



IBM System i™

Refreshing MI Programs

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i want stress-free IT.

i want control.

*i want an **i**.*

Overview

- **What and why?**
- **About program conversion**
- **Improvement examples**
- **Preparation on V5R4 or V5R3**
- **Refresh choices on V6R1**

What is being done?

- **(Re-)create ALL Machine Interface (MI) programs**
 - Integrated Language Environment (ILE) and Original Program Model (OPM) programs
 - From all previous releases
 - Applications, i5/OS and other IBM products
 - **Many applications, some IBM products re-created via conversion**

Why?

➤ **UPGRADE software without source changes!**

- Capitalize on MI's object-based, abstract definition

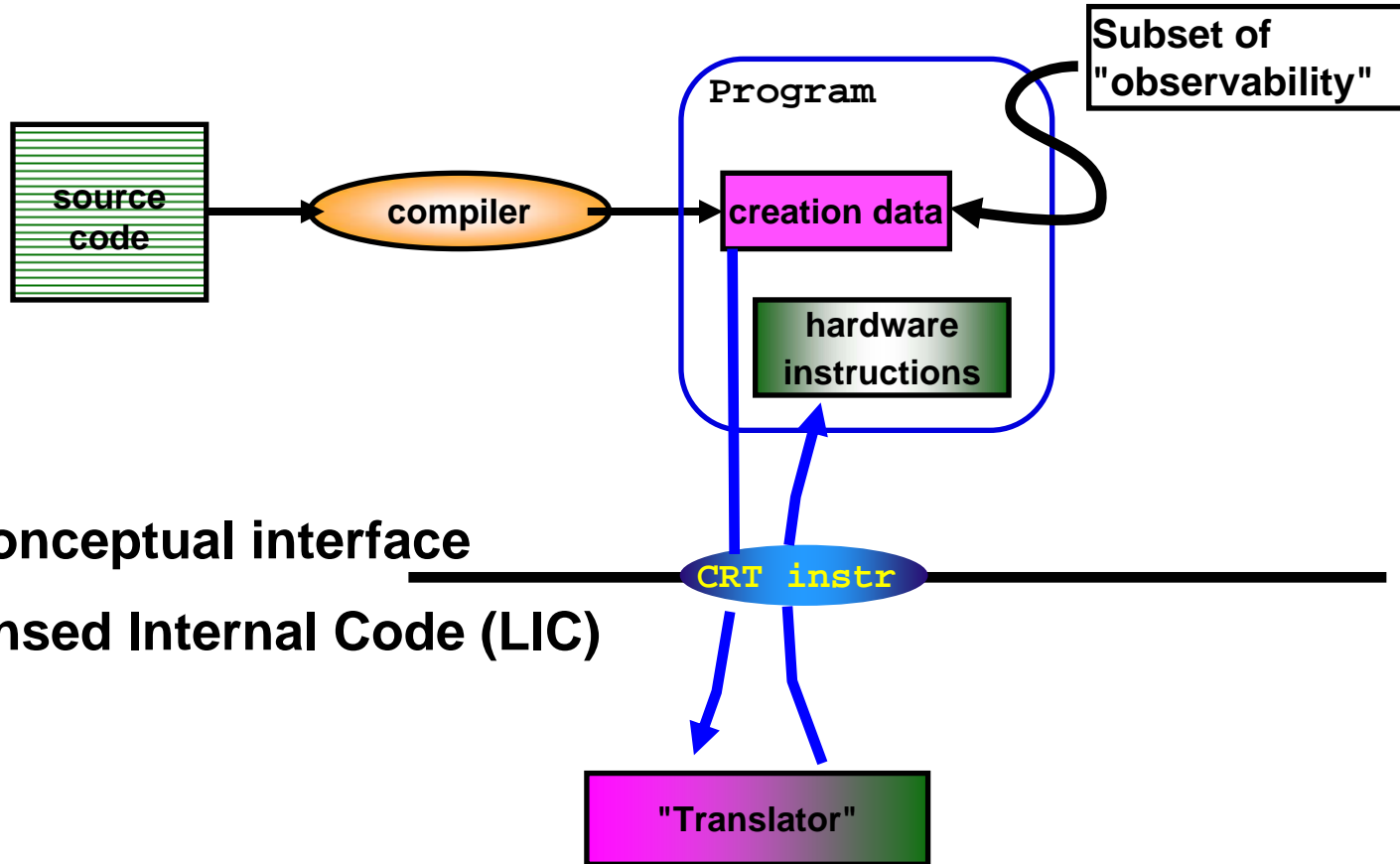
■ **Enhance:**

- Integrity
- Performance
- Function

■ **Send message:**

- System technical vitality

Program Creation (simplified)



About Conversion

- **Replace existing program object, without compile**
 - Most attributes retained; modification timestamp is updated
- **One-time process, but required either direction**
 - V5R4 or V5R3 → V6R1
 - V5R4 or V5R3 ← V6R1
 - Creation TGTRLS does NOT affect conversion need
- **Integral to V6R1, so no options or added fees**
- **Average per-program convert times, large sample**
 - Sub-second on fastest processors, < 4 seconds on slowest
 - Programs with many modules can take a lot longer

Conversion exception cases

- **Creation data not available, even to LIC**
 - Program or constituent module target release before V5R1 AND creation data was removed
 - Must compile from source if creation data gone
- **Program relies on unsupported alterations**
 - Conversion removes such modifications
 - Must use supported interfaces instead
- **Main message: most programs can be converted!**
 - All* created for V5R1 or later
 - Older programs, unless creation data removed

Historical Perspective

- **Previous MI program refreshes**
 - System/38 to AS/400 (V1R1, 1988)
 - IMPI to PowerPC AS, a.k.a. CISC to RISC (V3R6, 1995)

- **V6R1 MI programs refresh**
 - Easier for customers:
 - much less overall system change
 - even more programs have creation data
 - conversion *many times* faster
 - no hardware change needed, in most cases
 - Includes more IBM investment in program environment

Integrity improvement examples

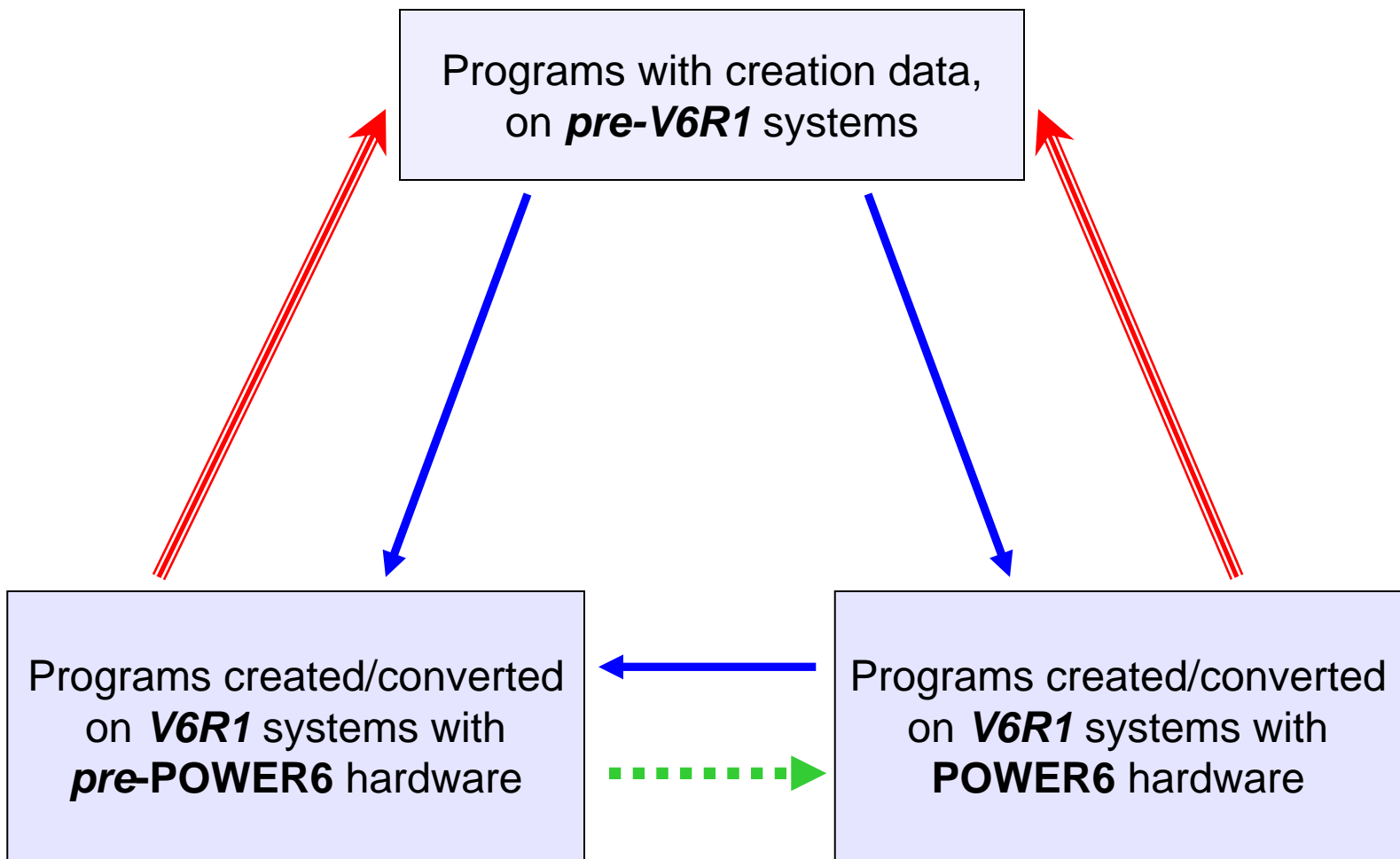
- **Eradicate any altered programs that exist now**
- **Extend unique ability to remove any future code corruption**
 - Any runnable MI application, **without** program source
 - **No** ongoing updates needed
- **Prevent load of non-i5/OS 'system state' program**
- **Prevent load of non-i5/OS V6R1-format program that lacks creation data**




Performance improvement examples

- **Faster activation, procedure calls, pointer use**
- **More efficient memory handling**
 - Remove software teraspace emulation cases
 - Use more hardware facilities
- **Generate processor-specific code**
 - Use latest processor features immediately
 - Can “opt out” of adaptive code generation (ACG) if desired
- **New create options, no source changes required:**
 - Optimize between-module procedure-call argument passing
 - Defer service program activation

Function improvement examples

- **Theme: ease application development, deployment**
- **Teraspace:**
 - **ALL** programs now enabled
 - 100x larger
 - Process locality strictly enforced
- **Add thread local static storage**
 - Ease thread-safe programming
 - RPG H spec 'THREAD(*CONCURRENT)'
 - individual variable declaration qualifiers:
RPG: 'static(*allthread)' C++,C: '__thread'
- **Performance EXplorer, trace always available**
 - No need to recompile with different options



-  Optional conversion during restore, mandatory before running
-  Mandatory conversion during restore
-  No conversion required

Prepare before upgrade

- **Get the latest information**

Redpaper REDP-4293,

“i5/OS Program Conversion: Getting ready for i5/OS V6R1”
now, while draft:

www.redbooks.ibm.com/redpieces/abstracts/redp4293.html

when formally published: www.redbooks.ibm.com

System i planning web site

www-304.ibm.com/jct01004c/systems/support/i/planning/upgrade/index.html

Info APAR I14306

www.ibm.com/support/docview.wss?uid=nas23af47a966c4df94586257306003c6868

- **Delete unsupported products**

- Save first, in case needed on pre-V6R1 system
- Product delete may call old program that can't be converted

Prepare before upgrade: ANZOBJCVN

- **Download V5R4 or V5R3 PTFs**
- **Run Analyze Object Conversion tool**
 - Consider Redpaper recommendations
 - Collect data
 - Generate report(s)
 - Identifies potential MI program conversion issues, estimates times
- **If purchased application won't convert and you don't have source to recompile**
 - Ask provider for version compiled for V5R1 or later

Other conversions checked by ANZOBJCVN

- **Java programs in IFS**
 - Straightforward conversion
 - ANZOBJCVN estimates times

- **Some Integrated File System (IFS) names**
 - Automatic conversion for names in case-insensitive file systems, as needed to avoid name clashes under Unicode Standard 4.0
 - ANZOBJCVN identifies affected names
 - You may want to change affected names before upgrade

- **Spooled files**
 - By default, spooled file conversion occurs during IPL or ASP vary on
 - ANZOBJCVN estimates times

Conversion method choices on V6R1

- **Choose combination of methods**
 - You initiate by library
 - **STROBJCVN**
 - Restore/install
 - **FRCOBJCVN(*YES *ALL)** or set **QFRCCVNRST** ≥ 2
 - First call (etc.)
- **Consider ANZOBJCVN estimates, Redpaper recommendations**
- **Must regenerate applications that won't convert**
 - Compile from source or acquire

Refresh method choices, application provider

- **Application converted on each customer system**
 - Test conversion, inform customers of best method
 - consider application time-out potential and ACG
- **Recompile and redistribute programs (and fixes)**
 - Required if program altered or lacks creation data
 - Recommended if:
 - VERY large programs used
 - application profiling data removed after being applied
 - you add a digital signature, still needed on customer systems
 - Ship both pre-V6R1 and V6R1 versions, so no conversion needed
 - must build on separate partitions; could use same source
 - e.g. build & save from v6r1, restore to v5r4, save from v5r4
 - application's install code can select version
 - -OR- Compile, ship one new version, V5R1 or later
 - converts on V6R1
 - can be done now, so ready for GA and even for beta customers

Need to test drive V6R1? **Free of Charge**

- **V6R1 Early Availability Program (your own copy, now)**
 - Restrictions apply
 - Contact Bill Schulz, wschulz@us.ibm.com
- **ISV Solutions Enablement organization**
 - Using VPN access, for Independent Software Vendors
 - Check with Gottfried Schimunek, schimu@us.ibm.com
- **Virtual Loaner Program (available starting in January)**
 - IBM PartnerWorld members - Business Partners and ISVs
 - 2 weeks maximum
 - Partition data can be saved and reservation renewed
 - See <http://www.ibm.com/systems/vlp>

MI program refresh summary

- **Upgrades software without more programming**
 - Most programs refreshed via conversion
 - **Delivers** enhanced integrity, performance and function
- **Increases overall system value, with *EXTREME* integrity and flexibility**
 - Now can convert MI programs (except i5/OS) any time
 - **Enables** much easier leverage of new hardware and future system structure changes
- **Demonstrates System i technical vitality**
- **Read Redpaper, use ANZOBJCVN to prepare**

Detailed backup information

Adaptive Code Generation (ACG) details

- **Defaults:**
 - Use features of hardware on which program is created/converted
 - Convert when moving to different hardware only if required
- **To use only features found on all systems (opt out)**
 - Use **LICOPT('CodeGenTarget=Common')** on **CRT*** or **CHG*** commands
 - Set **QIBM_BN_CREATE_WITH_COMMON_CODEGEN** environ var to **2**
- **To optimize to latest hardware if not created there**
 - **CHGPGM** or **CHGSRVPGM FRC CRT(*YES)** if observable creation data
 - Restore (from save file, e.g.) using one of:
 - **RSTOBJ** or **RSTLIB FRC OBJCVN(*YES *ALL)**
 - first set system value **QFRCCVNRST** to **7**
- **See ILE Concepts document, when available**

Further create-time options detail

- **CRTPGM and CRTSRVPGM command parameters**
 - No source code changes needed
 - Only available for target release V6R1 or later
 - Optimize procedure calls between modules, in a (service) program:
ARGOPT(*YES)
 - Choose deferred activation, by service program:
BNDSRVPGM((libA/srvpgmA *IMMED) (libB/srvpgmB *DEFER))
Can also be specified via **ADDBNDDIRE** parameter:
OBJ((srvpgmX *SRVPGM *DEFER))
 - for best performance, specify all ***IMMED** uses first
- **See ILE Concepts document, when available**

Creation data status details

- For individual programs, use **DSPPGM** or **DSPSRVPGM**
- **Creation data unavailable for conversion if:**
 - For ILE (service) programs, '**All creation data**' is ***NO**
 - For OPM programs, '**Observable information**' is ***NONE**

ANZOBJCVN PTF details

- **Usually just order MRI PTF, code requisites included.**
English e.g.:
 - V5R3: SI28425 V5R4: SI28415
- **If MRI PTF ordered before December, check whether you have latest code PTF, order separately if not**
 - V5R3: SI29369 V5R4: SI29370

PTF History

| | Original (July) | Enhanced (September) | Latest (December) |
|-------------|-----------------|----------------------|-------------------|
| V5R3 | | | |
| MRI: | SI27515 | SI28425 | (no change) |
| code: | SI27513 | SI28412 | SI29369 |
| | SI25504 | (no change) | (no change) |
| | SI27473 | (no change) | (no change) |
| V5R4 | | | |
| MRI: | SI25550 | SI28415 | (no change) |
| code: | SI25543 | SI28410 | SI29370 |
| | SI25502 | (no change) | (no change) |
| | SI26706 | (no change) | (no change) |

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