

# CA 2E r8.6 Technical Update

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# About the Speaker

- Rory Hewitt
  - Software Architect for 2E team
  - Software developer for 17 years (14 with 2E development team)
  - Helped design some of the largest features in recent 2E history
    - RPGIV generator, function wrapping & duplicate parameters, triggers
  - Competition-level snowboarder and karateka
  - British (hence the strange accent!)

# agenda

overview of r8.5

new functionality at r8.6

- enhanced array support (EAS)
- other 2E features
- 1E ("Toolkit") features
- Web Option

questions

# release 8.5

Latest GA release is r8.5

- Available since 2009
- Major release
- Significant take-up by customer base

# release 8.5 – major features

## Service Program Support

- Service program function type
- Bind in existing 2E and non-2E modules
- Generates as a BND source member
- 'Compiles' into a \*SRVPGM object
- Fully integrated with 2E environment
  - Impact analysis (where used and how)
  - Change management

# release 8.5 – major features

## Web Service Support

- Ability to create a Web service function
- Can be called using a WSDL interface
- Entire runtime processing
  - Multiple commands for use outside 2E to create WS Instance
- Portable deployment

# release 8.5 – major features

## Web Option Environments

- Separation of system and user data
- Allow multiple data sets with single set of programs
  - Development, Production, Test...
  - Marketing, Sales, Finance...
- Easier upgrade processing
- Internal override processing for improved performance

## Currently in development

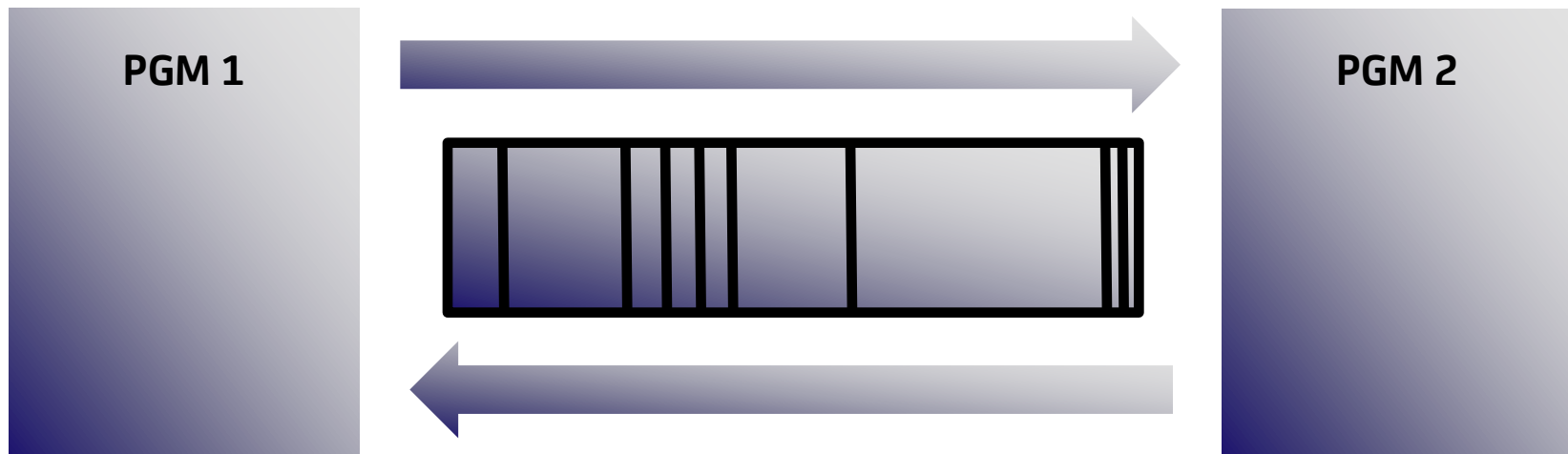
- Estimated GA is early 2012
- Consists of one 'marquee' feature + other features
- Developed using Agile development methodology
  - Frequent 'semi-supported' versions available for 'alpha' customers
  - 4 week sprint cycle allows
  - Continuous customer feedback on works in progress
- Available for V5R4 onwards

## Enhanced Array Support

- What is Enhanced Array Support
  - Ability to return a result set from a function call
  - Pass multiple records to/from a 2E function
- Key to developing web services
  - Allows complex parameter structure interface
  - Communications bottleneck, so fewer calls = better performance
  - Result set functionality standard in most web languages
  - Many 2E customers have implemented their own version

# existing 'standard' array parameter support

Typical use of passing a RCD parameter

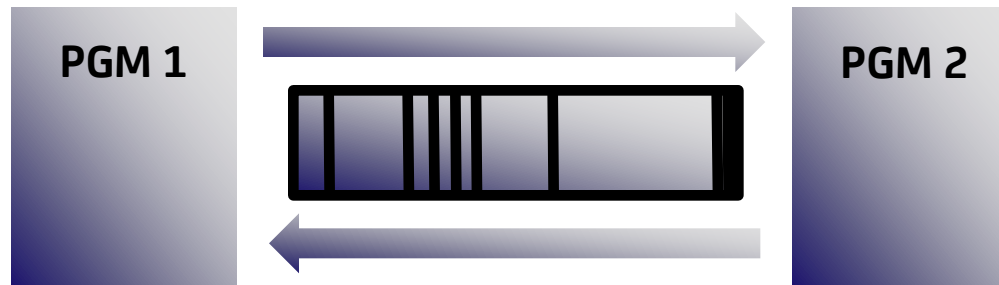


PGM 1 calls PGM 2 passing a RCD parameter

Single parameter composed of a record format or array

May be Input, Output or Both

# existing 'standard' array parameter support



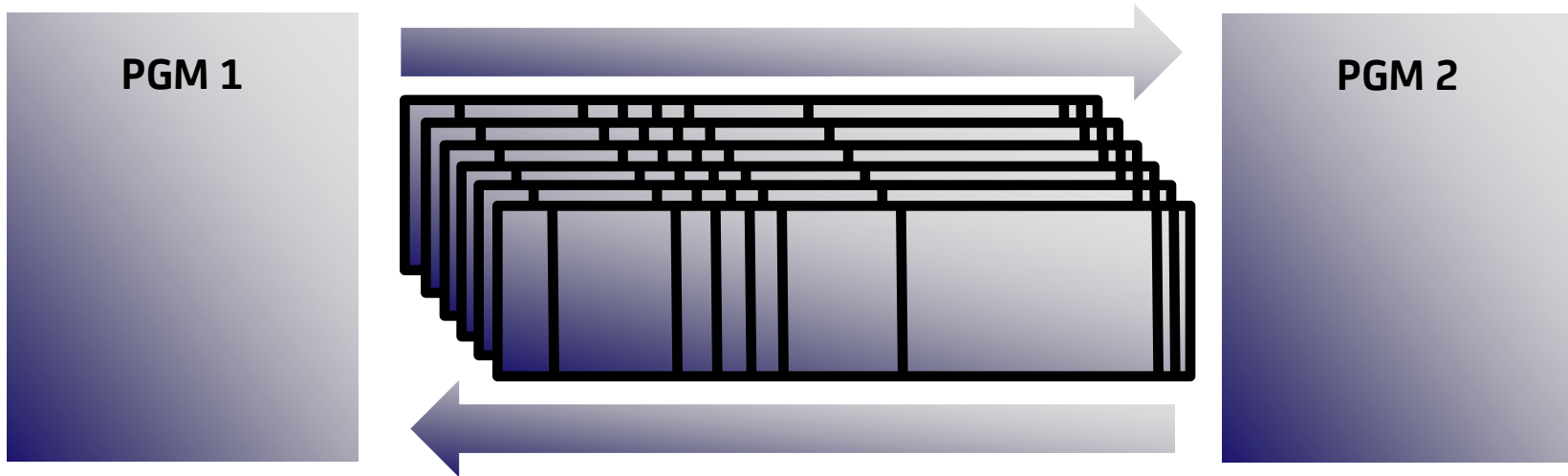
- Allows multiple fields to be passed at once
- Default passing method for e.g. RTVOBJ
- Simple to externalize RTVOBJ inside EXCEXTFUN

But.....

Still have to call EXCEXTFUN once per record retrieved

# enhanced array support

Pass multiple instances of an array as a single parameter

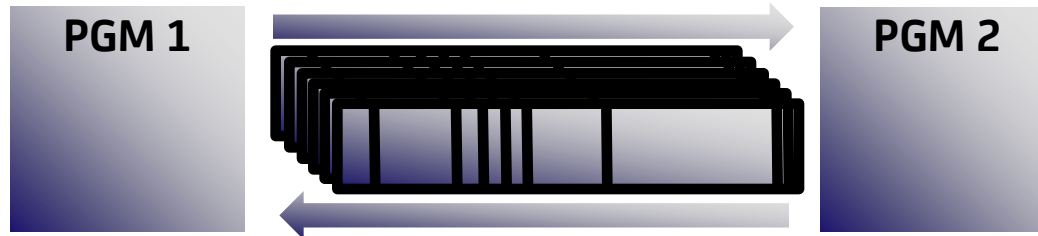


Multiple-instance array passed as a single parameter

Defined as existing 2E array (on \*Arrays file)

Number of instances defined in array definition

# enhanced array support



- Called program (PGM 2) only called once
- Can return/process multiple records (up to 9999)
- Currently available for EXCEXTFUN and EXCUSRPGM

# EAS: criteria and limitations

- Must be defined using an array
  - Not available directly using a file's record format...
  - ...but can define an array like a record format
- Number of instances of array taken from array definition
  - Defaults to 100 (i.e. 100 records passed in parameter)
- All fields in array must be passed (no Dropped fields)
  - Fields can have mix of usages (Input, Output, Both and None)
  - Performance improvements if all fields have same usage





# EAS: parameter options

```
Op: 5/23/11 19:23:40
EDIT FUNCTION PARAMETER DETAILS
Function name. . : Called program      Type : Execute external function
Received by file : Product             Array: Product Array
Parameter (file) : *Arrays             Passed as: RCD (ARRAY)
                                       Number of elements : 100

? Field          Usage  Role  Flag error
_ Product code   0      MAP
_ Product description 0      MAP
_ Product price date 0      MAP
_ Product price   0      MAP
```

Number of elements taken from array definition

SEL: Usage: I-Input, O-Output, B-Both, N-Neither, D-Drop.  
Role: R-Restrict, M-Map, V-Vary length, P-Position. Error: E-Flag Error.  
F3=Exit

# EAS: action diagram editor

- In Action Diagram Editor, appears as single parameter
  - Don't specify separate fields within array
  - Specified using new ARR context
  - If also passed in to calling PGM, can be specified using PAR
    - 'Throughput' parameter – passed from PGM1 through PGM2 to PGM3
- Very simple interface
  - Limited changes to visible interface
  - Simple to understand

# EAS: action diagram editor

```
EDIT ACTION DIAGRAM          Edit          Product
FIND=>                       Calling program
I (C,I,S)F=Insert co
I (A,E,Q,*,+,-,=,=A)        EDIT ACTION - FUNCTION NAME
```

```
EDIT ACTION - FUNCTION DETAILS
Function file : Product
Function. . . : Called program
```

| IOB Parameter   | Obj | Use Typ    | Ctx Object Name |
|-----------------|-----|------------|-----------------|
| I Product code  | FLD | LCL        | Product code    |
| A Product Array | ARR | <u>ARR</u> | Product Array   |

Object name is not  
editable – only  
context

```
d          F9=Edit parms
ious      F15=Undefined parms only
```

- Can't use array subfields directly using existing BIF's
  - New built-in function specifically for EAS
- \*MOVE ARRAY
  - Allows multiple different types of array move
  - Allows user to specify array index (i.e. array element)
    - From WRK field to array subfield in specified array element
    - From array subfield in specified array element to WRK field
    - From subfield in one array to a subfield in another array
  - Works with all field types (TXT, NBR, DT#, TS# etc.)
- Once copied to WRK field, normal processing

# EAS: \*MOVE ARRAY built-in function (IN DEVELOPMENT)

```
EDIT ACTION DIAGRAM          Edit          Product
FIND=>                        Calling program
I(C,I,S)F=Insert co
I(A,E,Q,*,+,-,=,=A)  EDIT ACTION - FUNCTION NAME

EDIT ACTION - FUNCTION DETAILS
Function file :
Function. . . : *MOVE ARRAY

IOB Parameter          Obj
Use Typ          Ctx Object Name
0 *Array          FLD   ARR Product Array
0 *Array field    FLD   ARR Product price
0 *Array index    FLD   WRK Current line
I *Array          FLD   _____
I *Array field    FLD   WRK Current price
I *Array index    FLD   _____

F3=Exit          F5=Reload          F9=Edit parms
F10=Default parms  F12=Previous          F15=Undefined parms only

ARR.Product Array(WRK.Current line).Product price = WRK.Current price
```

# EAS: \*MOVE ARRAY built-in function (IN DEVELOPMENT)

```
EDIT ACTION DIAGRAM          Edit          Product
FIND=>                       Calling program
I(C,I,S)F=Insert co
I(A,E,Q,*,+,-,=,=A)         EDIT ACTION - FUNCTION NAME

EDIT ACTION - FUNCTION DETAILS
Function file :
Function. . . : *MOVE ARRAY

IOB Parameter                Obj
Use Typ      Ctx Object Name
0 *Array      FLD      _____
0 *Array field FLD      WRK Current price
0 *Array index FLD      _____
I *Array      FLD      ARR Product Array
I *Array field FLD      ARR Product price
I *Array index FLD      WRK Current line

F3=Exit      F5=Reload      F9=Edit parms
F10=Default parms F12=Previous F15=Undefined parms only

WRK.Current price = ARR.Product Array(WRK.Current line).Product price
```

# EAS: \*MOVE ARRAY built-in function (IN DEVELOPMENT)

```
EDIT ACTION DIAGRAM          Edit          Product
FIND=>                        Calling program
I(C,I,S)F=Insert co
I(A,E,Q,*,+,-,=,=A)        EDIT ACTION - FUNCTION NAME

EDIT ACTION - FUNCTION DETAILS
Function file :
Function. . . : *MOVE ARRAY

IOB Parameter                Obj
Use Typ      Ctx Object Name
0 *Array      FLD   ARR Product Array
0 *Array field FLD   ARR Product price
0 *Array index FLD   WRK Current line
I *Array      FLD   ARR Bulk Items
I *Array field FLD   ARR Bulk discount price
I *Array index FLD   WRK Input line

F3=Exit          F5=Reload          F9=Edit parms
F10=Default parms F12=Previous       F15=Undefined parms only

ARR.Product Array(WRK.Current line).Product price =
ARR.Bulk Items(WRK.Input line).Bulk discount price
```

# EAS: generation details (IN DEVELOPMENT)

- EAS parameters generated in RPG as MODS
  - Multiple Occurrence Data Structures
  - Fewest changes to underlying generation programs
    - Faster development/test cycle
  - Simplest implementation – 2E handles all the low-level stuff
- EAS parameters generated in COBOL as array
  - Significantly more complex than RPG

# EAS: model areas affected

- Model interaction
  - YCPYMDLOBJ
  - YCHKFUNACT
  - YCHKMDL
  - Impact analysis
  - Action diagram error scanning
  - CM

# release 8.6 – other features

- Updated Splash Screen
  - Option to 'pause' model loading to display "What's New"
  - You can turn off after you've looked at the release docs!
  - Easy way to ensure users (you!) actually know what we've done
- New YCHKFUNPAR command
  - Checks existing functions for parameter mismatches
  - Looks for invalid duplicate parameters etc.
- Lots more stuff we haven't committed to/can't discuss
  - Only part-way through the development cycle
  - Come talk to Simon, Bob, Bill and me during the conference...

# release 8.6 – other features

- 66 bug fixes, including
  - Long constant generation in RPG
  - SFLRCDNBR increased from 999 to 9999 (model panels)
  - Standardized processing for locked objects in model lists
  - SFLFOLD function key changed
  - Large model space errors
  - Several Web Service bugs/enhancements
- R8.6 Documentation has a complete list

# release 8.6 – 1E (Toolkit) features

- More compile preprocessor enhancements
- Service Program Diagnostic Load Utility (SPDLU)
  - Allows user or CA support to quickly diagnose \*SRVPGM errors

# release 8.6 – Web Option features

- Performance-related changes
  - Increased number of server jobs allowed, from 30 to 500
  - Improved asynchronous auditing
  - New YSKLCHK control value
    - Improved performance by not checking for skeleton changes
- YGENMLS changed to flush memory
  - Always uses latest control values from file
- New test library options
  - Simplifies implementation of test fixes
- Service Program Diagnostic Load Utility (SPDLU)
  - Allows user or CA support to quickly diagnose \*SRVPGM errors

# Finally...

- You'll all be glad to hear that we have a new Development machine
  - Dedicated to 2E Development only
  - Bigger – all our stuff takes up about 10% of entire disk space!
  - Faster – CPU-tastic Power 7!!
  - Better – we're not sharing with other teams!!!
- CA has committed to the future of CA 2E

thank you