
  - ➢ cd  /usr/z1090/bin
  - ➢ ./uimreset  -I

- Your system may now be using a different serial number so your system z OS will see a different serial number!
  - ➢ If you use serial numbered OEM products, try swapping the tokens

- Consolidate multiple tokens into one whenever possible it makes for much easier administration.

# *Restrictions*

- Cannot run z/OS 2.1 on an older level of zPDT, must be GA5 or newer;

- Cannot run ADCD distribution z/OS 2.1 on a real System z – It will not run;

- Decrypted z/OS image is "fingerprinted" with your individual ID;

- Expect that future releases of zVM and zVSE will have similar restrictions;

- Updating of 1090 code and licenses must be done with zPDT instances stopped.

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

# *Recommendations*

- Stick with standard SuSE and Red Hat distributions of Linux

- Chose a robust x86 platform with multi-core CPU based on rule-of-thumb:  *x86 cores needed ≥  # of 1090 CPs  +  1* *(at minimum)*

- Chose RAID with cache to improve I/O performance and reliability

- Simplicity rules; start small and add complexity after confirming operation (e.g. Sysplex, VM SSI, multi-stack shared TCPIP, etc.)

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

Information Technology Company LLC

HQ in Falls Church, VA

Service Offices in Houston, TX; Raleigh, NC;

and Atlanta, GA

800-994-9441 / 703-237-7370

www.p390.com