

# CA 2E to Java/.NET, the Cloud, and beyond

Overview

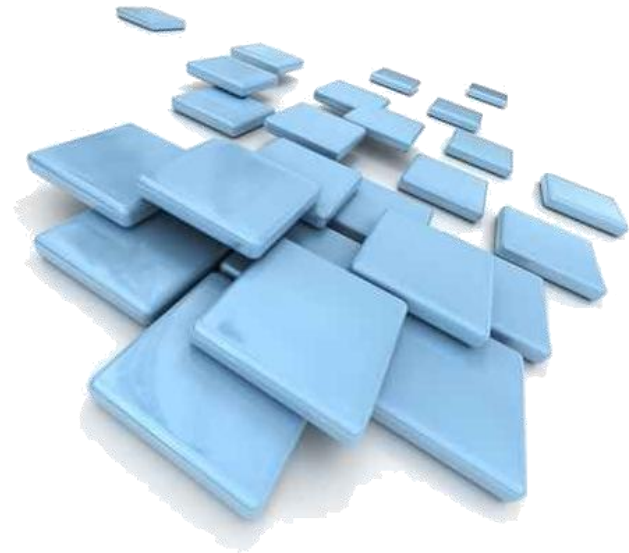
ADC Austin  
with  
CM First

# What are we talking about

Automated CA 2E modernization

## *The M3Solution*

- *CA Plex target, with both IBM-centric Java/RPG IV and Microsoft-centric C# .NET deployment options*
- *Total Solution - Highly automated and maintainable (2E model only)*
- *Deep IBM i knowledge coupled with 2E skills*



- Overview of 2E Modernization
  - Background of M3
  - Getting Started: Discovery / Analysis
- Case Study
  - Large scale modernization
  - Demo

# Select Customers



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# A Multitude of Ways to Modernize



But ***few***  
**RIGHT WAYS**

# Model-based Migration Methodology

The screenshot illustrates a model-based migration methodology by showing the transition from a legacy terminal-based M3 system to a modern web-based interface.

**Legacy Terminal Interface (Left):**

- Session A - [24 x 80]**: A terminal window showing the M3 command-line interface.
- ITPLUI06**: The main menu options.
- CORP Warehouse Area**: The selected area.
- Type options**: A list of options including '5=Details'.
- Sell by Date**: A table of sell-by dates.
- F3=Close F4=Implies**: Function key shortcuts.

W-Date	LT	Current	Flag	S	D
>				2/9	
>				2/9	
>				2/9	
				6/2	
				6/2	

**Modern Web Interface (Right):**

- WHSEGU1P - Edit Warehouse**: A web browser window displaying the M3 web client.
- Logistics > Process > Labor > Orders > Transportation > Purchasing**: The navigation menu.
- CORP > WHSEGU1P - Edit Warehouse**: The current page title.
- Warehouse 0**: The selected warehouse.
- Description**: The warehouse description.
- Available for Orders**: A dropdown menu.
- + Add**: A button to add a new warehouse.
- Table of Warehouses**: A table listing warehouses and their availability.

Warehouse Number	Description	Available for Orders
1	Central Warehouse 1	Available
2	Secondary Warehouse	Available
3	Freezer Warehouse	Not Available
4	Refrigerator Warehouse	Available
10	Off Site Warehouse	Available
18	Off Site Warehouse	Available

**Footer:**

- ADC AUSTIN**: The company logo.
- cm FIRST TECHNOLOGIES**: The company logo.
- McLane Distribution System**: The system name.
- Internet | Protected Mode: Off**: The browser status bar.

# The **Right** Way

Know before you buy

- **Effective** modernization requires:

- High levels of automation, approach 100%
- maintainability by existing staff
- web applications and SOA out of the box

- **Few get it right**

- **M3 One Avenue**

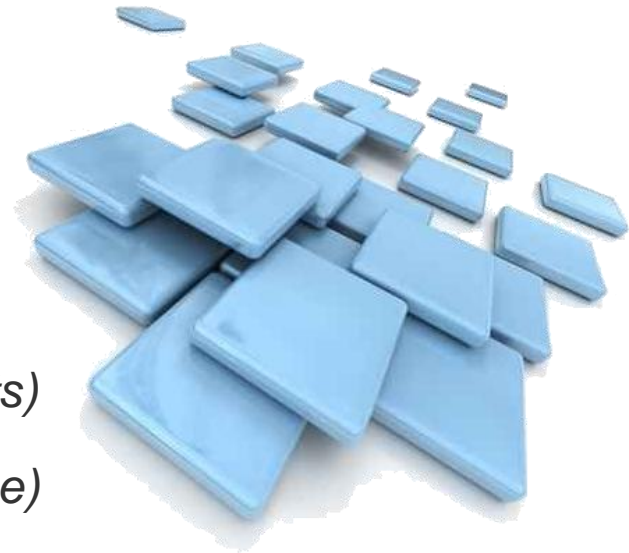
- M3 methodology



# The M3 Way

Automated modernization with refactoring

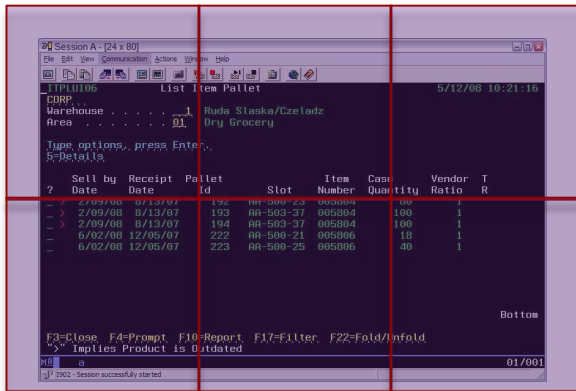
- **More than a tool – a methodology**
  - Faster than a rewrite & maintainable
  - +multiplatform, +web, +SOA
- **Avoid costly risks:**
  - web facing / screen scraping (*dual environments*)
  - manual migration (*uneven quality, cost, timeframe*)
  - syntax translators (*maintainability, “JOBOL”, runtimes*)
  - packages (*acquisition & customization expense*)



# M3 Process

XML based design migration

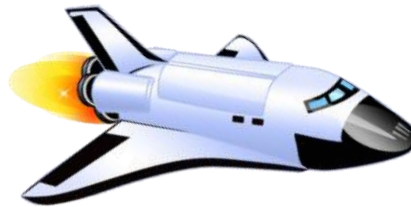
## Original 5250



The screenshot shows a 5250 terminal window with a menu bar at the top and a data table below. The table has columns for Date, Receipt Date, Pallet Id, Slot, Item Number, Case Quantity, Vendor Ratio, and T. The data is as follows:

Date	Receipt Date	Pallet Id	Slot	Item Number	Case Quantity	Vendor Ratio	T
2/09/08	8/13/07	192	AR-500-23	005004	100	1	
2/09/08	8/13/07	192	AR-500-37	005004	100	1	
2/09/08	8/13/07	194	AR-500-37	005004	100	1	
6/02/08	12/05/07	222	AR-500-21	005006	18	1	
6/02/08	12/05/07	223	AR-500-25	005006	40	1	

Migration  
(ADCMS XML2ES)  
(Discovery Services)



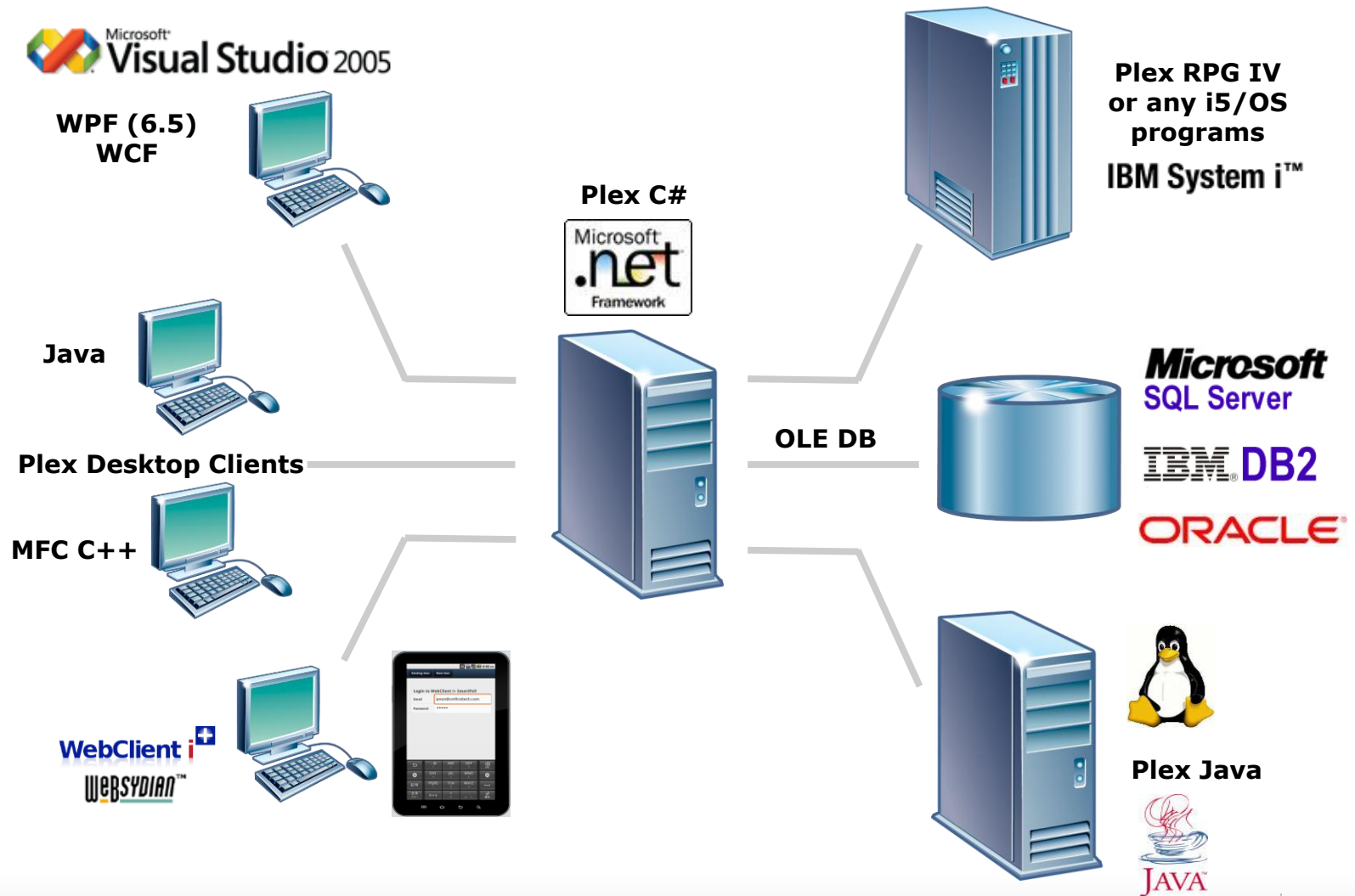
- CA 2E (Synon) models & generated applications
- Native:
  - RPG
  - COBOL
  - CL/i5/OS artifacts

- Native code modernization
- Worksoft Certify regression testing

## New Environment (SOA & Web)



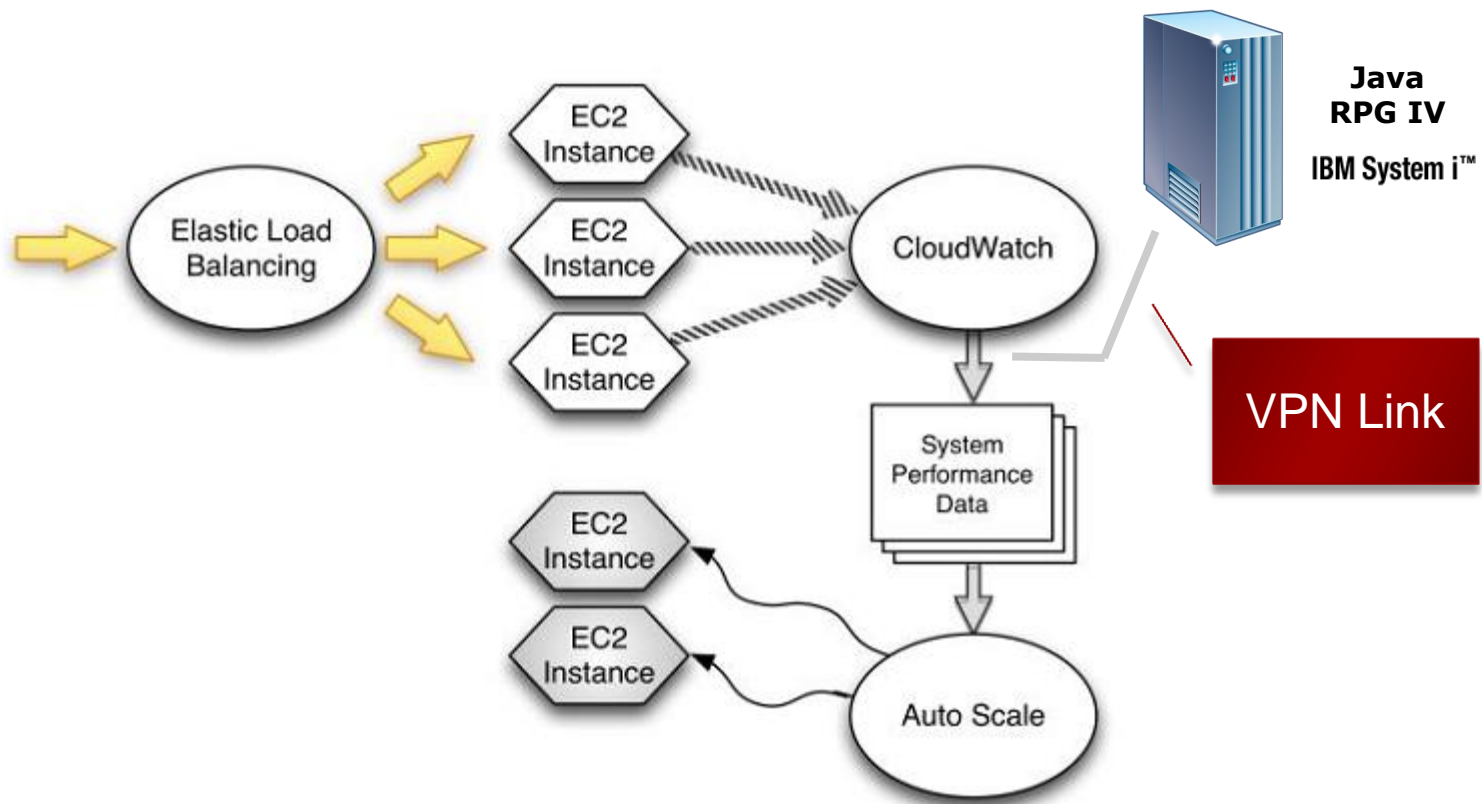
# Platform Options

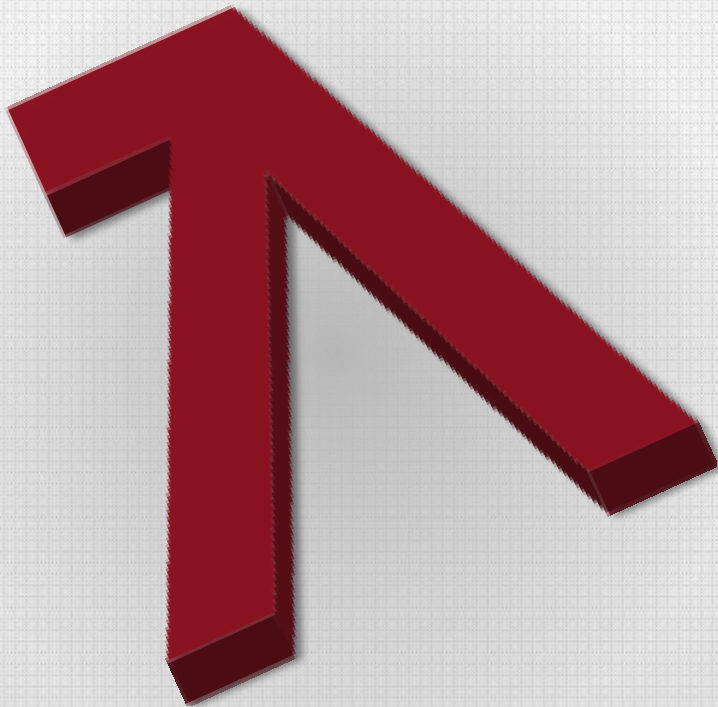


# Cloud Computing Instances



One way – Deploy CA Plex apps to Amazon Cloud





**Getting Started:  
Discovery  
Analysis  
Next**

Discovery phase involves extracting object counts that will be migrated from the 2E model

Object count will list out all the 2E objects like files, fields, field conditions, Different function types, Messages, Arrays, Screen and Report formats

- Determine basic non-automated counts
- PRTFIL, PRTOBJ, EXCUSRSRC, EXCUSRPGM

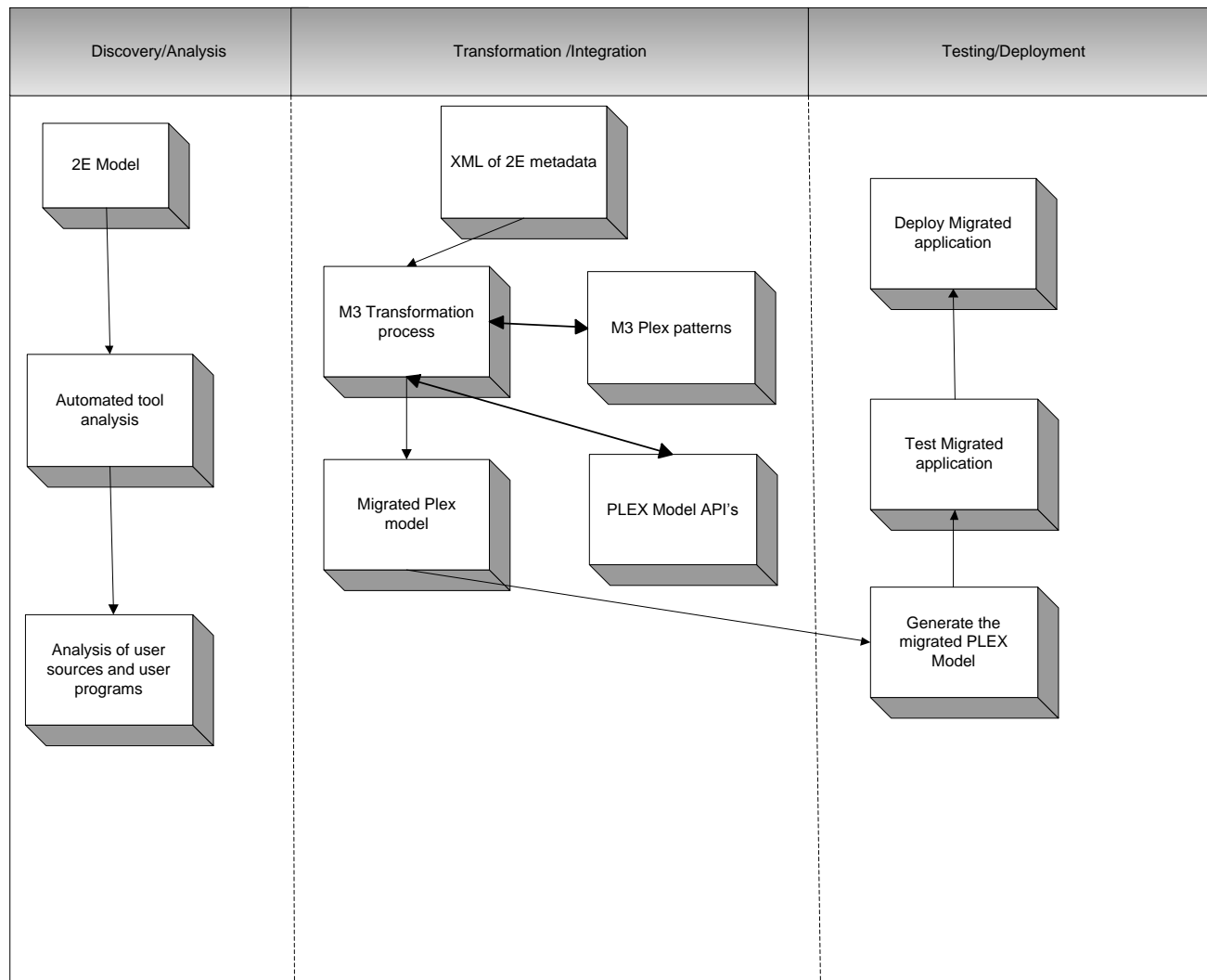
This will determine a high level estimate for the migration

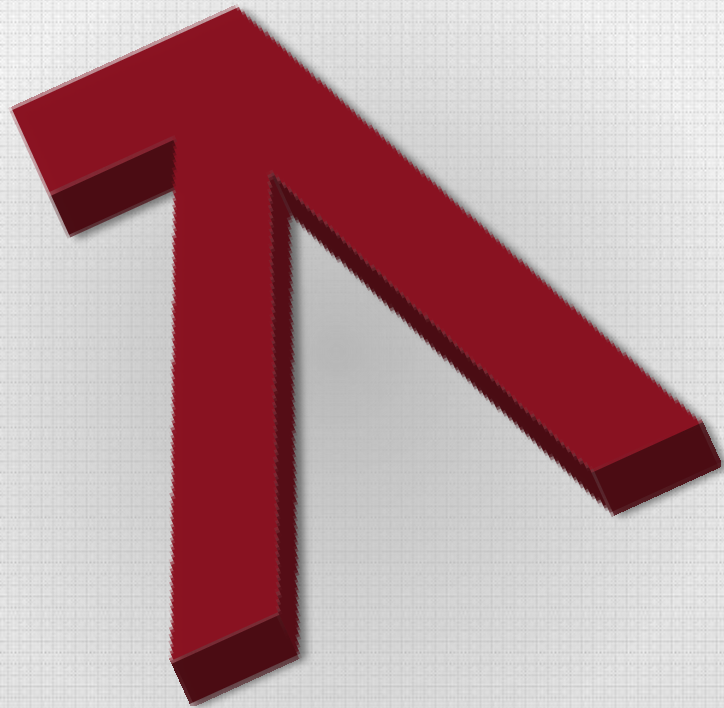
- 4-6 Weeks ( or more) depending on complexity of model
- Scope includes the following
  - **Evaluate all EXCUSR SRC**
    - Identify whether it is used in client side functions, server side functions or both. Determine whether it needs to be replaced or rewritten.
  - **Evaluate all usage of AS/400 API's and AS/400 specific environment**
    - Job Descriptions
    - Library List
    - Local Data Area
    - Data Areas
    - Data Queues
    - AS/400 Job information
  - Identify whether it is used for client side functions, server side functions or both. Determine whether its use is appropriate and/or available on target platform.
  - **Evaluate all User Defined Data Types** - Determine if the User defined data type may be mapped to a Plex Data Type.
  - **Evaluate all EXCUSRPGM and PRTFIL functions** - Determine if a function is a Boundary Node or an Intermediate Node in the call graph. All Public interfaces of the application. Migrated functions that are called by EXCUSRPGM and PRTFIL functions. This requires Binary Interoperability to pass the state information between migrated 2E external functions
  - **Find "Broken Encapsulation"** - Find dependencies and behaviors not defined and/or set within an application. For Example Call RTVOBJ with same access path in a DSPFIL
  - **Evaluate Call Graphs of Server Functions** - Determine if the Call Graph of a Server function include Client functions. This behavior is undefined in a migrated application.
  - **Evaluate Look and Feel Expectations** - Determine if the Look and Feel required can be delivered in the Migration or only in Post Migration refactoring

- M3 uses both X-Analysis and proprietary analysis tools to build model object lists, object references and usages.
- X-Analysis is used to produce Data flow diagrams and function Decomposition diagrams
- At the end of the analysis phases M3 will deliver the following
  - Count of objects that will be automatically migrated.
  - Count of objects that needs to re-written manually.
  - High Level program flows provided from the automated tool.
  - Analysis report with findings and recommendations.
  - Project plan with time lines and estimates.

- Migration phase includes Resolution, Transformation and Import
  - Resolution will make sure that all the 2E objects are present in the XML
  - Transformation will transform in the XML in to an intermediate language based on ADC Migration patterns
  - Based on the transformation the 2E model is imported in to PLEX model using PLEX model API's

# Migration – Phases





## Case Study

## Statistics of current migration

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- The 2E model had the following objects counts
- The model is migrated in 5 phases – currently migrated 7000+ functions, data model, and associated artifacts
- Total model:

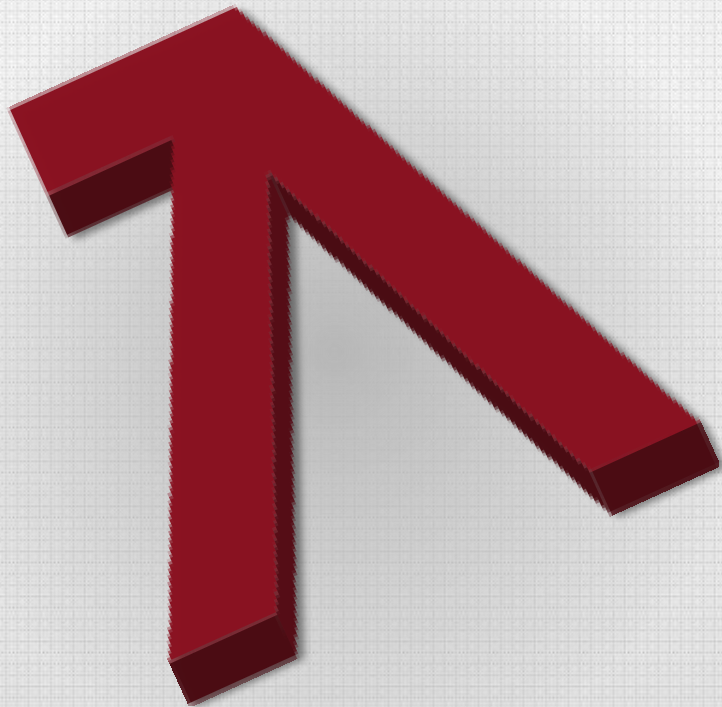
Object	Count
Access path	8506
Fields	33273
Functions	26,387
Arrays	87
Messages	6047

## Specific Challenges Encountered

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- Using \*CMD key in WRK and LCL context
- The use of an uninitialized output parameter in an internal function
- The parameter fields that are present as Input and Output but not Both
- Default parameters that are implicitly mapped
- Duplicate access paths passed as Input and Both
- WRK context fields passed as duals in internal functions
- Performance Limitations with PLEX model API's

- Manual Work Arounds
- Adjustments to M3 transformation logic
- CA Plex Model API – working with CA to improve performance



## Case Study Demo

# Summary

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More than modernization

- **New application capabilities**
  - Integrate to Microsoft .NET and Java, yet remain compatible with RPG/COBOL applications
  - Web presentation
  - SOA / open access
- **With quality development process**
  - no screen scraping
  - user-friendly features (tabs, wizards, portals, etc.)
  - Maintainable - no source code syntax translation

# M3 and CA Plex Information

<http://adcaustin.com/>  
<http://cmfirstgroup.com>

