IBM Education Assistance for z/OS V2R1

Item: Tracking Facility
Element/Component: BCP Generic Tracker

Material is current as of June 2013

Agenda

- Trademarks
- Presentation Objectives
- Overview
- Usage & Invocation
- Migration & Coexistence Considerations
- Installation
- Presentation Summary
- Appendix

Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.
- The term “tracker” or “tracking facility” is used as short form of “IBM Generic Tracker for z/OS” (new) or “IBM Console Tracking Facility” (old).
- The term Health Checker is used as short form of “IBM Health Checker for z/OS” in this presentation.
- The term “health check” or just “check” is used as short form of “health check for the IBM Health Checker for z/OS” in this presentation.

Presentation Objectives

- Introduce the new tracking facility “Generic Tracker”.
- Compare Generic Tracker to the “old” Console Tracking Facility and show how to switch from old to new.

Overview

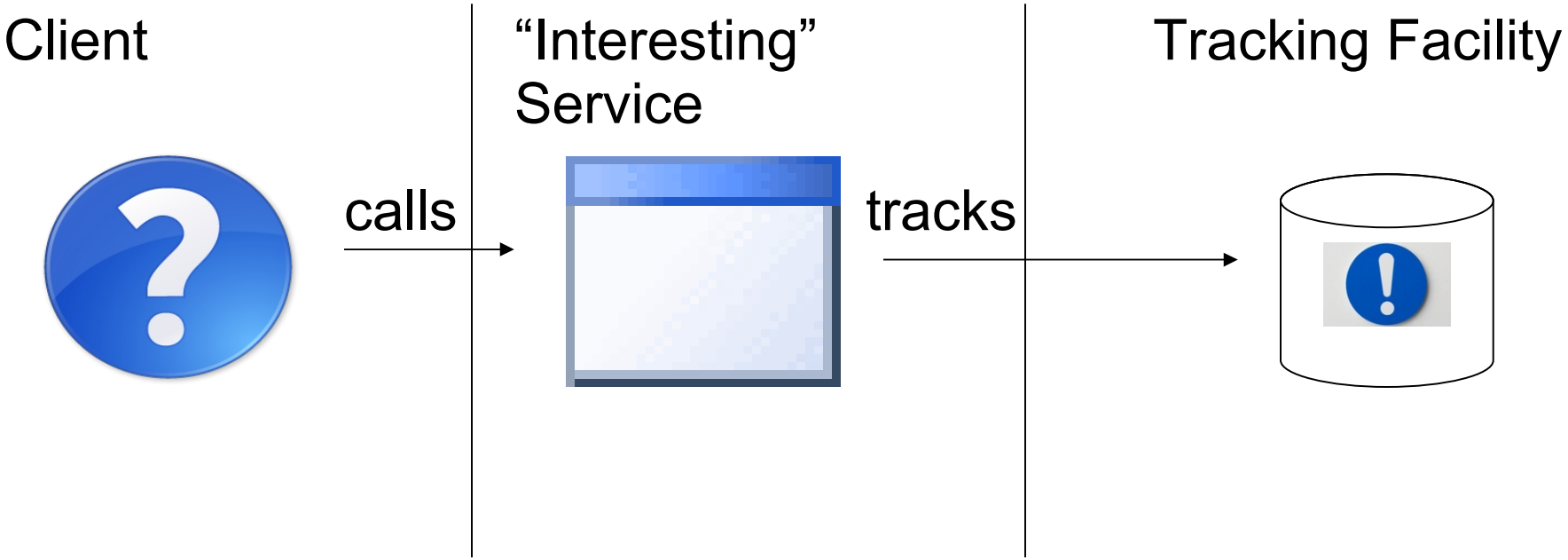
- Problem Statement / Need Addressed
  - The existing “One-byte console ID tracker” started as a single purpose migration aid. Over time other components used it to track events that would aid in their migration efforts. While never designed for such additional use, the Console Tracker reached its limits.
- Solution
  - Provide a “generalized” version of the tracking facility, the new “Generic Tracker”.
- Benefit / Value
  - The new tracking facility allows to track more information and is more flexible when it comes to working with the tracker, making it a general tool to assess migration needs and to assess exploitation of product functions.

Usage & Invocation

- The following describes the Generic Tracker as a new function, as if you never used / heard of the “old” Console Tracker.
- The Migration section later will describe the connection between new and old tracker.

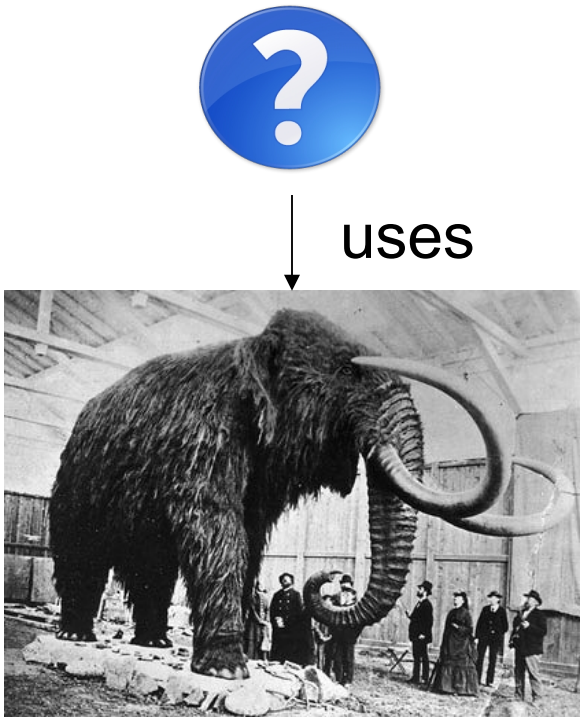
What does it do?

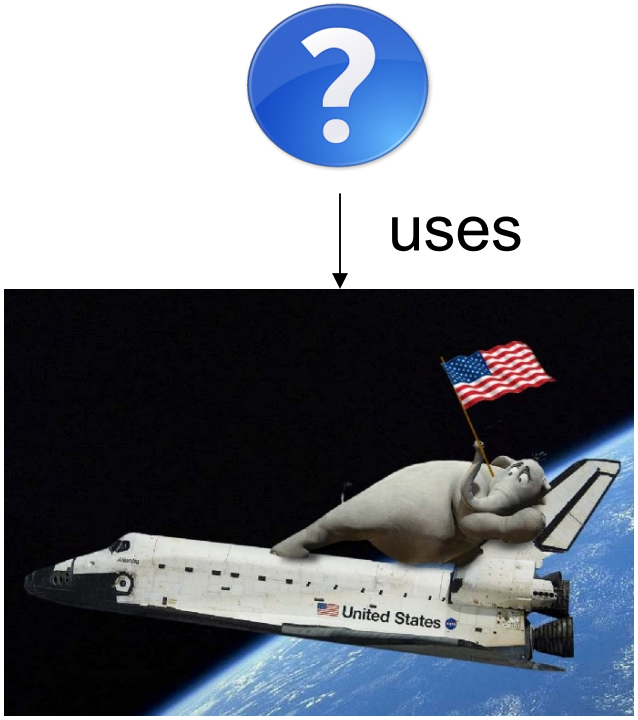
- It finds the name of a calling program and
- keeps a (track) record of the call for you



What to use it for?

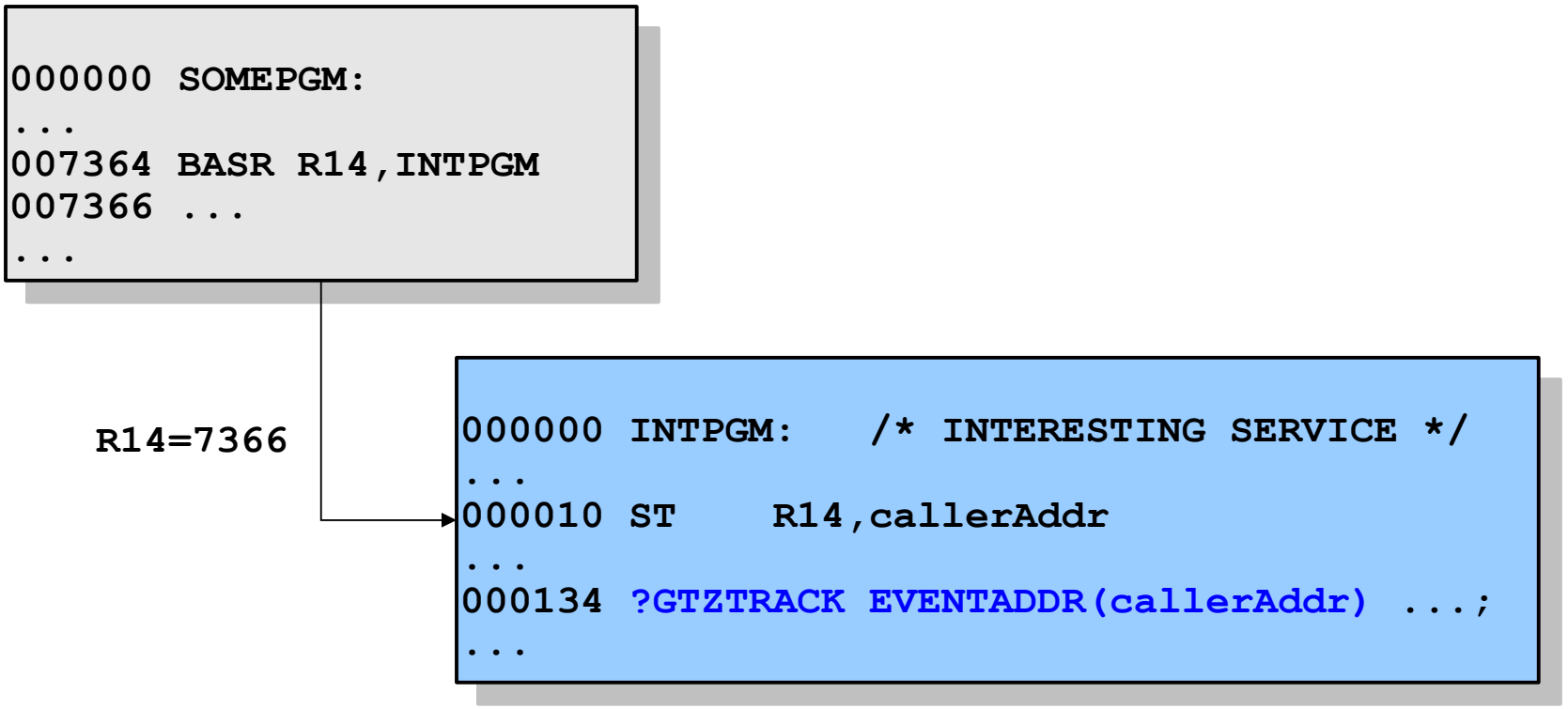
- Migration aid
- Exploitation assessment
- Compliance checking





How to use it?

- As owner of an “interesting” service:
  - Instrument code with GTZTRACK service call



How to use it?

- As system programmer
  - Inspect recorded tracked instances

```
 - SY39  D GTZ,TRACKDATA
GTZ1002I  13.33.59 GTZ TRACKDATA     FRAME  1     F      E   SYS=SY39
FOUND 4 MATCHING TRACKED INSTANCE(S)
INSTANCE 1 ----------------------------------------------------------
 EVENTDESC:      'SMS-E:1 DADSM OBTAIN        '
 OWNER:          IBMCNZ                SOURCE:         CNZTRKR
 EVENTDATA:      x0000000000000000     x0000000000C10001
 PROGRAM:        IFCEREP1              PROGRAMOFFSET:  x00000000000002C2
 HOMEJOB:        IBMUSER               HOMEASID:       x002C
 EVENTJOB:       IBMUSER               EVENTASID:      x002C
 COUNT:          2                     AUTHORIZED:     YES
 FIRST TIME:     2012-08-21 12:08:21
...
```

What to do with the result?

- Look for clues and report

```
- SY39  D GTZ,TRACKDATA
GTZ1002I  13.33.59 GTZ TRACKDATA      FRAME  1      F       E    SYS=SY39
FOUND 4 MATCHING TRACKED INSTANCE(S)
INSTANCE 1 ------------------------------------------------------
 EVENTDESC:      'SMS-E:1 DADSM OBTAIN          '
 OWNER:          IBMCNZ                SOURCE:       CNZTRKR
 EVENTDATA:      x0000000000000000     x0000000000C10001
 PROGRAM:        IFCEREP1              PROGRAMOFFSET: x00000000000002C2
 HOMEJOB:        IBMUSER               HOMEASID:      x002C
 EVENTJOB:       IBMUSER               EVENTASID:     x002C
 COUNT:          2                     AUTHORIZED:    YES
 FIRST TIME:     2012-08-21 12:08:21
...
```

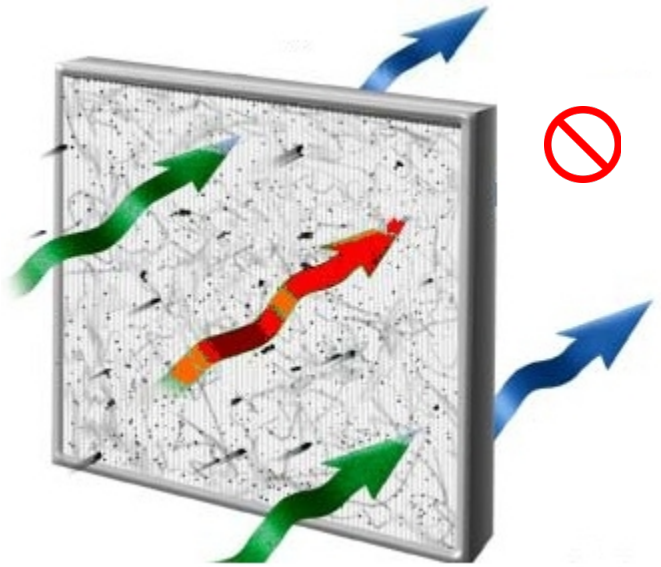
(Intermediate) Summary

- The tracking facility
  - Allows developers (not just IBM) to instrument their code with a “tracking” service
  - Expects the instrumented code to determine the caller(-address) of this code section
  - Resolves the address to a program name and creates a record of it (and of additional context information) in its internal database
  - Allows this information to be retrieved via centralized services for further analysis

That's not all...

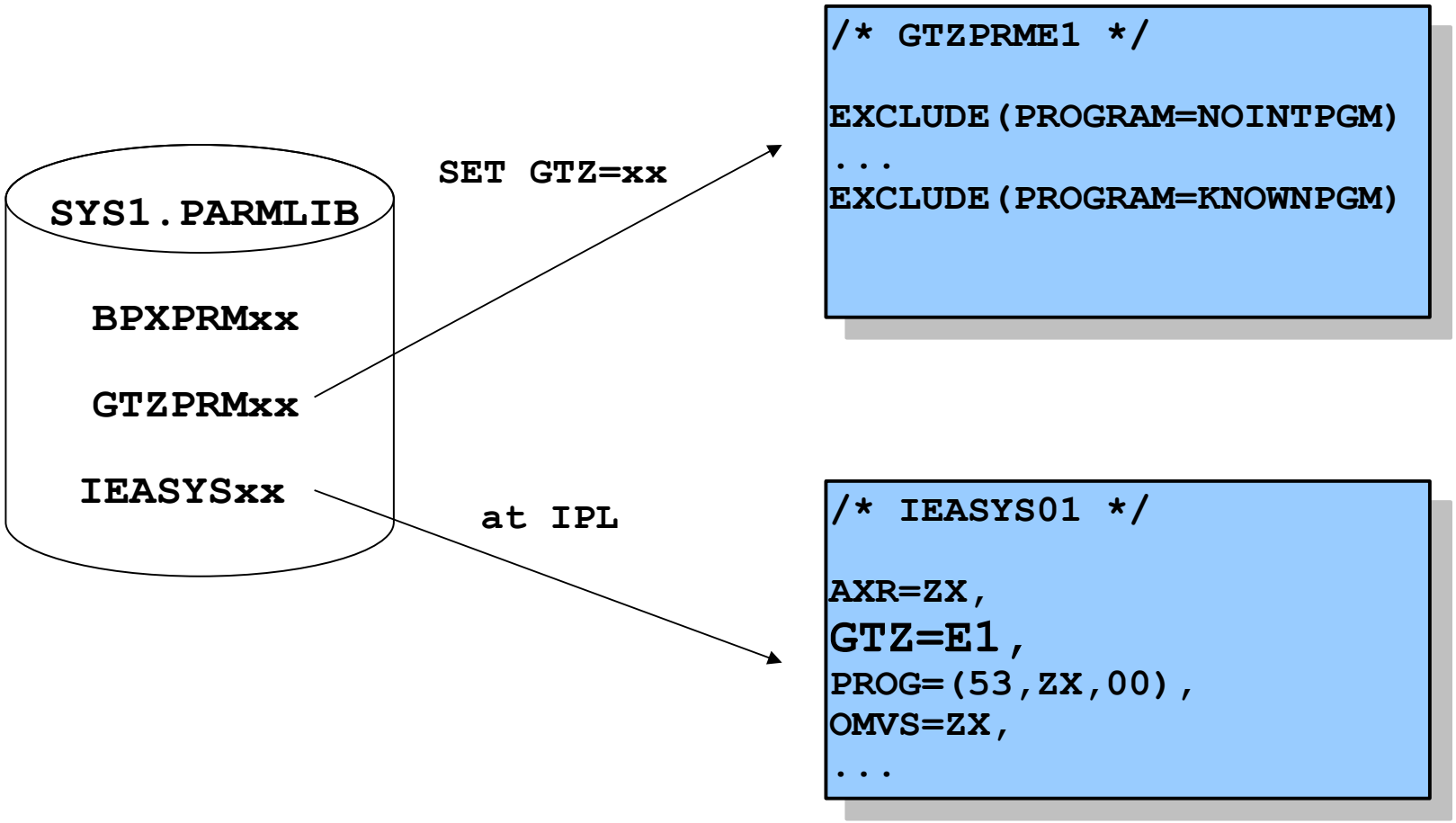
- Can exclude “uninteresting” events from being tracked

```
SETGTZ EXCLUDE(PROGRAM=NOINTPGM)
```



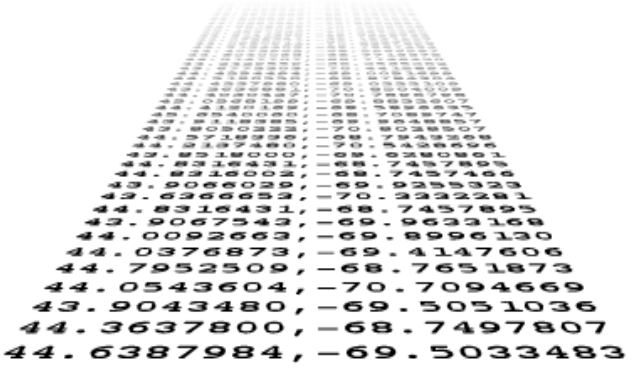
Want to set it and forget it?

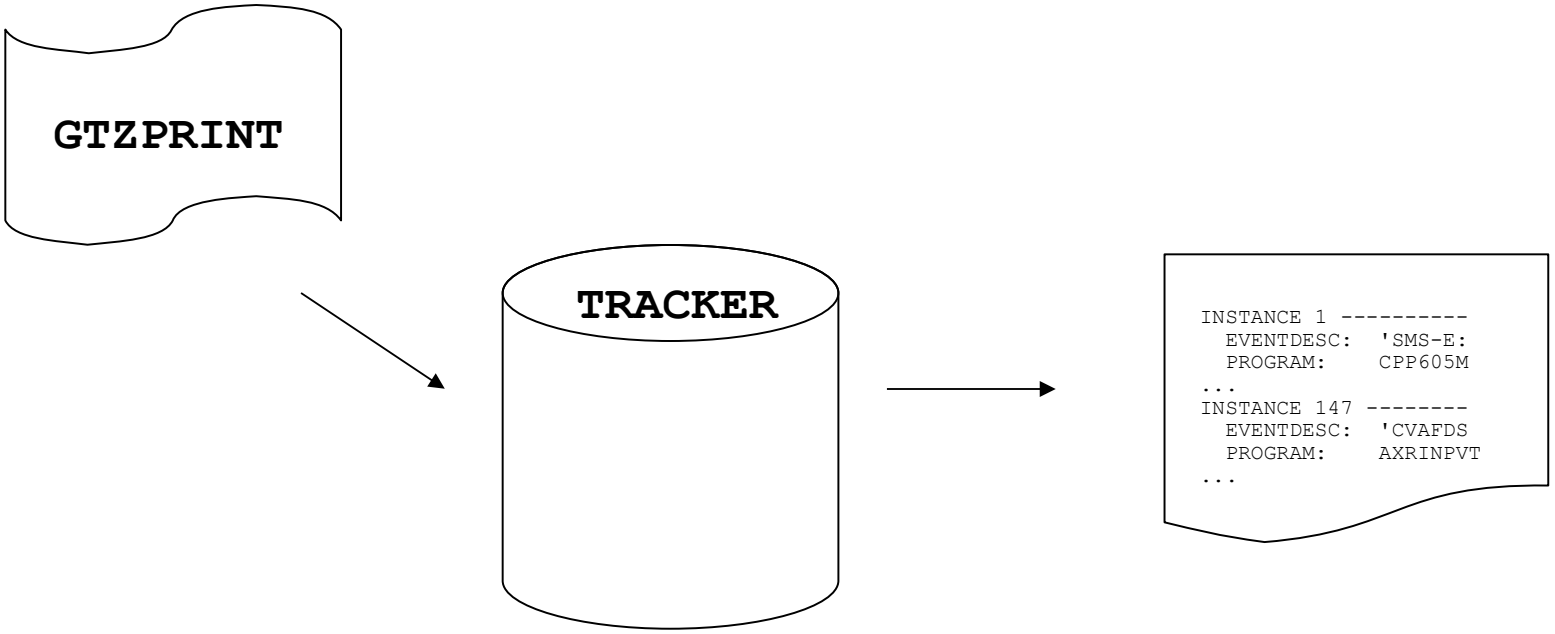
- Use PARMLIB



Too much to look at?

- Store, view, and share it via a dataset





Want to write your own analysis tool?

- Use the GTZQUERY API

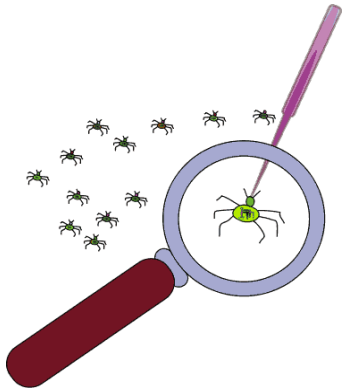
Let a health check automate things

- Use GTZQUERY to write a health check
- Health Checker framework takes care of
  - Automatic scheduling
  - Central reporting

- Check out the GTZSHCK sample health check
  - Can report on specific tracked instances...
  - ...or if *any* instances were found
  - Use JCL sample GTZSHCKJ to build the sample

For the hard-to-track callers

- Use DEBUG



```
SETGTZ DEBUG(ACTION=ABEND
             REASON=x401
             PROGRAMOFFSET=xB76B2C2
             HOMEJOBNAME=IBMUSER
             SOURCE=CNZTRKR)
```

```
- SY39  D GTZ,TRACKDATA
GTZ1002I  13.33.59 GTZ TRACKDATA      FRAME  1      F       E    SYS=SY39
FOUND 4 MATCHING TRACKED INSTANCE(S)
INSTANCE 1 ----------------------------------------------------
 EVENTDESC:      'SMS-E:1 DADSM OBTAIN          '
 OWNER:          IBMCNZ                 SOURCE:         CNZTRKR
 EVENTDATA:      x0000000000000000      x0000000000C10001
 PROGRAM:        *UNKNOWN               PROGRAMOFFSET: x000000000B76B2C2
 HOMEJOB:        IBMUSER                HOMEASID:       x002C
 EVENTJOB:       IBMUSER                EVENTASID:      x002C
 COUNT:          2                      AUTHORIZED:     YES
 FIRST TIME:     2012-08-21 12:08:21
```

Want to start fresh?

- Use CLEAR

```
SETGTZ CLEAR={TRACKDATA|
              EXCLUDE|
              DEBUG|
              ALL}
```

Don't forget

```
SETGTZ TRACKING=ON
```

Some interface details – GTZTRACK service

- GTZTRACK input
  - OWNER
  - SOURCE or SOURCEPATH
  - EVENTDESC
  - EVENTDATA
  - EVENTASID
  - EVENTADDR
  - EVENTPSW
- GTZTRACK derived output
  - PROGRAM or PROGRAMPATH
  - PROGRAMOFFSET
  - HOMEJOB
- See SYS1.MACLIB(GTZTRACK)

Some interface details – GTZQUERY service

- GTZQUERY REQUEST(STATUS)
- GTZQUERY REQUEST(EXCLUDE)
- GTZQUERY REQUEST(DEBUG)
- GTZQUERY REQUEST(TRACKDATA)
  [OWNER...]
  [SOURCE/SOURCEPATH...]
  [EVENTDESC...]
  [EVENTDATA...]
  [EVENTJOB...] [EVENTASID...]
  [HOMEJOB...] [HOMEASID...]
  [PROGRAM/PROGRAMPATH...] [PROGRAMOFFSET...]
  - *filter keys allow for wildcards (*, ?)*
- See SYS1.MACLIB(GTZQUERY) – action macro + embedded documentation
- See SYS1.MACLIB(GTZZQRY) – mapping macro + return codes

Some interface details – SETGTZ command

- SETGTZ TRACKING=[ON|OFF]
- SETGTZ EXCLUDE([OWNER=...]...)
- SETGTZ DEBUG(ACTION=...
  REASON=...
  LIMIT=...
  [OWNER=...]...)
- SETGTZ CLEAR={TRACKDATA|EXCLUDE|DEBUG|ALL}

- The EXCLUDE and DEBUG filter keys allow for wildcards (*, ?)

- Omit the “SETGTZ” and use in GTZPRMxx, too

Some interface details – SET command

- SET GTZ={xx | (xx,...,zz) }
  - Adds configuration statements

- System parameter GTZ specifies initial suffix list

- Compare SYS1.PARMLIB(GTZPRM00)

Some interface details – GTZPRINT utility

- SYSIN DD accepts “DISPLAY GTZ script”
  - PRINT STATUS
  - PRINT EXCLUDE
  - PRINT DEBUG
  - PRINT TRACKDATA[(*[OWNER...] ...)]*
    - filter keys allow for wildcards (*, ?)

- Output routed to SYSOUT DD

- See SYS1.SAMPLIB(GTZPRNTJ)

Some interface details – GTZ procedure

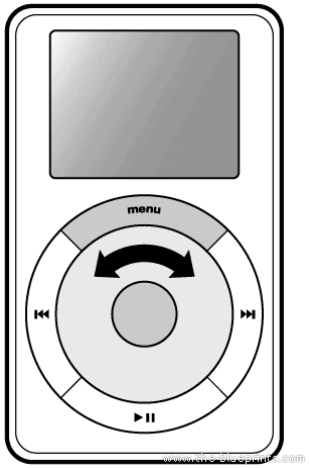
- Used for auto-start
- No need to touch, but has adjustable MEMLIMIT
- See SYS1.PROCLIB(GTZ)

Migration & Coexistence Considerations

- More details on the following pages, but in summary
  - Generic Tracker replaces the Console ID Tracking facility (Console Tracker)
  - All commands relating to the Console Tracker have been removed
  - The CNZTRKR macro service continues to be supported and is routed to Generic Tracker under the covers

It's not all new

(Initially) Single Purpose
"One-Byte-Console-ID Tracker"



Generic Tracker

Not without limits, but Generic Tracker...

- Allows more than 1 parmlib member
- Allows more than 1000 unique tracked instances
- Allows and reports z/OS Unix path names

Adds convenience

- Exclusion lists can be applied “late”
- GTZPRINT replaces log scraping
- More clues about who's tracking what
- Targeted DEBUG option replaces ABEND-all-or-nothing

Adds convenience, for programmers, too

- Parameter list is filled in by macros
- Macros are bilingual (PLX/Assembler)
- AMODE64 and AR-mode are allowed
- GTZQUERY gives programmatic access to tracker data

From old to new – Services

- CNZTRKR → GTZTRACK
  - TRPL_Track_Info → EVENTDE
  - TRPL_Track_Value → EVENTDATA
  - TRPL_Violators_Addr → EVENTAD
  - TRPL_Dont_ABEND → NOABEND

  - 'IBMCNZ' → OWNER
  - 'CNZTRKR' → SOURCE
  - For all “old”, CNZTRKR, track requests

- CNZTRKR still supported, but not recommended.

From old to new – Commands

- SETCON TRACKING,{ON|OFF} → SETGTZ TRACKING={ON|OFF}
- SETCON TRACKING=ONWITHABEND → SETGTZ DEBUG(ACTION=ABEND...
- DISPLAY OPDATA,TRACKING → DISPLAY GTZ
- SET CNIDTR=xx → SET GTZ=xx

And conversion tool GTZCNIDT,
see SYS1.SAMPLIB(GTZCNIDJ)

- Old commands do not work anymore!

Interactions & Dependencies

- Software Dependencies
  - None
- Hardware Dependencies
  - None
- Exploiters
  - Existing users of CNZTRKR
  - A small number of IBM components starting to use GTZTRACK instead of CNZTRKR for new/changing code

Installation

- Tracking facility comes with the z/OS base
- Starts automatically, but
  - "Tracking disabled"
  - No GTZPRMxx selected by default

Presentation Summary

- Generic Tracker replaces the Console ID Tracker
- Generic Tracker has additional commands, services, options, and tools on top of previously available functionality

Appendix

- z/OS V2R1 MVS Diagnosis: Tools and Service Aids
  - Overview / Anchor for Generic Tracker
- z/OS V2R1 MVS System Commands
  - SETGTZ, DISPLAY GTZ, SET GTZ
- z/OS V2R1 MVS Assembler Services Reference ABE-HSP
  - GTZTRACK, GTZQUERY – or just check prologues in SYS1.MACLIB
- z/OS V2R1 MVS Initialization and Tuning Guide
  - GTZPRMxx, system parameter GTZ
- http://www.ibm.com/systems/z/os/zos/downloads/
  - Latest IBM supplied GTZPRM00