

# April 1, 2020

## Community, Conference, Tips

**cm**FIRST  
Rethink Modernization

**ca** A Broadcom  
Company  
technologies

**IBM**

**AXON iVY**  
digitalize your business

**SPH|AG**

**HAWK**BRIDGE

**AXSOS**

**SODISA**<sup>®</sup>

**FUTURASISTEMI**  
Informatica e Ricerca

**WEBSYDIAN**<sup>™</sup>



# POLL #1 – Top of Mind IT Topics





Today's Moderator  
Mark O'Brien

# The Agenda

Q&A at End of Webinar

Please enter questions in the  
GoToWebinar Application



## Introductions / Community Update

Mark O'Brien



### Lighting Talks

- **Web Services Change Management**
  - Christoph Heinrich
- **CA Plex performance – SQL vs. DDS**
  - Kiyoshi Terasawa
- **CA Plex/2E/RPG Analysis (CM evolveIT),  
Open Access Analysis for CA 2E**
  - John Rhodes



## Fall Conference Planning, Q&A

Mark O'Brien

# CA 2E and CA Plex Community

Mark O'Brien



# CA Broadcom Product Management Team

**Principal Product Manager**  
**Pravesh Jha**



**Product Owner**  
**Vijaya Kumar Dasari**





# State of the CA 2E/Plex Nation



- Broadcom continues to support the product under “Enterprise Software”
  - Community needs to take lead on user groups
- Resellers are providing solutions for small customers
- CM First and other partners are here to help

# Roadmaps



- "Making good progress on 2E upgrade. No change to timeline." -Prahesh Jha, 4/1/2020
- A lot is on hold everywhere due to the crisis.
- Questions can be posted on the Broadcom forum, or go through your reseller



# Upcoming 11th Worldwide Dev Conference



- Planning is in Process...
- To be held in Austin, Texas
- Dates: Thursday & Friday, Oct 22-23 (before F1 Race)
- Discovery & Hands-On, Remote component
- More info later today on webcast

# Supporting the Smaller Customer



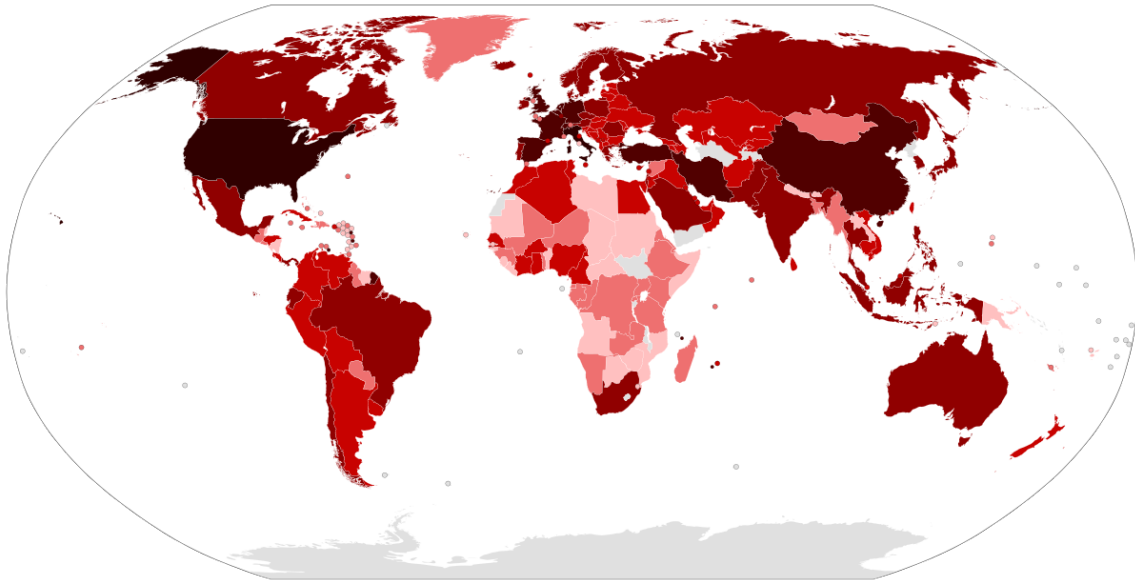
- Broadcom has a minimum revenue policy of 25K/year
- CM First is offering an affordable cloud bundle, in discussions w/ CA Broadcom

## Concept is: Azure Cloud Instance

- CA Plex
- Compiler of Choice
- CM Matchpoint
- CM WebClient
- CM EvolveIT

CA 2E TBD

# COVID-19 affects everyone of us.



- We understand it is difficult, and sometimes Broadcom is hard to reach
- We are here for the 2E & Plex community, if you need it –
- Our engineers can help at no cost to diagnose issues and make recommendations







# POLL #2 – Conference: Remote vs In Person



## Lightning Talk #1 - Web Services on IBM i

Christoph Heinrich and Mark Schroeder

# What we're going to talk about

- Creating Web Services from CA 2E
- Deploying Web Services on the IBM I using the Integrated Web Services Server IWS
- Automating Management and Deployment of IBM I Web Services



# The Challenge

- The deployment of Web Services on the IBM I requires many manual steps.
- All steps need to be repeated every time a web service is deployed into a new environment.
- The manual steps are time consuming and error prone.
- There is no information stored about when a web service has been deployed.
- Parameter Names not meaningful

The screenshot displays the IBM Web Administration for I console. The main content area is titled 'Manage Deployed Services' and shows a table of deployed services. The table has columns for 'Service name', 'Status', 'Startup type', and 'WSDL - service definition'. One service, 'ConvertTemp', is listed with a status of 'Running' and a startup type of 'Automatic'. Below the table are several action buttons: 'Deploy', 'Stop', 'Properties', 'Uninstall', 'Refresh', and 'Test Service'. The left sidebar contains a navigation menu with categories like 'Common Tasks and Wizards', 'Web Services Wizards', 'Server Properties', 'Services', and 'Problem Determination'. The top navigation bar includes 'Setup', 'Manage', 'Advanced', and 'Related Links'.

Service name	Status	Startup type	WSDL - service definition
ConvertTemp	Running	Automatic	<a href="#">View definition</a>

# IBM Web Services Wizard

Manual steps to deploy a SOAP or REST Web Service in the IBM I

1. Select IBM I Web Server
2. Select Deploy or Redeploy
3. Enter Service Name and Service Description
4. Set Parameters to Input or Output
5. Select User ID
6. Enter Library List
7. Specify Transport Metadata
8. Specify WSDL Options
9. Finish



# The Solution

## CM MatchPoint ALM IBM I Web Services Deployment

The screenshot displays the CM MatchPoint - Application Lifecycle Manager interface. The main window is titled 'Edit Change Requests' and features a 'Filter' section with fields for CR Number, Status, CR Description, Reference, Object, and Environment. Below the filter is a 'List' table showing various change requests. A secondary window, 'Web Service Settings', is overlaid on the right, showing configuration details for a web service.

Application	Version	Change Request	CR Description	Subsystem
H2	V300	2007651	New Edit function for transportation	
H2	V300	2007653	Release 55.1	
H2	V300	2007663	XML Interface for app integration	Interface SAP
H2	V300	2007720	Fix 3 for PTF 123	Address Management
H2	V300	2007719	Fix 2 for PTF 123	
H2	V300	2007362	New Webservice to provide custom	Interface SAP
H2	V300	4000003	New Panel for edit customers	Address Management
H2	V300	2007665	Field overlap on customer entry pan	Contract Management
H2	V300	2007666	Add new values for customer type	Contract Management
H2	V300	2007712	Import Conflict in Test Env	
H2	V300	2007722	Deploy web objects	Contract Management
H2	V300	2007662	Create new update function for dep	Address Management
H2	V300	2007718	Fix 1 for PTF 123	test
H2	V300	2007717	PTF 123	test
H2	V300	2007707	PTF 45.55	ready for prom
H2	V300	2007706	Web changes	ready for prom
H2	V300	2007372	New date field formats for SAP inter	Interface SAP

**Web Service Settings**

Change

Application: WSTEST Version: 1.0 Change Request: 4000126 Promotion: 1

Object Type: SVRPGM Implementation Name: MSAGSPS

Web Service Name: GetUser

Web Service Type: \*SOAP11

WS PCML Path: /MPWSTEST/MSAGSPS.PCML

Web Service User ID: Web Service Module Library: MLSWRKGEN Web Service Module Name: MSAFXFR

List

Program	Parameter Name Value	Parameter Length Value	Parameter Usage Value	Parameter Rename Value
MSAGSPS	PORTN	7	output	status
MSAGSPS	WP0001	6	input	userID
MSAGSPS	WP0002	25	output	name
MSAGSPS	WP0003	25	output	address



# IBM Web Service Deployment

## A CM MatchPoint ALM Module

1. Add the web service in CM MatchPoint (manually or through import)
2. Give it a name and define input/out parameters and meaningful parameter names
3. Press Deploy Button

Steps 1 and 2 only need to be done once. For all following deployments (to QA or Production) only need step 3.

# Main Benefits of CM MatchPoint WS Deployment

- **Automated Deployment**
- Once a Web Service is defined in CM MatchPoint, the deployment process is fully automated across all environments
- **Deployment History**
- Every deployment is logged into the Deployment History and makes any change traceable in order to meet audit requirements.
- **Remote Deployment**
- IBM I Web Services can be deployed across multiple IBM I Servers
- **Deploy with other changes**
- The deployment of IBM I Web Services is fully integrated into the change management of the complete application. It can be deployed with any other object associated with the change.
- **Meaningful Parameter Names**
- The Web Service Parameters can be overridden with meaningful names. These meaningful names are used every time the Web Service is deployed
- **Integrated into DevOps process**
- The deployment of web services is fully integrated into the defined DevOps process and all rules of the process are enforced when deploying IBM I web services
- **REST and SOAP services**
- Option for XML and JSON







## Lightning #2 – SQL Performance

Kiyoshi Terasawa



1 SQL Server performance is poor...

2 Plex generated SQL problems

3 CM Filter Pattern

4 Demo

5 Summary



# initiation

- converted application from RPG to Java wasn't usable
- poor performance
- in some cases it doesn't return any data
  
- number of record in a Table is a lot but that cannot be an excuse!



# CA Plex generated SQL problems for Block Fetch

- position GE
- fetch Next
- set Row Usage in the Function Logic
- fill 64 records





# position GE is not for SQL

- Plex original concept was simulating RPG SETLL and READ
- RPG SETLL doesn't load any record to 'ResultSet' but SQL SELECT does
- how many records 'ResultSet' will have?
- All records matched unless you tell a limit
- no concept Fetch Next Restrict in SQL



# position GE, problem...

- restrict only, (Position EQ)

- RST MyKey1

WHERE **MyKey1 = ?**

This is OK

- restrict with Position

- RST MyKey1

- POS MyKey2

WHERE ( (**MyKey1 > ?**) **OR** (MyKey1 = ? AND MyKey2 >= ? ))

This SQL return more records than you wish

Fetch Next Restrict filtering extra records

# set Row Usage in the Function Logic

- read a record and check if you like it or not in Function (application) layer
- to fill 64 records to return, how many record you need to read?
- if you are lucky : 64
- if not, it could be  $\infty$  (all records in the table)



# increase machine power

- you try
  - increasing CPU power
  - adding memory
- hardware acceleration helps your software runs comfortably
- it won't make your code better



# CM Filter Pattern





# CM Filter Pattern

- very light BlockFetch and ProcessGroup base pattern
- provided as Plex exported XML and small runtime
- construct SQL at runtime and executed with EXECSQL statement



# CM Filter Pattern : goals

- custom filter
- convert AD code block to set 'UseRow = \*No' to SQL WHERE condition
- use pagination
- skip n rows read next m rows



# CM Filter Pattern : filter

- custom where condition injection
- column and data comparison
- WHERE **A = 'M'**
- WHERE **A like 'K%'**
  
- column and column comparison
- WHERE **A = B**
  
- nested and/or comparison
- WHERE **(A = 'M' or A = 'X') and (B > 100)**



# CM Filter Pattern : pagination

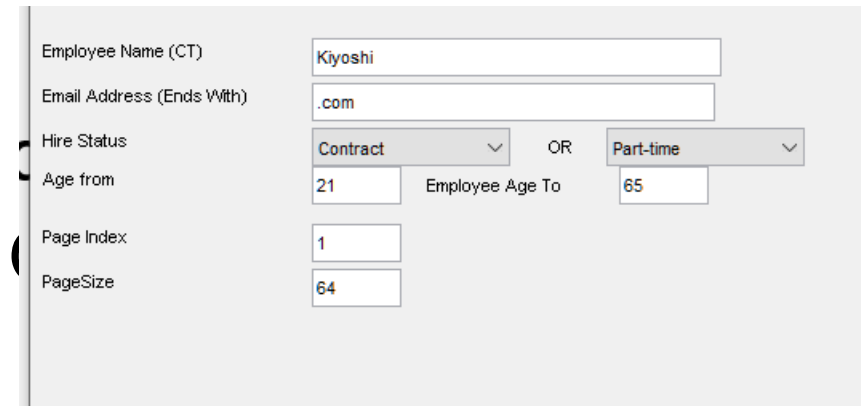
- true pagination SQL injection (skip n row read only next m row)
  - page 1: Skip 0 rows reads next 64 rows
  - page 2: Skip 64 rows reads next 64 rows
  - page 3: Skip 128 rows reads next 64 rows
- 
- if you can move all Filtering to SQL, this is the most efficient and what people are doing outside of Plex world





# What you can achieve?

- 'name' Contains as Like '%data%'
- 'Email' Ends with as Like '%data'
- 'hire status' as two combined nested
- 'age' (number) from data1 to data 2
- column comparison as column A <> Column B
- pagination

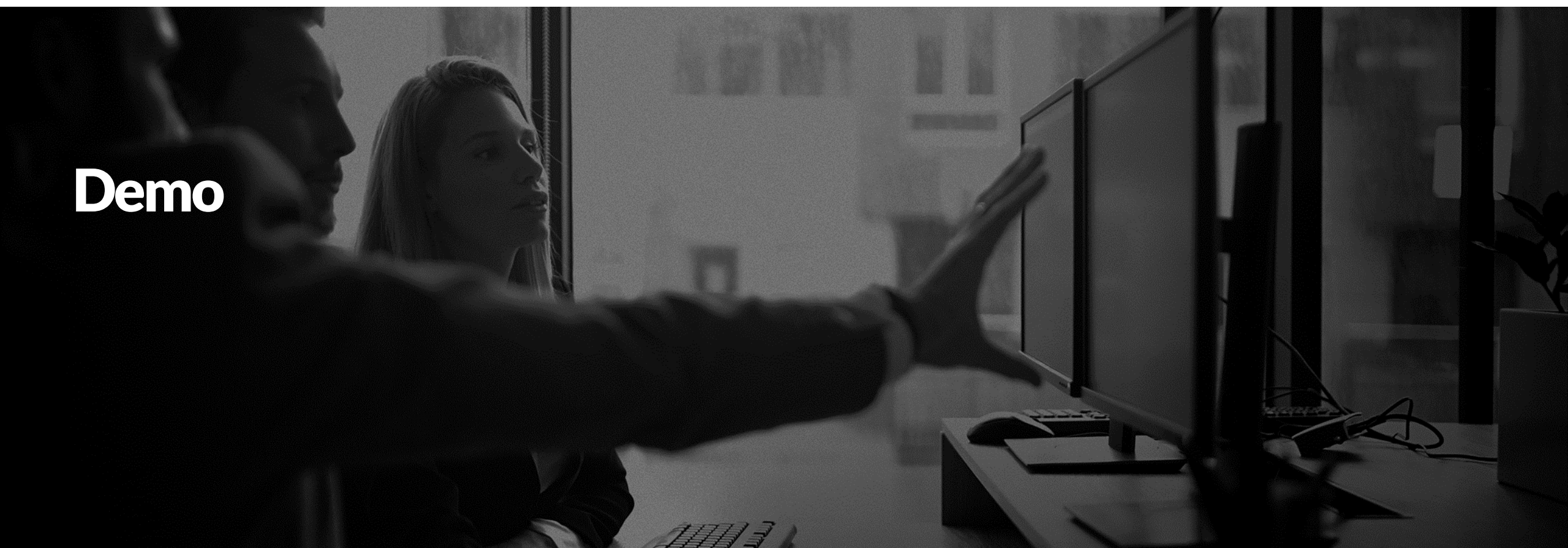


A screenshot of a search interface with the following fields and values:

- Employee Name (CT): Kiyoshi
- Email Address (Ends With): .com
- Hire Status: Contract (dropdown) OR Part-time (dropdown)
- Age from: 21
- Employee Age To: 65
- Page Index: 1
- PageSize: 64

```
Message Log
Log Clear
SELECT TRctA, TRcuA, TRcvA, TRcWvA FROM TRbwV WHERE (( TRctA >= '' )) AND ( TRcuA LIKE '%Kiyoshi%' ) AND ( TRcuA <> AAmA ) ORDER BY TRctA
SELECT TRctA, TRcuA, TRcvA, TRcWvA FROM TRbwV WHERE (( TRctA >= '' )) AND ( TRcuA LIKE '%Kiyoshi%' ) AND ( TRcWvA LIKE '%.com%' ) AND ( TRcuA <> AAmA ) ORDER BY TRctA
SELECT TRctA, TRcuA, TRcvA, TRcWvA FROM TRbwV WHERE (( TRctA >= '' )) AND ( TRcuA LIKE '%Kiyoshi%' ) AND ( TRcvA = '1' OR TRcvA = '2' ) AND ( TRcWvA LIKE '%.com%' ) AND ( TRcuA <> AAmA ) ORDER BY TRctA
SELECT TRctA, TRcuA, TRcvA, TRcWvA FROM TRbwV WHERE (( TRctA >= '' )) AND ( TRcuA LIKE '%Kiyoshi%' ) AND ( TRcvA = '1' OR TRcvA = '2' ) AND ( TRcWvA LIKE '%.com%' ) AND ( AAnA >= 21 AND AAnA <= 65 ) AND ( TRcuA <> AAmA ) ORDER BY TRctA
SELECT TRctA, TRcuA, TRcvA, TRcWvA FROM TRbwV WHERE (( TRctA >= '' )) AND ( TRcuA LIKE '%Kiyoshi%' ) AND ( TRcvA = '1' OR TRcvA = '2' ) AND ( TRcWvA LIKE '%.com%' ) AND ( AAnA >= 21 AND AAnA <= 65 ) AND ( TRcuA <> AAmA ) ORDER BY TRctA OFFSET 64 ROWS FETCH NEXT 64 ROWS ONLY
```

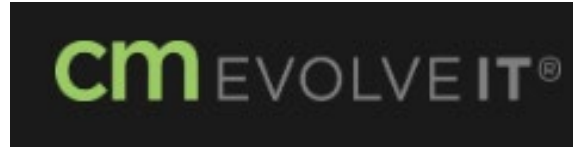
Demo



## how to use?

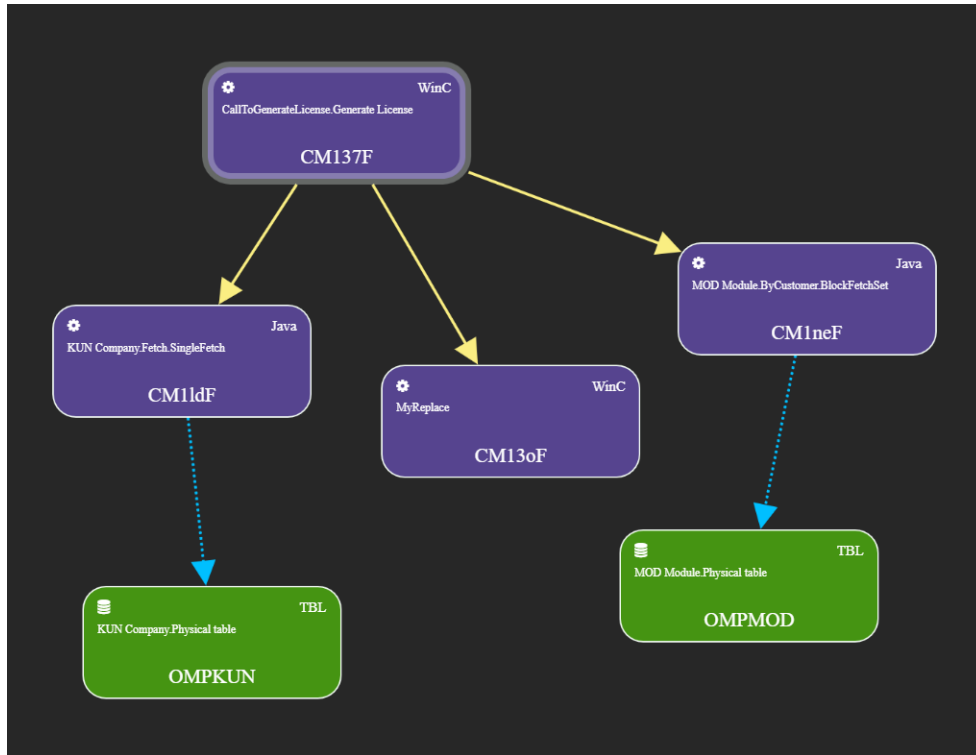
- inherit ~FilterBlockFetch function
- analyze function and generated SQL
- modify action diagram as needed

analyze with



○ Detect Call Graph

○ Find SQL statement



Note information

Is Public

Other Notes

System Notes

Noted by System.DBAccess on 9/24/2019 12:00:00 AM

```
'SELECT CM1ijA, CM1jmA, CM1jnA, CM1joA, CM1jpA, CM1jqA, CM1jrA, CM1jsA, CM1jtA, CM1nrA, MP1s1A, MP1s2A, MP1s3A, MP1s4A, MP1s5A, MP1s6A, MP1vlA, MP1vmA, MP1s7A, MP1s8A, MP1s9A, MP1saA, MP1sbA, MP1scA, MP1sdA, MP4pkA, MP6p7A, MP5plA, MP4piA, MP6p8A FROM OMLKUN01 WHERE ( CM1ijA = ? ) ORDER BY CM1ijA '
```

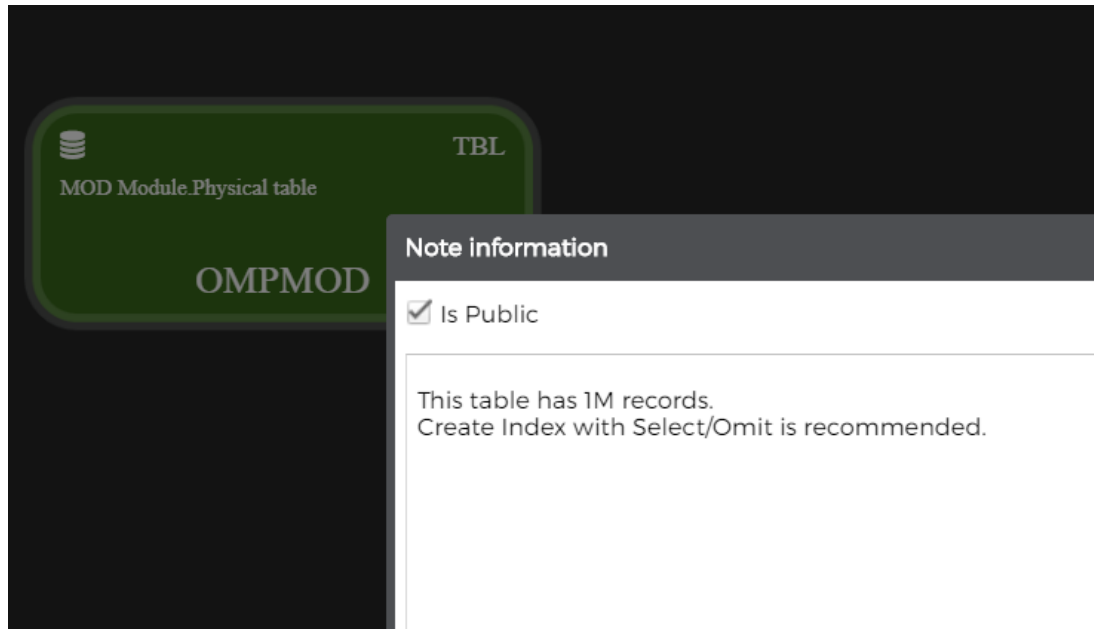
Save & Close Save Cancel



analyze with



- share information



# improvement?



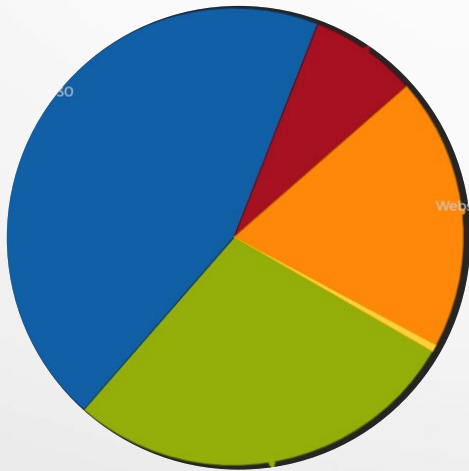
# Summary

- implemented
- for Java
- for Microsoft SQL Server
- expandable
- for .NET
- for other database, Oracle, DB2...



Lightning #3 –  
EvolveIT for CA Plex,  
2E, and RPG + Open  
Access for CA 2E  
John Rhodes

# CM Evolve IT Overview

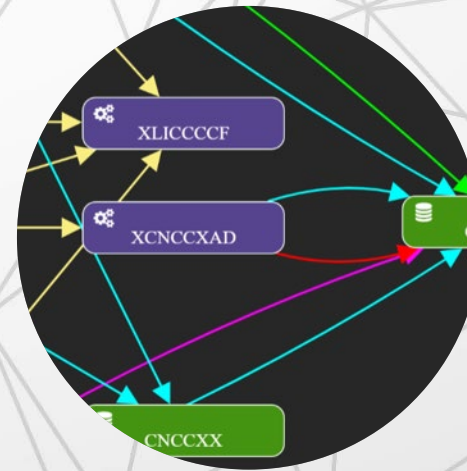


statistics

A screenshot of the 'browse' interface showing a hierarchical menu of system components. The menu includes:

- LCV\_CMFM - Conversion
- LDM\_CMFM - Data Management Se
- 2 - Financial Rep Download - PWK.
- 3 - Productivity Rep Download - P...
- LID\_CMFM - ISD
- LIT\_CMFM - Investment Trx Reporting
- 1 - Run Daily Reports - PRUNDLYP
- 10 - Partial Rcv Xfer Rpt by Bran
- 11 - Confirmed Xfer Rpt by

browse



call graph

A screenshot of the 'estimate' interface showing a table with columns for 'Function', 'Count', and checkboxes. The table data is as follows:

Function	Count	Checkboxes
ole	1298	x <input type="checkbox"/>
plex	212	x <input type="checkbox"/>
	1698	x <input type="checkbox"/>
	63	x <input type="checkbox"/>
	420	<input type="checkbox"/>

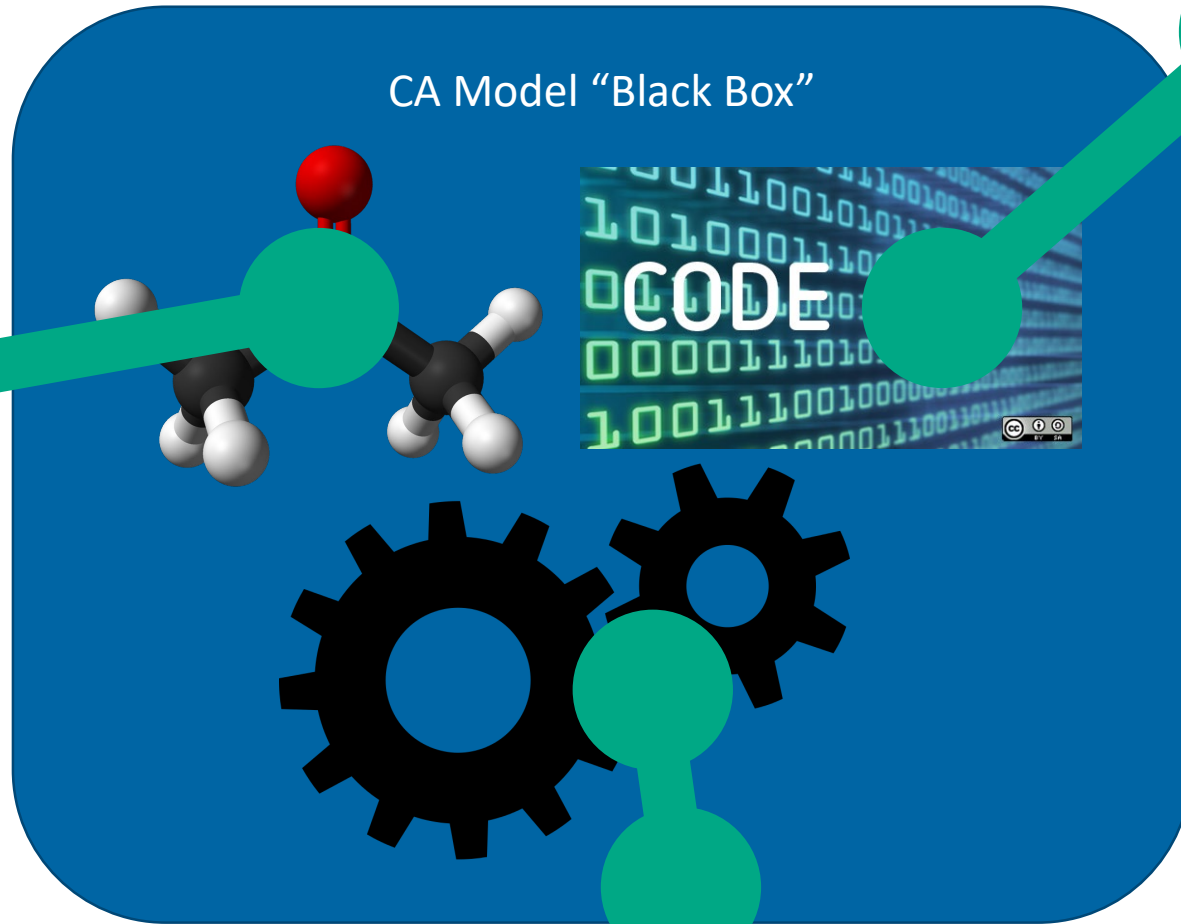
estimate





# Our Secret Sauce: 3-Way Analysis

Deep Source  
Analysis



Model Inspection

Application Configuration



# CM EvolveIT for 2E, Plex, RPG new features

- CLP, RPG, DDS parsing
- Dynamic Properties within Call Graph
- Call Graph Diagram UX
  - Vertical and Horizontal view
  - Search
  - Show/Hide Nodes and Edges
- Source code and Message Object Usage
- SQL statement extraction













# Call Graph Analysis

Analyzing DB Access within a call graph

☑ Is Prex Object    ☐ Access DB    ☐ Read Data    ☐ Update Data    ☐ Delete Data    ☐ Insert Data    ☑ Has Panel    ☐ Has Report

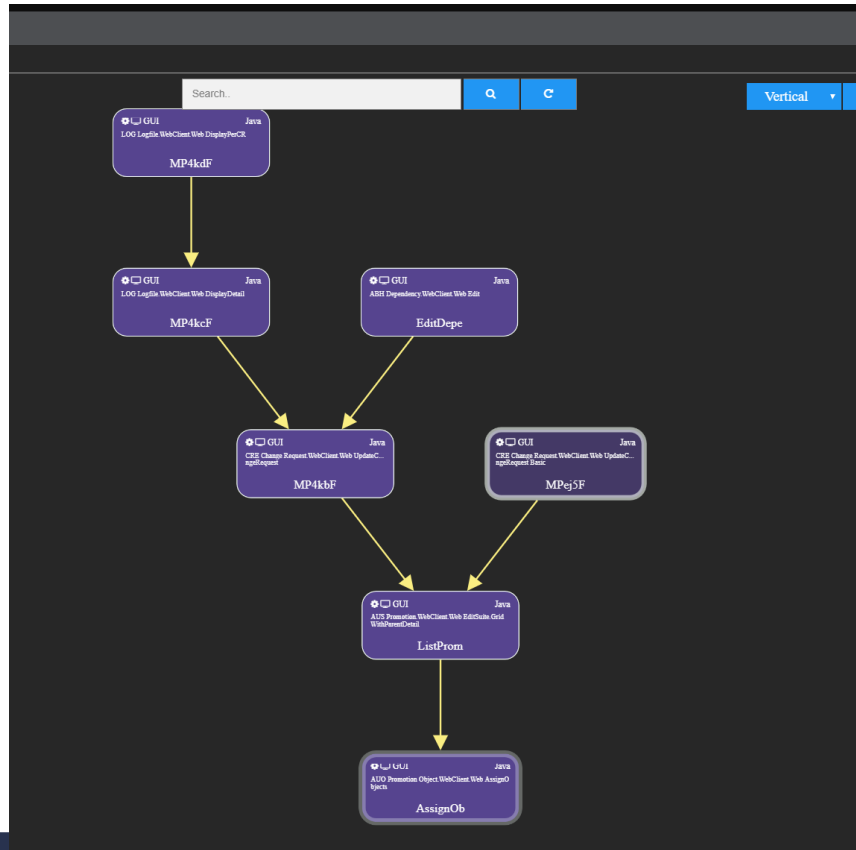
---

DB Schema    Function

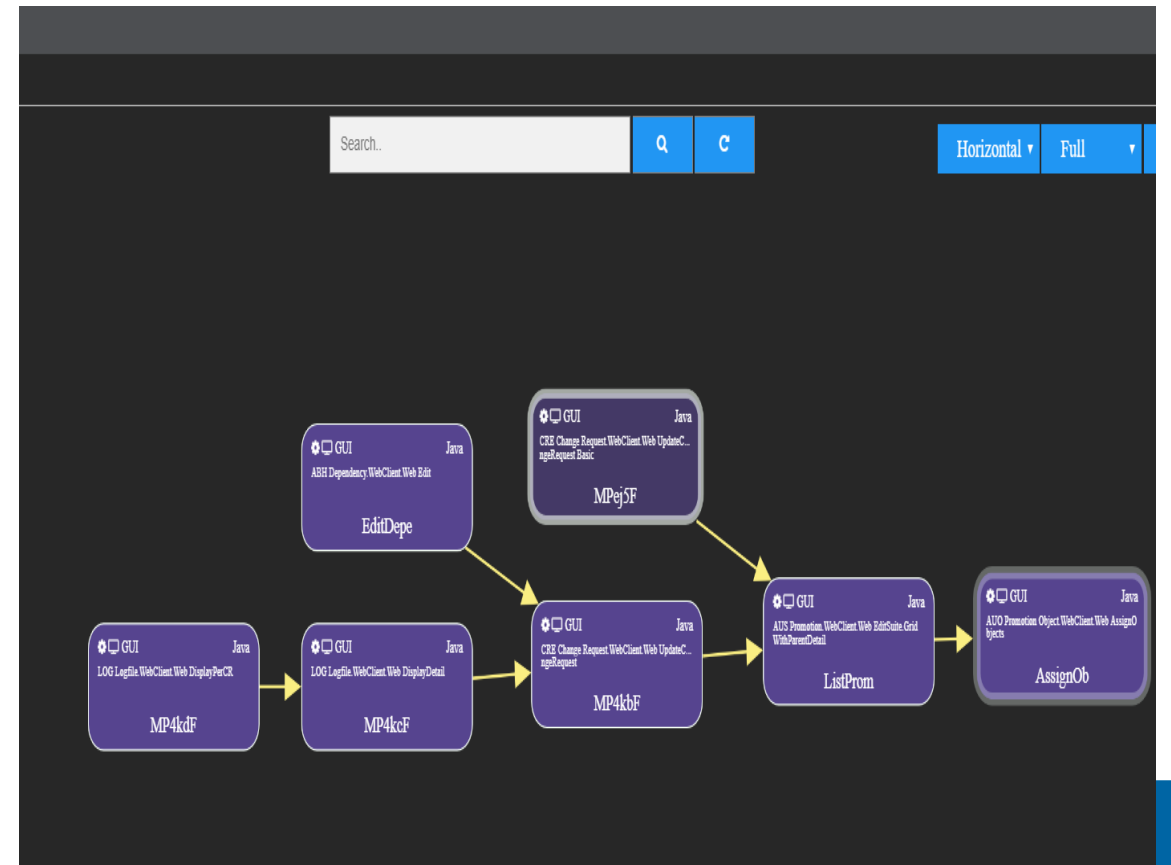
Actions	Name	Description	Type	CUD by Functi...	Read Access Fu...	Insert Access Fu...	Update Access F...	Delete Access F...
  	OMPPER	PER User.Physical...	Table	<input checked="" type="checkbox"/>	2	0	1	0
  	OMPABT	ABT Department...	Table	<input type="checkbox"/>	2	0	0	0
  	OMPBGR	BGR User Group...	Table	<input type="checkbox"/>	1	0	0	0
  	OMPCPA	CPA Control Para...	Table	<input type="checkbox"/>	1	0	0	0

# Call Graph Diagram UX

## ○ Vertical

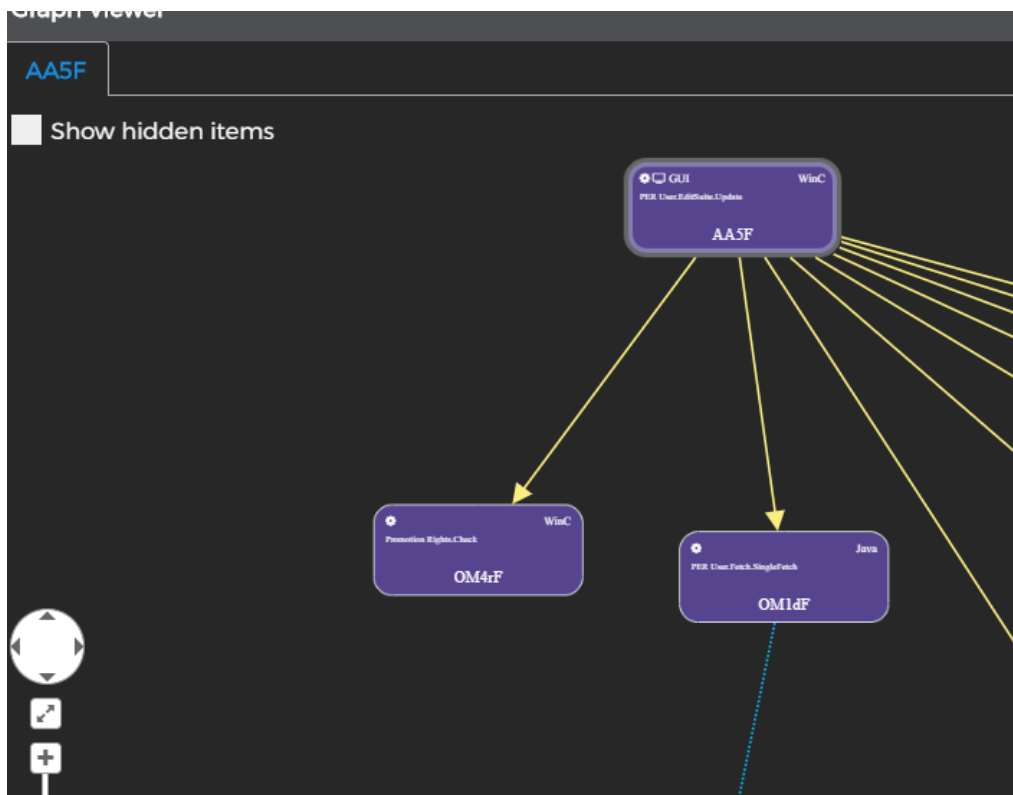


## ○ Horizontal

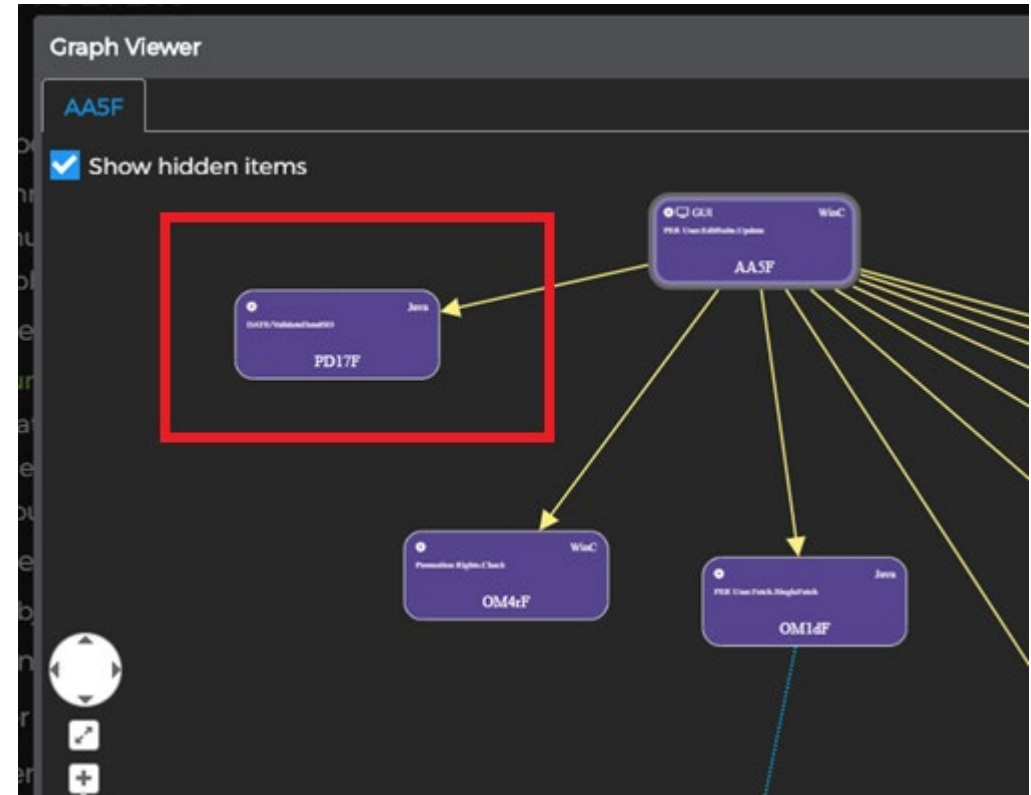


# Call Graph Diagram UX

○ Hide



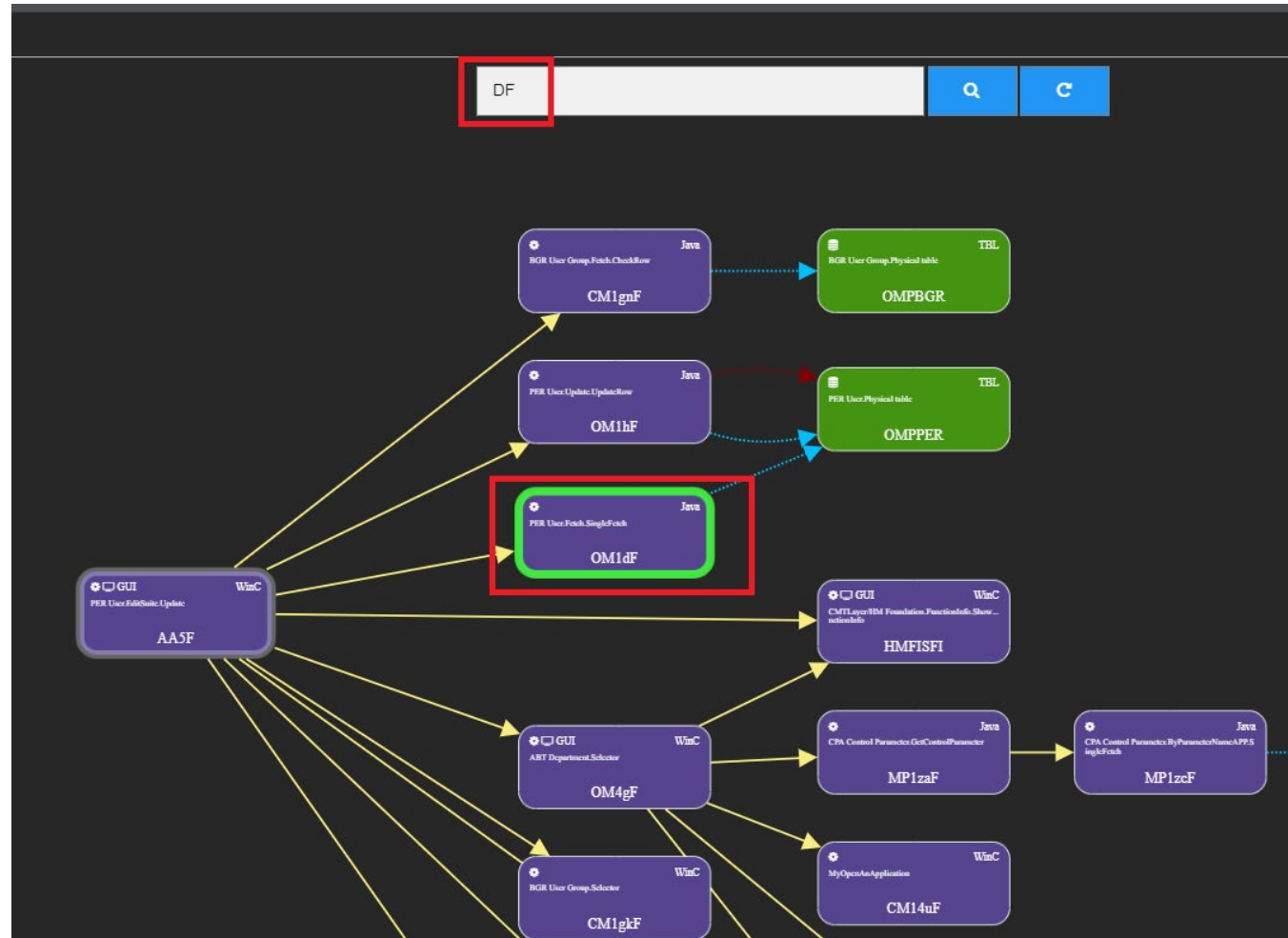
○ Show



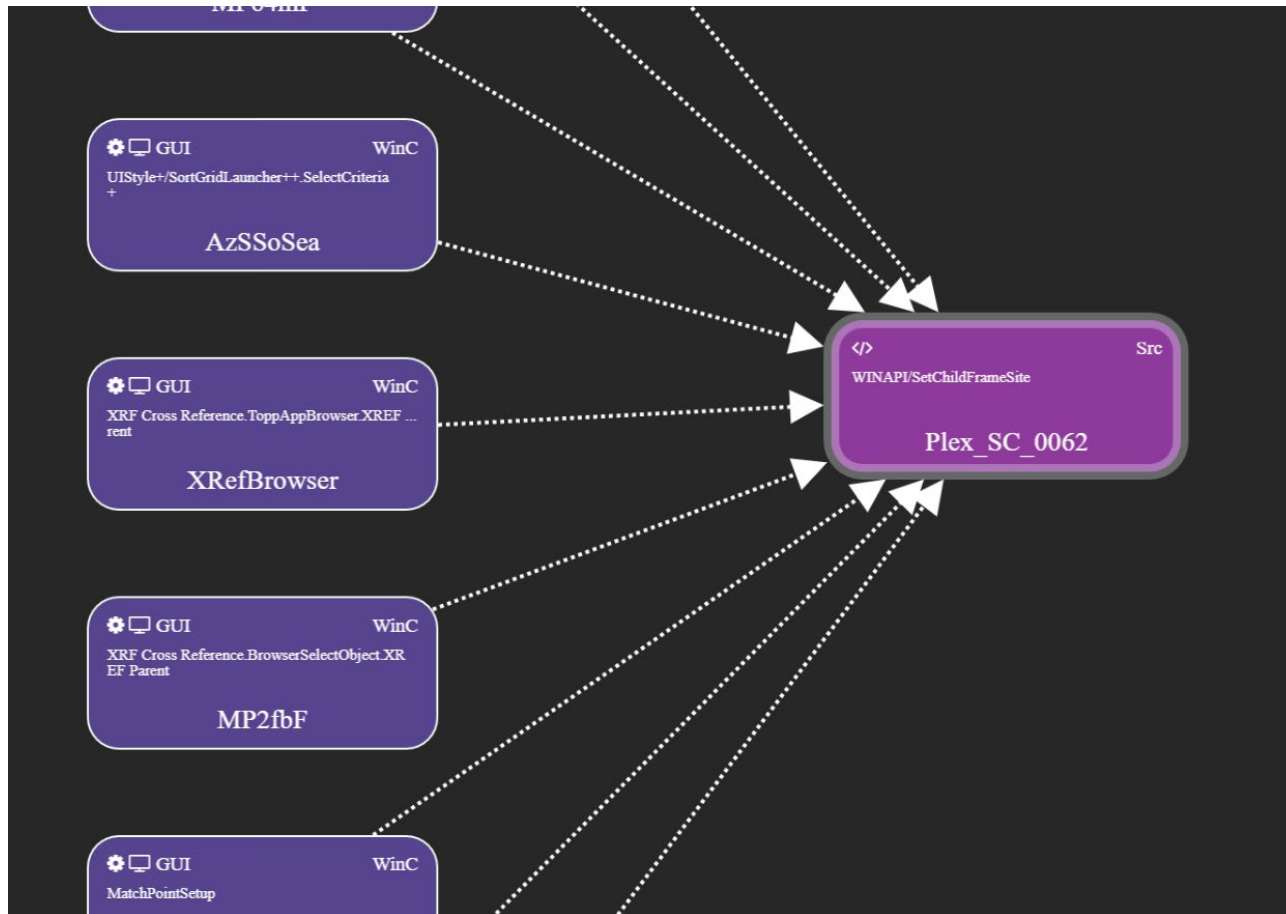


# Call Graph Diagram UX

Search and highlight



# Source code and Message Object Usage



# Extract SQL statement

The screenshot displays a software interface with two main components. At the top, a flow diagram shows a 'WinC' box on the left containing 'Generate License' and '137F', with an arrow pointing to a 'Java' box on the right containing 'KUN Company.Fetch.SingleFetch' and 'CM1IdF'. Below this, a 'Note Information' dialog box is open. The dialog has a title bar with standard window controls. It contains a checked checkbox for 'Is Public'. Below this is a large empty text area. Further down, there are two sections: 'Other Notes' and 'System Notes', both with expandable arrows. The 'System Notes' section is expanded and contains the following text: 'Noted by System.DBAccess on 9/24/2019 12:00:00 AM' followed by an SQL statement: '\*SELECT CM1ijA, CM1jmA, CM1jnA, CM1joA, CM1jpA, CM1jqA, CM1jrA, CM1jsA, CM1jtA, CM1nrA, MP1s1A, MP1s2A, MP1s3A, MP1s4A, MP1s5A, MP1s6A, MP1v1A, MP1vmA, MP1s7A, MP1s8A, MP1s9A, MP1saA, MP1sbA, MP1scA, MP1sdA, MP4pkA, MP6p7A, MP5plA, MP4plA, MP6p8A FROM OMLKUN01 WHERE ( CM1ijA = ? ) ORDER BY CM1ijA \*'. At the bottom of the dialog are three buttons: 'Save & Close', 'Save', and 'Cancel'.

WinC  
Generate License  
137F

Java  
KUN Company.Fetch.SingleFetch  
CM1IdF

Note Information

Is Public

Other Notes

System Notes

Noted by System.DBAccess on 9/24/2019 12:00:00 AM

```
*SELECT CM1ijA, CM1jmA, CM1jnA, CM1joA, CM1jpA, CM1jqA, CM1jrA, CM1jsA, CM1jtA, CM1nrA, MP1s1A, MP1s2A, MP1s3A, MP1s4A, MP1s5A, MP1s6A, MP1v1A, MP1vmA, MP1s7A, MP1s8A, MP1s9A, MP1saA, MP1sbA, MP1scA, MP1sdA, MP4pkA, MP6p7A, MP5plA, MP4plA, MP6p8A FROM OMLKUN01 WHERE ( CM1ijA = ? ) ORDER BY CM1ijA *
```

Save & Close Save Cancel

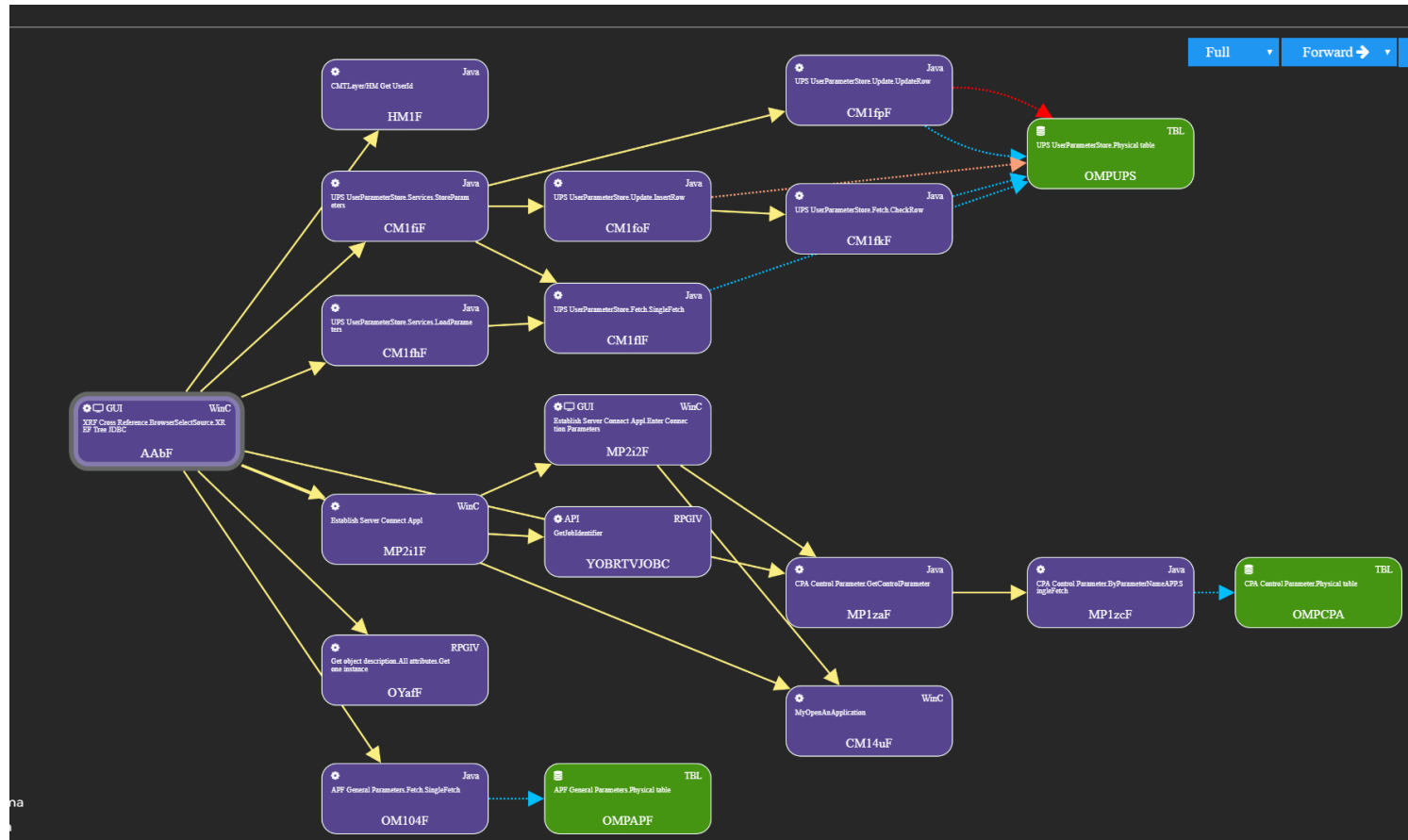
Apr 01 2020

# Rest API for CA 2E

Open Access for All



# 2E Data Model as ER Diagram?



# Plex Has a Model API, but CA 2E has no API

- No officially supported access to 2E model – Must use internal files or reports
- Many (including CM First) have developed internal mechanisms to get at information.
  - Sometimes it is easy (Files)
  - Sometimes it is hard (Action Diagrams)

At CM First, we feel the time is right to open access for all

- Understanding
- Modernization



# Developing Rest API as Community Open Source



- Extensible
- Easy to use by anyone, with open source tools
- Can be used for any purpose (We will use for CM evolveIT and CM M3)
- Good for 2E Community

We are seeking collaborators in the CA 2E community to join us!

# Initial Focus of Development



- Java Based REST API foundation (free tools)
- Object information by type, owner and name
- Data Model for Entity
- Screens and Action Diagram later

# What is available now?

— RIGHT HERE —  
**RIGHT NOW.**

## Object APIs

- GET Entity
- GET Field
- Get Function
- GET Accesspath
- Relation APIs
  - GET Entity Data Model

# GET Entity 'Agent'

```
{  
  "objectSurrogate": 1161,  
  "object": "Agent",  
  "objectType": "FIL",  
  "objectAttribute": "REF",  
  "implName": "AK",  
  "creationTimestamp": "2015-02-24T01:02:23Z",  
  "updateTimestamp": "2015-03-03T13:03:03Z",  
}
```

# GET Entity Data Model for Entity Agent 1161

```

*PGMR  CMINSM DL2                Op: MSCHROEDER QPADEV000L  3/25/20 17:39:55
EDIT DATABASE RELATIONS          CMINSM DL2
=>   Agent
?   Typ Object                    * Rel lvl:
--- FIL Agent                    Relation      Seq Typ Referred object
--- FIL Agent                    Known by     5 FLD Agent ID
--- FIL Agent                    Refers to   10 FIL Person Table
--- FIL Agent                    Includes    15 FIL Audit Stamp
  
```

```

{
  "relationSurrogate": 1164,
  "relationLevel": "KEY",
  "relationSequence": 5,
  "relationType": "Known by",
  "referredObjectSurrogate": 1163,
  "referredObject": "Agent ID",
  "referredObjectType": "FLD"
}
  
```

```

{
  "relationSurrogate": 1165,
  "relationLevel": "ATTRIBUTE",
  "relationSequence": 10,
  "relationType": "Refers to",
  "referredObjectSurrogate": 1026,
  "referredObject": "Person Table",
  "referredObjectType": "FIL"
}
  
```

```

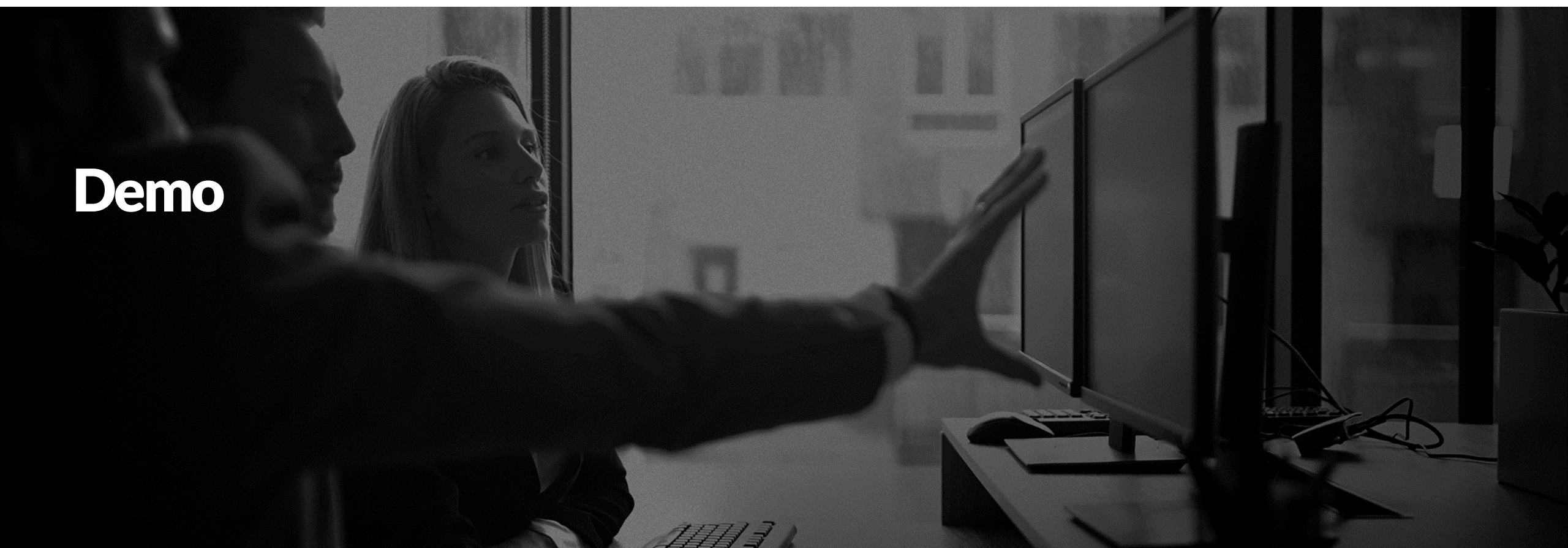
{
  "relationSurrogate": 1214,
  "relationLevel": "ATTRIBUTE",
  "relationSequence": 15,
  "relationType": "Includes",
  "referredObjectSurrogate": 1200,
  "referredObject": "Audit Stamp",
  "referredObjectType": "FIL"
}
  
```

# GET Function

```
{  
  "objectSurrogate": 1104895,  
  "object": "ABT PMT Agent",  
  "objectType": "FUN",  
  "objectAttribute": "RP4",  
  "ownerSurrogate": 1161,  
  "owner": "Agent",  
  "implName": "INCIPVR",  
  "creationTimestamp": "2015-06-01T19:06:01Z",  
  "updateTimestamp": "2016-01-12T17:01:12Z",  
  "functionType": "PMTRCD"  
}
```



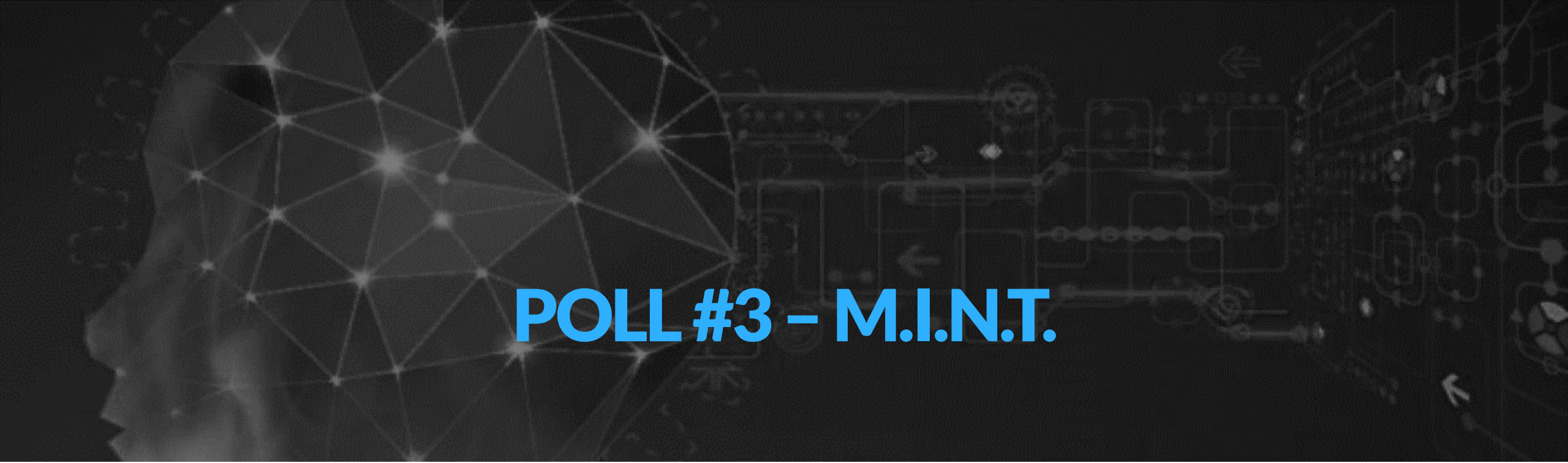
Demo



# Possible Use Cases?



- Visualize 2E model in CM evolveIT (Under development)
- DevOps?
- Gen and build CA 2E Functions as Rest API?
- Use JT400.jar to execute commands?
- Enhance Screen Scraper Front Ends?
- Extract Action Diagram for analysis?



# POLL #3 – M.I.N.T.



# Fall Conference Planning

Mark O'Brien



# Upcoming Conference



- 2 days – In Person and Online mix
- 1 day lecture, 1 day lab
- Broader than just Plex/2E Developer/Devops - also featuring:
  - RPA
  - Security
  - IBM i

# Call For Speakers



- We all have an idea, story, tip to share ...
- Can be about 2E, Plex, SQL, Automation, Data Security, Test, etc.
- Get a FREE Conference Pass
- Also a special, unique Gift for participating





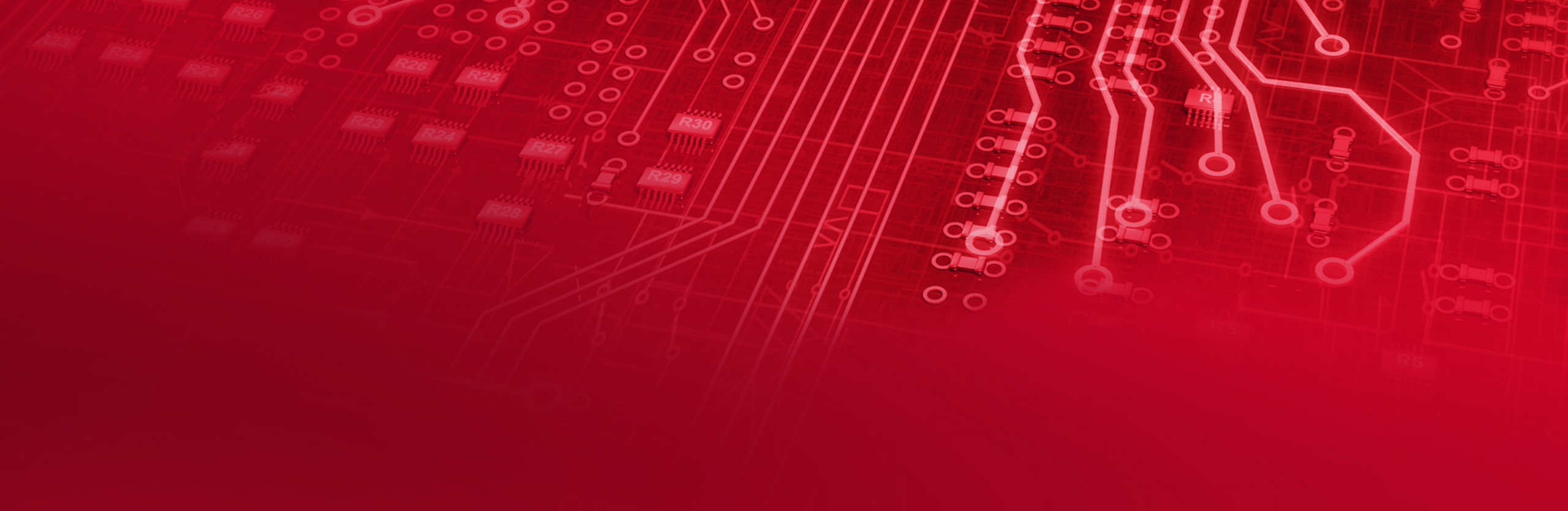


# POLL #4 – SaaS Access to Plex/2E



# Q&A

Please use the Question feature in Webinar



Thank You and Until Next Time

