OpenEdge Legacy Application Modernization by Example

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Consultingwerk Ltd.

- Independent IT consulting organization
- Focusing on **OpenEdge** and **related technology**
- Located in Cologne, Germany, subsidiary in UK
- Customers in Europe, North America, Australia and South Africa
- Vendor of developer tools and consulting services
- 28 years of Progress experience (V5 … OE11)
- Specialized in GUI for .NET, Angular, OO, Software Architecture, Application Integration

SmartComponent Library

- Helps to protect your investment in your OpenEdge based application
- The framework is designed to modernize existing OpenEdge applications and to provide the foundation of new projects
- In the cloud and on premise
- UI flexibility – Desktop, Web & Mobile
- The architecture of the SmartComponent Library simplifies integration with future technologies and the implementation of new business requirements.

Agenda

- **Introduction / Application Modernization**
- Modern OpenEdge Application Architecture
- ADM2 SDO migration
- TTY Update editing migration
- ABL GUI migration
- OSIV3G Modernization example

Modernization Strategies

- Modernization of the whole application?
  - Going from ABL GUI to GUI for .NET or Web or Mobile
  - What is the *"final"* UI technology
  - GUI for .NET as an intermediate / integration with legacy GUI while the backend is rearchitected

- Or do we (first) add a few new features?
  - Mobile client for parts of the application
  - REST/REST(ful) interfaces for parts of the application

Quality of the application

- Are parts of the application reusable?
  - With no or little changes
  - Are major functional changes required?
  - Are major changes to the database structure required?

- Can parts of the application serve to describe the requirements
  - Legacy code review as part of the requirements definition
  - Is the existing source code the only (complete) description of the application functionality?

Skills of development team

- New development process (let's get agile)
- New tools (Progress Developer Studio, SCM, Unit Tests, Frontend tools)
- New architecture: Distributed
- New development languages
  - OOABL
  - html, JavaScript, TypeScript, rapidly changing
  - Desktop technologies

Modernization Examples in this presentation

- The modernization examples provided in this presentation demonstrate refactoring techniques based on simple examples
- These or similar techniques can be used for other types of ABL legacy applications
- Foundation for source code migration is always
  - understanding of existing code structure/architecture
  - understanding of target architecture
  - a concept
  - tools
  - experience
  - trial and error, or let's call it a proof-of-concept

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OERA OpenEdge Reference Architecture

- Architecture blue print for service-oriented OpenEdge applications
- Initially released with OpenEdge 10.0 (15+ years)
- Primary goals at the time
  - AppServer enabling OpenEdge applications
  - Building non-monolithic OpenEdge applications
  - Supporting client flexibility
  - Providing guidance for use of the ProDataset
  - Providing guidance for use of OOABL (later, around OE10.1+)

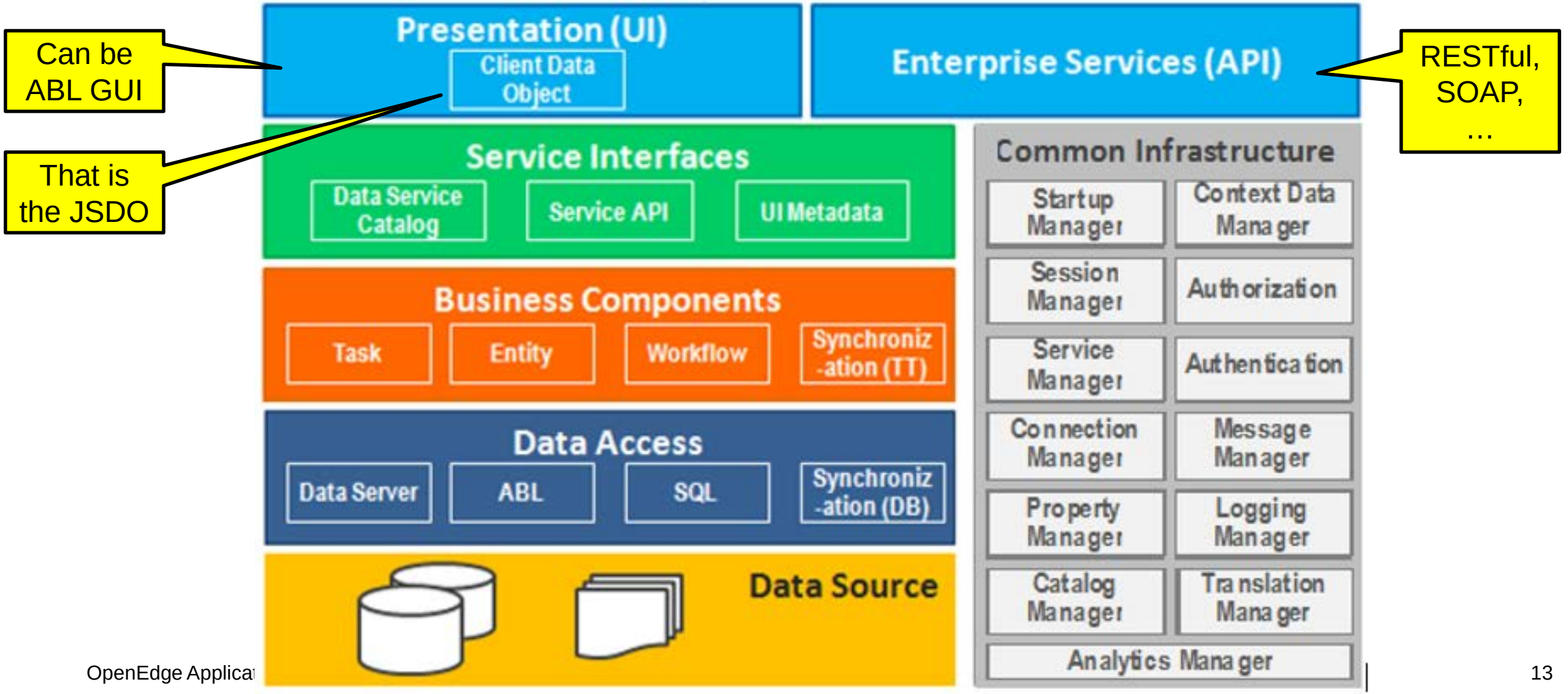
OERA today

- Fast forward to 2015 …
- Modernization of OpenEdge applications more relevant than ever; especially since Telerik acquisition and demands for UI flexibility
- OEAA – OpenEdge Application Architecture, redefining the OERA
- OERA back on focus, foundation of the **CCS (common component specification)** project as a vehicle for community and Progress driven architecture-spec efforts
- More detailed specs, rather than just programming samples
- Specs that an application or framework could be certified against
- CCS starting to influence *"in-the-box"* features

Business Entities

- Business Logic Component in the Business Service Layer
- Manages a set of database tables
  - Customer
  - Order/OrderLine/Item (read-only)
- CRUD actions (create, read, update, delete)
- Custom actions, verbs of the entity (PutCustomerOnCreditHold)
- Primary backend component for the JSDO
  - Kendo UI, Kendo UI Builder
  - NativeScript

The OpenEdge Application Architecture (OEAA)



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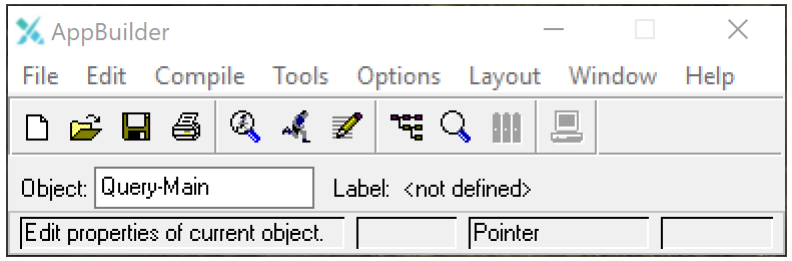
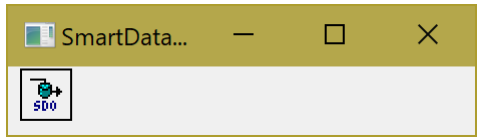
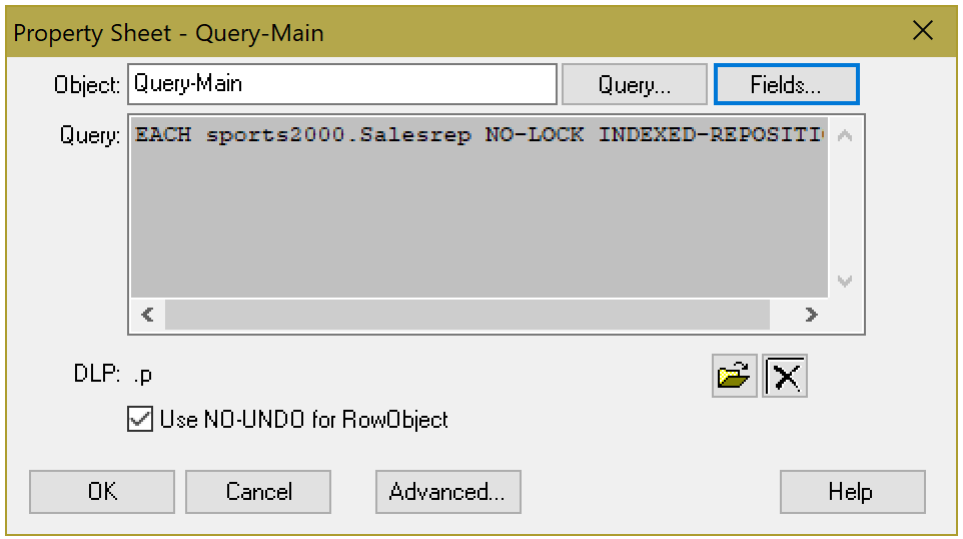
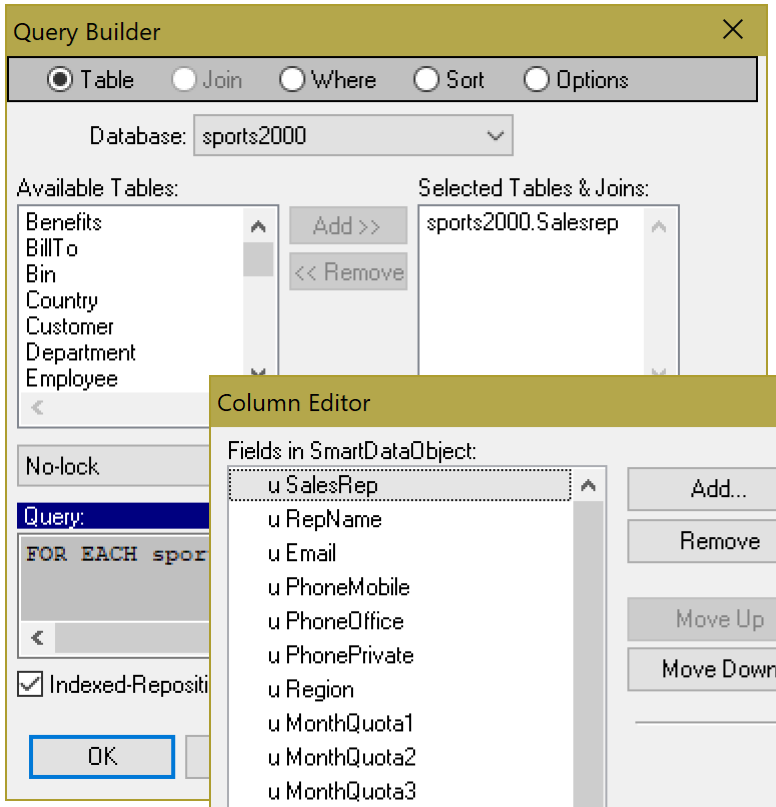
ADM2 SDO migration

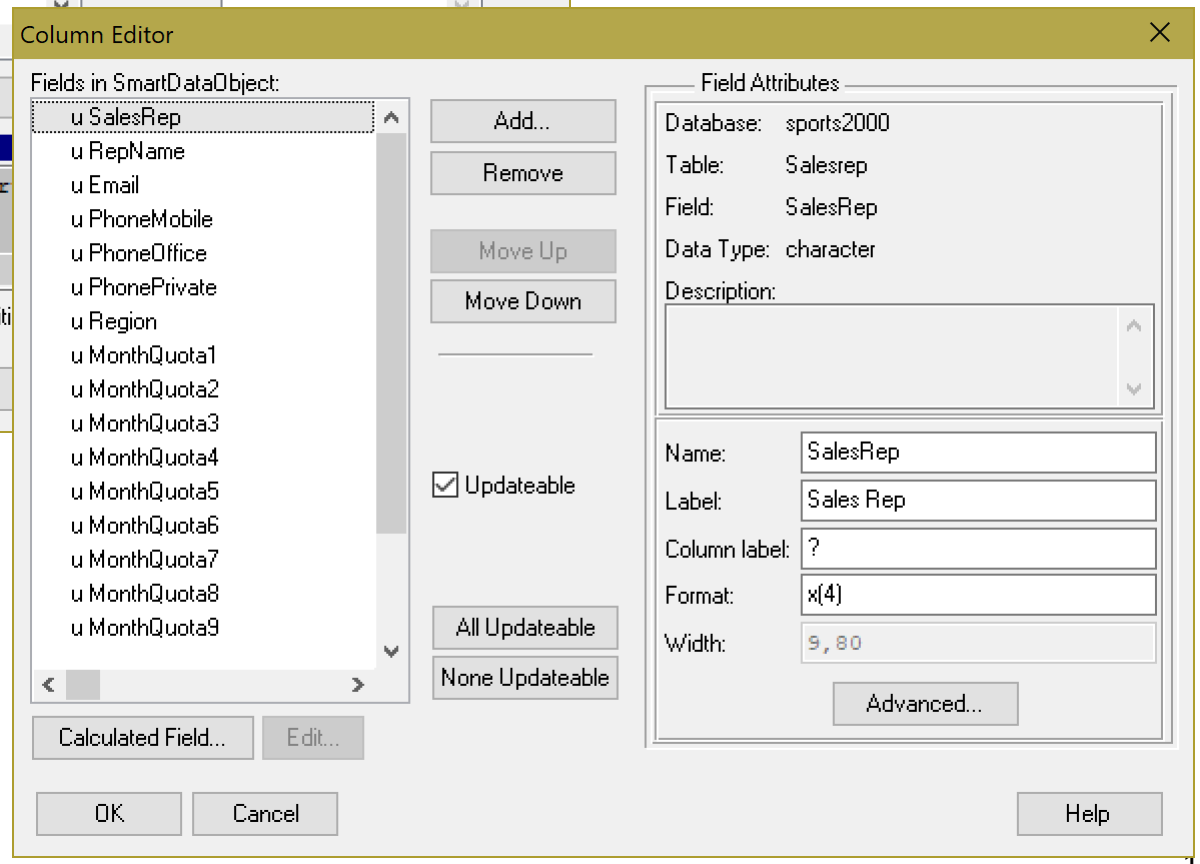
- SmartDataObjects (SDO's) were introduced with Progress Version 9 and the ADM2
- SmartDataObjects have a similar responsibility within an application as a Business Entity
  - Centrally managing all read and update access to a database table
  - Based on temp-tables
  - Providing dedicated hooks for validation and calculated fields
  - Providing standards for change tracking and error reporting
  - Providing a central location for custom code that fits into the scope of the set of database tables


AppBuilder
File Edit Compile Tools Options Layout Window Help
Object: Query-Main
Label: <not defined>
Edit properties of current object.
Pointer


SmartData...
SDO


Property Sheet - Query-Main
Object: Query-Main
Query...
Fields...
Query:
EACH sports2000.Salesrep NO-LOCK INDEXED-REPOSITI
DLP: .p
Use NO-UNDO for RowObject
OK
Cancel
Advanced...
Help


Query Builder
Table Join Where Sort Options
Database: sports2000
Available Tables:
Benefits
BillTo
Bin
Country
Customer
Department
Employee
Add >>
<< Remove
Selected Tables & Joins:
sports2000.Salesrep
No-lock
Query:
FOR EACH spor
Indexed-Reposit
OK


Column Editor
Fields in SmartDataObject:
u SalesRep
u RepName
u Email
u PhoneMobile
u PhoneOffice
u PhonePrivate
u Region
u MonthQuota1
u MonthQuota2
u MonthQuota3
u MonthQuota4
u MonthQuota5
u MonthQuota6
u MonthQuota7
u MonthQuota8
u MonthQuota9
Add...
Remove
Move Up
Move Down
Updateable
All Updateable
None Updateable
Calculated Field...
Edit...
Field Attributes
Database: sports2000
Table: Salesrep
Field: SalesRep
Data Type: character
Description:
Name: SalesRep
Label: Sales Rep
Column label: ?
Format: x(4)
Width: 9,80
Advanced...
OK
Cancel
Help

Section Editor - SmartDataObject - C:\Work_STREAM\SmartComponentLibrary\Develop\A...

File Edit Insert Search Compile Help

Section: Functions | List... | Insert Call...

Name: calculate_AnnualQuc | New... | Rename...

```
RETURNS DECIMAL
  ( /* parameter-definitions */ ) :
/*------------------------------------------------
  Purpose:
    Notes:
------------------------------------------------*/

    RETURN RowObject.MonthQuota1 +
           RowObject.MonthQuota2 +
           RowObject.MonthQuota3 +
           RowObject.MonthQuota4 +
           RowObject.MonthQuota5 +
           RowObject.MonthQuota6 +
           RowObject.MonthQuota7 +
           RowObject.MonthQuota8 +
           RowObject.MonthQuota9 +
           RowObject.MonthQuota10 +
           RowObject.MonthQuota11 +
           RowObject.MonthQuota12 .

END FUNCTION.
```

Section Editor - SmartDataObject - C:\Work_STREAM\SmartComponentLibrary\Develop\A...

File Edit Insert Search Compile Help

Section: Procedures | List... | Insert Call... | Private | DB-Required

Name: SalesrepValidate | New... | Rename...

```
/*------------------------------------------------------------------------------
  Purpose:
  Parameters:  <none>
  Notes:
------------------------------------------------------------------------------*/

    DEFINE INPUT  PARAMETER pcSalesrep AS CHARACTER NO-UNDO.

    IF pcSalesrep = ? OR pcSalesrep = "":U THEN
        RETURN ERROR "Salesrep may not be empty" .


END PROCEDURE.
```

Reasons to migrate SDO's to Business Entities

- Procedural nature
- Unclear separation between frontend and backend
- Complicated API when used from outside the ADM2
- Customization complicated, lots of code, understood only by a few developers
- Single table interface, Proprietary change tracking mechanism based on two temp-tables (a prototype of the ProDataset)
- AppBuilder tooling required for ADM2
- ProDataset better supported with modern tooling and UI

SDO migration

- Well defined source code structure
- Well defined patterns for internal procedures/functions
- Meta data defined in preprocessor directives
- SDO RowObject temp-table can serve as foundation for Business Entities

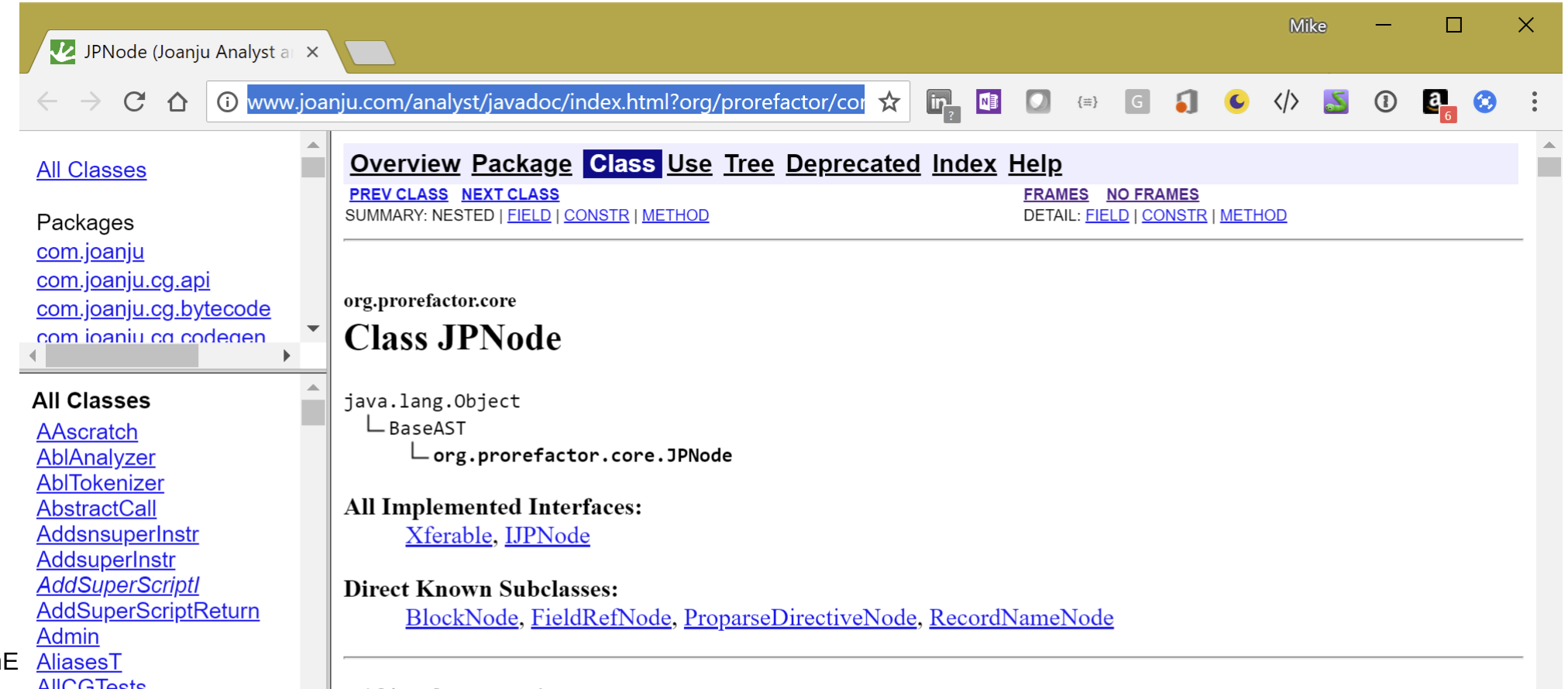
```
/* Internal Tables (found by Frame, Query & Browse Queries)             */
&Scoped-define INTERNAL-TABLES Salesrep

/* Definitions for QUERY Query-Main                                     */
&Scoped-Define ENABLED-FIELDS  SalesRep RepName Email PhoneMobile PhoneOffice PhonePrivate Region~
 MonthQuota1 MonthQuota2 MonthQuota3 MonthQuota4 MonthQuota5 MonthQuota6~
 MonthQuota7 MonthQuota8 MonthQuota9 MonthQuota10 MonthQuota11 MonthQuota12
&Scoped-define ENABLED-FIELDS-IN-Salesrep SalesRep RepName Email ~
PhoneMobile PhoneOffice PhonePrivate Region MonthQuota1 MonthQuota2 ~
MonthQuota3 MonthQuota4 MonthQuota5 MonthQuota6 MonthQuota7 MonthQuota8 ~
MonthQuota9 MonthQuota10 MonthQuota11 MonthQuota12
&Scoped-Define DATA-FIELDS  SalesRep RepName Email PhoneMobile PhoneOffice PhonePrivate Region~
 MonthQuota1 MonthQuota2 MonthQuota3 MonthQuota4 MonthQuota5 MonthQuota6~
 MonthQuota7 MonthQuota8 MonthQuota9 MonthQuota10 MonthQuota11 MonthQuota12~
 AverageQuota AnnualQuota
&Scoped-define DATA-FIELDS-IN-Salesrep SalesRep RepName Email PhoneMobile ~
PhoneOffice PhonePrivate Region MonthQuota1 MonthQuota2 MonthQuota3 ~
MonthQuota4 MonthQuota5 MonthQuota6 MonthQuota7 MonthQuota8 MonthQuota9 ~
MonthQuota10 MonthQuota11 MonthQuota12
&Scoped-Define MANDATORY-FIELDS
&Scoped-Define APPLICATION-SERVICE
&Scoped-Define ASSIGN-LIST   rowObject.MonthQuota1 = Salesrep.MonthQuota[1]~
  rowObject.MonthQuota2 = Salesrep.MonthQuota[2]~
  rowObject.MonthQuota3 = Salesrep.MonthQuota[3]~
  rowObject.MonthQuota4 = Salesrep.MonthQuota[4]~
  rowObject.MonthQuota5 = Salesrep.MonthQuota[5]~
  rowObject.MonthQuota6 = Salesrep.MonthQuota[6]~
  rowObject.MonthQuota7 = Salesrep.MonthQuota[7]~
  rowObject.MonthQuota8 = Salesrep.MonthQuota[8]~
  rowObject.MonthQuota9 = Salesrep.MonthQuota[9]~
  rowObject.MonthQuota10 = Salesrep.MonthQuota[10]~
  rowObject.MonthQuota11 = Salesrep.MonthQuota[11]~
  rowObject.MonthQuota12 = Salesrep.MonthQuota[12]
&Scoped-Define DATA-FIELD-DEFS "modernizationworkshop/adm2salesrep/dsalesrep.i"
&Scoped-Define DATA-TABLE-NO-UNDO NO-UNDO
&Scoped-define QUERY-STRING-Query-Main FOR EACH Salesrep NO-LOCK INDEXED-REPOSITION
{&DB-REQUIRED-START}
&Scoped-define OPEN-QUERY-Query-Main OPEN QUERY Query-Main FOR EACH Salesrep NO-LOCK INDEXED-REPOSITION.
{&DB-REQUIRED-END}
&Scoped-define TABLES-IN-QUERY-Query-Main Salesrep
&Scoped-define FIRST-TABLE-IN-QUERY-Query-Main Salesrep
```

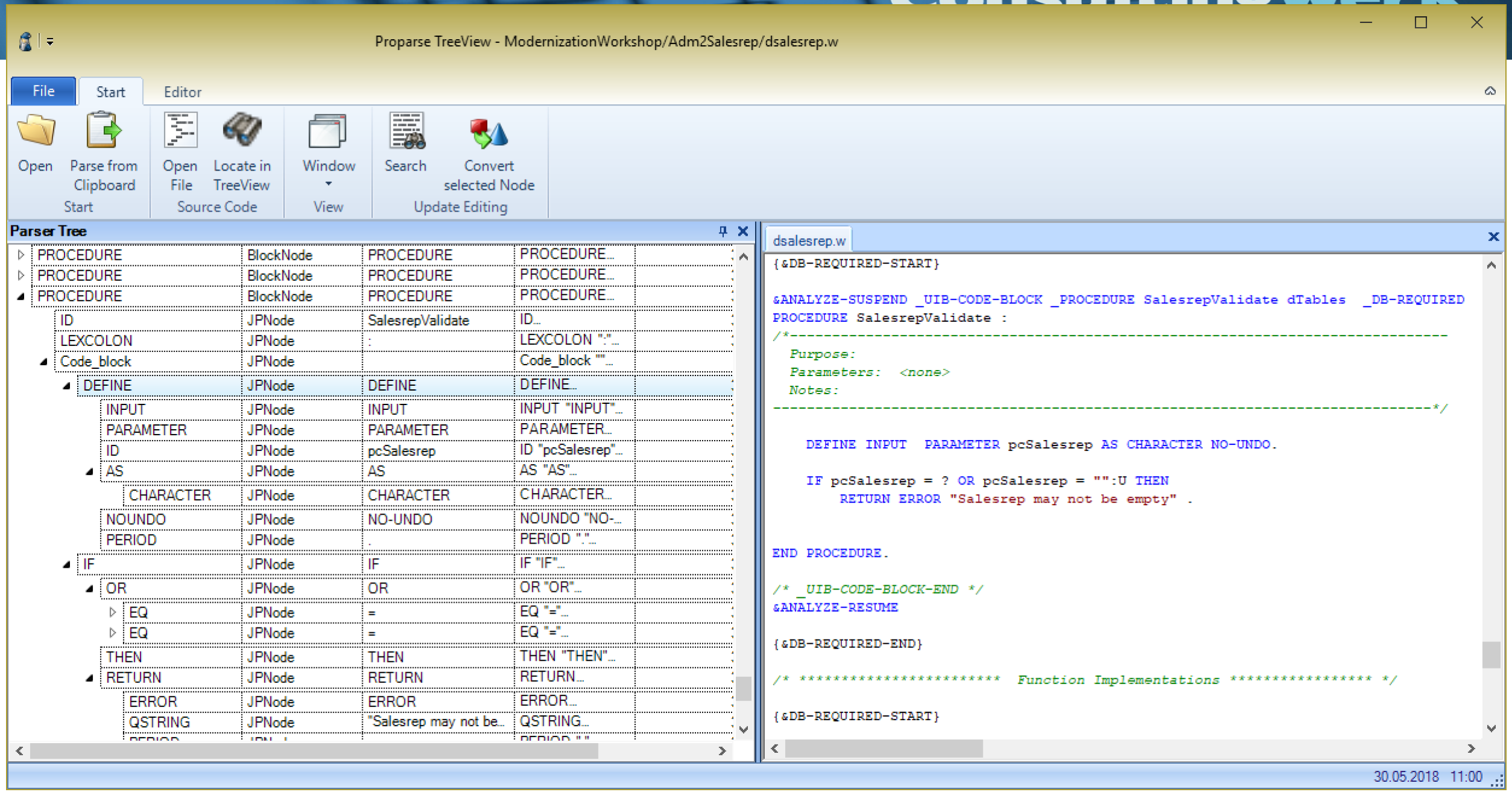
Source code parsing using Proparse

- ABL syntax parser, abstract view on ABL source code, based on ANTLR
- Eliminates the need for text based source code analysis
  - Resolves issues with line-breaks, abbreviated keywords, mixed order of keywords
- Open source
  - github.com/oehive/proparse
  - github.com/consultingwerk/proparse
  - github.com/riverside-software/proparse
- Actively maintained in various forks, support for 11.7 ABL syntax

Proparse

- http://www.joanju.com/analyst/javadoc/index.html?org/prorefactor/core/JPNode.html




Proparse TreeView - ModernizationWorkshop/Adm2Salesrep/dsalesrep.w
File
Start
Editor
Open
Parse from Clipboard
Start
Open File
Locate in TreeView
Source Code
Window
View
Search
Convert selected Node
Update Editing
Parser Tree
PROCEDURE BlockNode PROCEDURE PROCEDURE...
PROCEDURE BlockNode PROCEDURE PROCEDURE...
PROCEDURE BlockNode PROCEDURE PROCEDURE...
ID JPNode SalesrepValidate ID...
LEXCOLON JPNode : LEXCOLON ":"...
Code_block JPNode Code_block ""...
DEFINE JPNode DEFINE DEFINE...
INPUT JPNode INPUT INPUT "INPUT"...
PARAMETER JPNode PARAMETER PARAMETER...
ID JPNode pcSalesrep ID "pcSalesrep"...
AS JPNode AS AS "AS"...
CHARACTER JPNode CHARACTER CHARACTER...
NOUNDO JPNode NO-UNDO NOUNDO "NO-...
PERIOD JPNode . PERIOD "."...
IF JPNode IF IF "IF"...
OR JPNode OR OR "OR"...
EQ JPNode = EQ "="...
EQ JPNode = EQ "="...
THEN JPNode THEN THEN "THEN"...
RETURN JPNode RETURN RETURN...
ERROR JPNode ERROR ERROR...
QSTRING JPNode "Salesrep may not be... QSTRING...
dsalesrep.w
{&DB-REQUIRED-START}
&ANALYZE-SUSPEND _UIB-CODE-BLOCK _PROCEDURE SalesrepValidate dTables _DB-REQUIRED
PROCEDURE SalesrepValidate :
/*--
Purpose:
Parameters: <none>
Notes:
--*/
DEFINE INPUT PARAMETER pcSalesrep AS CHARACTER NO-UNDO.
IF pcSalesrep = ? OR pcSalesrep = "":U THEN
RETURN ERROR "Salesrep may not be empty" .
END PROCEDURE.
/* _UIB-CODE-BLOCK-END */
&ANALYZE-RESUME
{&DB-REQUIRED-END}
/* ************************ Function Implementations ***************** */
{&DB-REQUIRED-START}
30.05.2018 11:00

SDO to Business Entity Migration

- SDO structure imported into SmartComponent Library Business Entity Designer
- Functionality implemented as a plugin to the tool
  - Not relevant for all users of the Business Entity Designer, can be disabled
  - Allows for easy customization in fork of the plugin
- Wizard supports changes to the SDO structure, e.g. adding/removing/renaming fields of the RowObject temp-table; application of new naming standards

Demo

- Use Business Entity Designer plugin to convert SDO into Business Entity

Source Code migration

- Migration of arbitrary source-code influenced by existing coding style
- Migration of SDO source code requires
  - Location of relevant source code
  - Conversion of procedures/functions to methods
  - Modify procedural invocation of sub-routines to class based invocation
  - Change access to RowObject fields to new temp-table name
  - …

Proparse based source-code migration

- Extension to Proparse
  - ABL based API's to locate relevant code
  - enabling Proparse for in-memory manipulation of source code
- Alternative is to use Proparse for understanding of legacy code and simple OUTPUT TO or LONGCHAR operations to build new source code
- XFEF, COMPILE listing sometimes used as well. But majority of input is present in Proparse

```
ProparseHelper:Initialize() .
ProparseHelper:ExportDatabaseSchema() .

oParseUnit = ProparseHelper:ParseFile("ModernizationWorkshop/Adm2Salesrep/dsalesrep.w":U) .

oRoot = oParseUnit:getTopNode().

oChild = oRoot:firstChild () .

DO WHILE VALID-OBJECT (oChild) ON ERROR UNDO, THROW:

    IF NodeTypes:getTypeName (oChild:getType()) = "FUNCTION":U THEN DO:

        ASSIGN cId = ProparseHelper:GetIdNodeText (oChild) .

        IF cId  MATCHES "calculate_*":U THEN DO:

        END.
    END.

    FINALLY:
        IF VALID-OBJECT (oChild) THEN
            oChild = oChild:nextSibling () .
    END FINALLY.
END.
```

Continued on next slide

```
IF cId  MATCHES "calculate_*":U THEN DO:

    oCodeBlock = ProparseHelper:FindChildNodeOfNodeType(oChild, "Code_block":U) .

    IF VALID-OBJECT (oCodeBlock) /* skip forward definition */ THEN DO:

        cOriginal  = oCodeBlock:toStringFulltext() .

        oWalker = NEW NodeWalker ("Field_ref":U) .

        oWalker:WalkNodes (oCodeBlock, NEW RenameBufferNodeAction("RowObject":U, "eSalesrep":U)) .

        ASSIGN cDatatype = ProparseHelper:FindChildNodeOfNodeType(oChild, "RETURNS":U)
                                    :nextSibling()
                                    :getText () .

        CLIPBOARD:VALUE = SUBSTITUTE
                ("    METHOD PRIVATE &1 &2 ():&3~n~n    END METHOD.~n~n":U,
                 cDatatype,
                 cId,
                 StringHelper:Indent (oCodeBlock:toStringFulltext(),
                                      4)) .

        MESSAGE NodeTypes:getTypeName (oChild:getType()) SKIP
                cId "returns":U cDatatype SKIP
                "------------------------":U SKIP (2)
                cOriginal SKIP (2)
                "------------------------":U SKIP (2)
                oCodeBlock:toStringFulltext() SKIP (2)
                "------------------------":U SKIP (2)
                CLIPBOARD:VALUE
            VIEW-AS ALERT-BOX.
    END.
END.
```

Recursively processes JPNodes

Injected into NodeWalker, rewrites RowObject references in AST

Returns modified function source code

RenameBufferNodeAction.cls

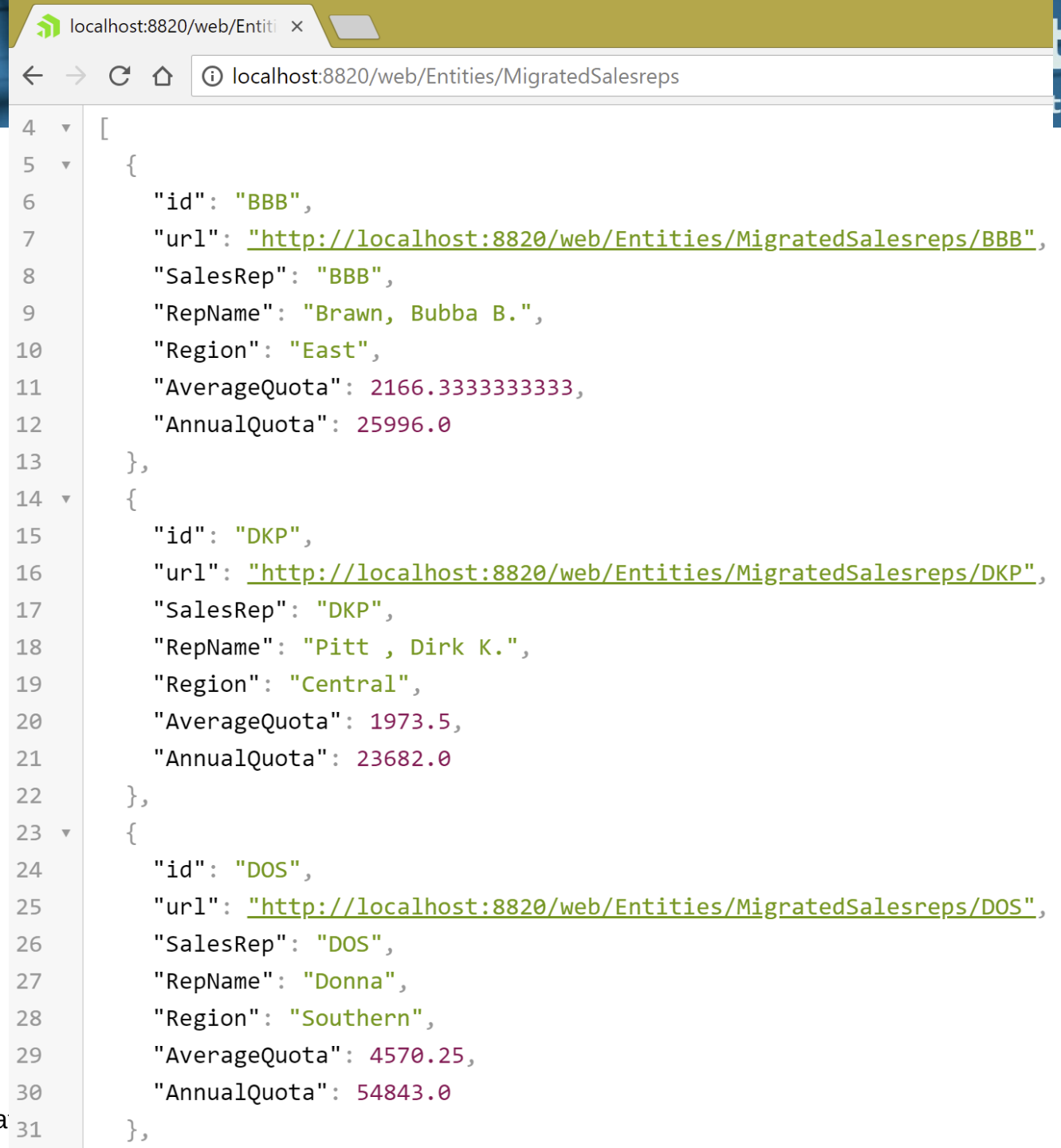
```
54      /**
55       * Purpose: Processes a JPNode
56       * Notes:
57       * @param poNode The JPNode to process
58       */
59      METHOD PUBLIC VOID ProcessNode (poNode AS JPNode):
60
61          DEFINE VARIABLE cFieldName AS CHARACTER       NO-UNDO .
62          DEFINE VARIABLE oId        AS JPNode          NO-UNDO .
63          DEFINE VARIABLE oFieldName AS BufferFieldName NO-UNDO .
64
65          IF NOT ProparseHelper:HasChildNodeOfNodeType(poNode, "ID":U) THEN
66              RETURN .
67
68          oId = ProparseHelper:FindChildNodeOfNodeType (poNode, "ID":U) .
69
70          ASSIGN cFieldName = oId:getText ()
71                 oFieldName = BufferHelper:ParseFieldName (cFieldName).
72
73          IF oFieldName:TableName = cFromBufferName THEN DO:
74              ASSIGN oFieldName:DatabaseName = ?
75                     oFieldName:TableName    = cToBufferName .
76
77              oId:setToken (NEW RefactoredToken (oId:getToken(),
78                                                 oFieldName:GetExpression ())) .
79          END.
80
81      END METHOD.
82
83  END CLASS.
```

Demo

- Migration Routines for
  - Calculated Field source code
  - Validation Procedures
  - Test Business Entity / Calculated Fields in Business Entity Tester
  - Test Update and Validation using source code
  - Define RESTful Endpoint for the Business Entity

Define RESTful endpoints using Annotations

```
@RestAddress (type="record", address="/MigratedSalesreps/~{SalesRep}", tables="eSalesrep", id="SalesRep",
              fields="eSalesRep.*", canRead="true", canUpdate="true", canDelete="true").

@RestAddress (type="collection", address="/MigratedSalesreps", tables="eSalesrep", id="SalesRep",
              fields="SalesRep,RepName,Region,AnnualQuota,AverageQuota", canCreate="true").
```


localhost:8820/web/Entiti
localhost:8820/web/Entities/MigratedSalesreps
[
{
"id": "BBB",
"url": "http://localhost:8820/web/Entities/MigratedSalesreps/BBB",
"SalesRep": "BBB",
"RepName": "Brawn, Bubba B.",
"Region": "East",
"AverageQuota": 2166.3333333333,
"AnnualQuota": 25996.0
},
{
"id": "DKP",
"url": "http://localhost:8820/web/Entities/MigratedSalesreps/DKP",
"SalesRep": "DKP",
"RepName": "Pitt , Dirk K.",
"Region": "Central",
"AverageQuota": 1973.5,
"AnnualQuota": 23682.0
},
{
"id": "DOS",
"url": "http://localhost:8820/web/Entities/MigratedSalesreps/DOS",
"SalesRep": "DOS",
"RepName": "Donna",
"Region": "Southern",
"AverageQuota": 4570.25,
"AnnualQuota": 54843.0
},

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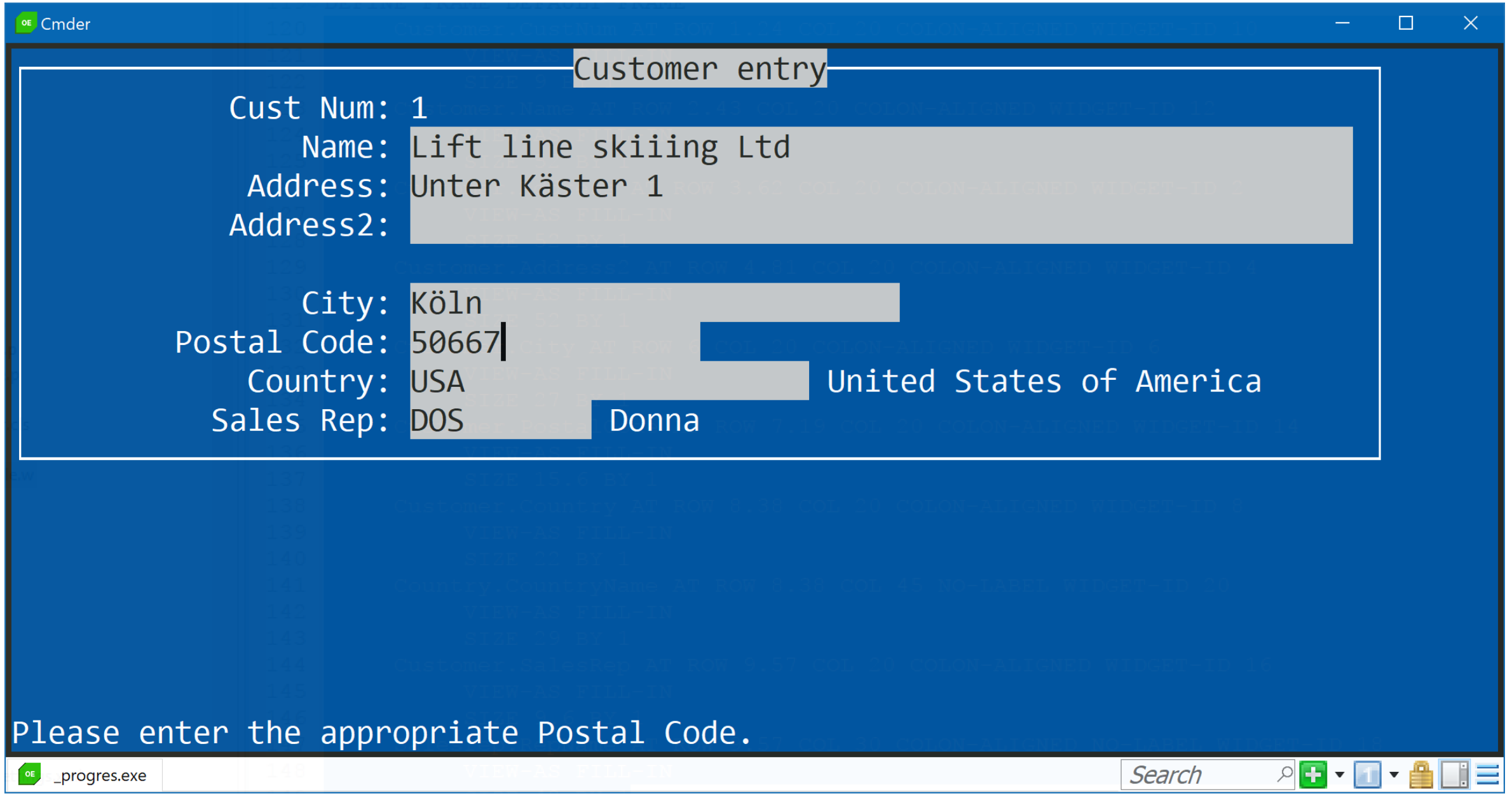
Cmder
Customer entry
Cust Num: 1
Name: Lift line skiiing Ltd
Address: Unter Käster 1
Address2:
City: Köln
Postal Code: 50667
Country: USA United States of America
Sales Rep: DOS Donna
Please enter the appropriate Postal Code.
_progres.exe
Search

UPDATE EDITING Blocks

```
DEFINE VARIABLE w-oldf AS CHARACTER NO-UNDO.

DO TRANSACTION:
    FIND CURRENT Customer EXCLUSIVE-LOCK .

    UPDATE {&ENABLED-FIELDS-IN-QUERY-DEFAULT-FRAME}
        WITH FRAME {&FRAME-NAME}
    blo-edit1:
    EDITING:

        READKEY.

        IF FRAME-FIELD <> "" THEN w-oldf = FRAME-FIELD.
        APPLY LASTKEY.

        IF FRAME-FIELD <> w-oldf OR GO-PENDING THEN
        DO:
            HIDE MESSAGE.

        /* ********** begin validation code ********** */
```

Single field validation within EDITING Block

```
IF w-oldf = "Salesrep" OR GO-PENDING THEN DO:

    FIND Salesrep WHERE Salesrep.SalesRep = INPUT Customer.SalesRep
        NO-LOCK NO-ERROR .

    IF NOT AVAILABLE Salesrep THEN DO:
        MESSAGE SUBSTITUTE ("Please enter a valid salesrep code. &1 is not a valid salesrep code.",
                            INPUT Customer.Salesrep) .
        NEXT-PROMPT Customer.Salesrep WITH FRAME {&frame-name}.
        NEXT blo-edit1.
    END.
    ELSE
        DISPLAY UPPER (Salesrep.SalesRep) @ Customer.SalesRep
                Salesrep.RepName WITH FRAME {&frame-name} .
END.
```

UPDATE EDITING Blocks

- Commonly used in TTY and early GUI applications
- Full of validation logic / Lookup functionality (locating foreign key descriptions)
- Tied to UI through “INPUT <fieldname>” references
- MESSAGE Statement used for error messages
- NEXT-PROMPT provides field that should receive input after error
- Record locked during duration of the UPDATE Statement

UPDATE EDITING Blocks

- Iterated for every keystroke or GO-PENDING
- When invoked on GO-PENDING, it's similar to a commit to a Business Entity
  - Validating all fields at once
  - Processing update when no validation error occurred
  - Returning validation error to user (with instruction of next field)
- Code flow in EDITING Block very similar to typical Business Entity validation

Business Entity Validation based on UPD EDITING

```
IF eCustomer.CustomerName = "" THEN DO:
     Consultingwerk.Util.DatasetHelper:AddErrorString (BUFFER eCustomer:HANDLE,
                                                       "Please enter customer name.",
                                                       "CustomerName":U) .
END.

FIND Salesrep WHERE Salesrep.SalesRep = eCustomer.SalesRep
    NO-LOCK NO-ERROR .

IF NOT AVAILABLE Salesrep THEN DO:
    Consultingwerk.Util.DatasetHelper:AddErrorString (BUFFER eCustomer:HANDLE,
                                                      SUBSTITUTE ("Please enter a valid salesrep code. &1 is
                                                      "SalesRep":U) .
END.
ELSE
    ASSIGN eCustomer.SalesRep = UPPER (Salesrep.SalesRep)
           eCustomer.RepName = Salesrep.RepName .

FIND Country WHERE Country.Country = eCustomer.Country
    NO-LOCK NO-ERROR .

IF NOT AVAILABLE Country THEN DO:
```

Business Entity Validation based on UPD EDITING

- IF w-oldf OR GO-ENDING not required; Business Entity typically validates all fields at once
  - Removing at least one level of blocks in the code
- *"INPUT <fieldname>"* replaced with temp-table field reference
- *DISPLAY* statements replaces with update of temp-table field
- *MESSAGE/NEXT-PROMPT* statements replaced with API call to return validation message to the consumer of the Business Entity and control target field

Demo

- Proparse based migration of UPDATE EDITING Blocks into Business Entity Validation block

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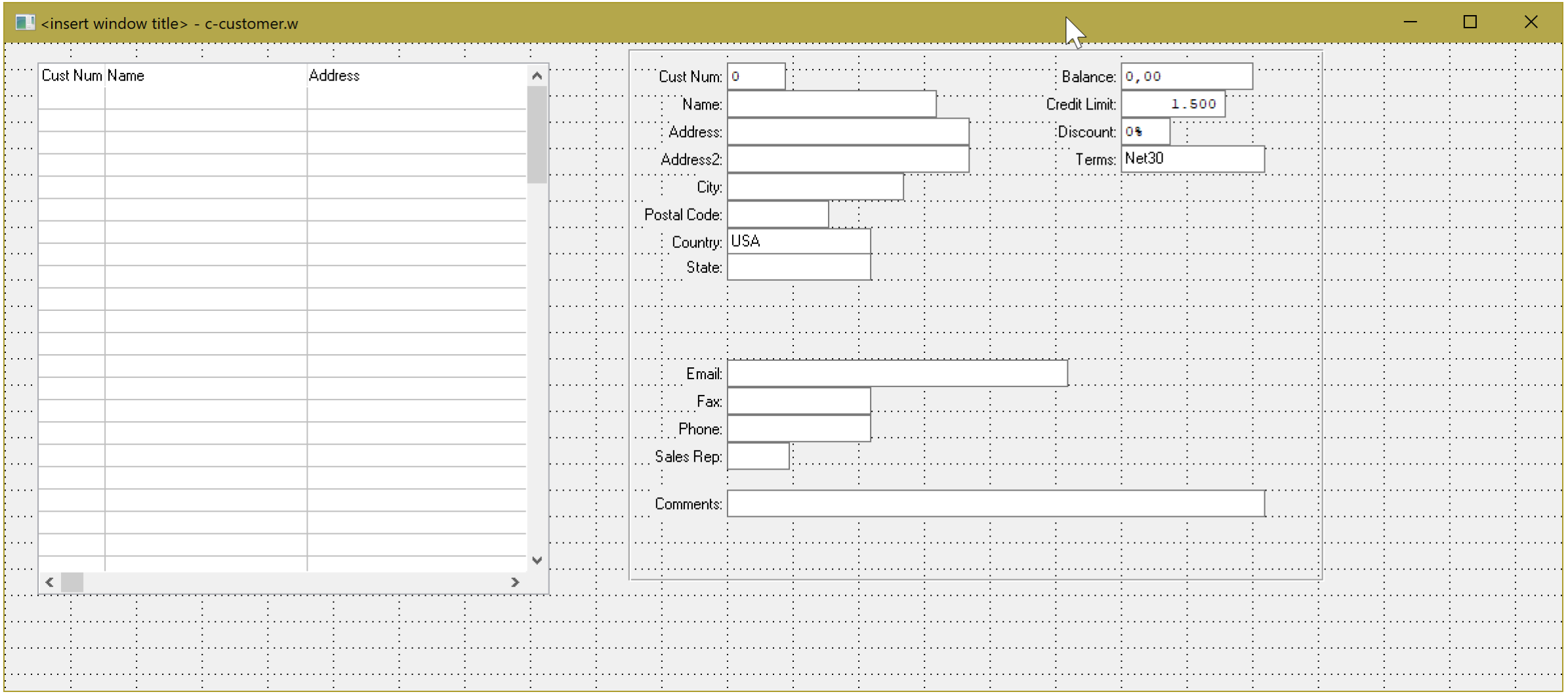
- OSIV3G Modernization example

ABL GUI Migration

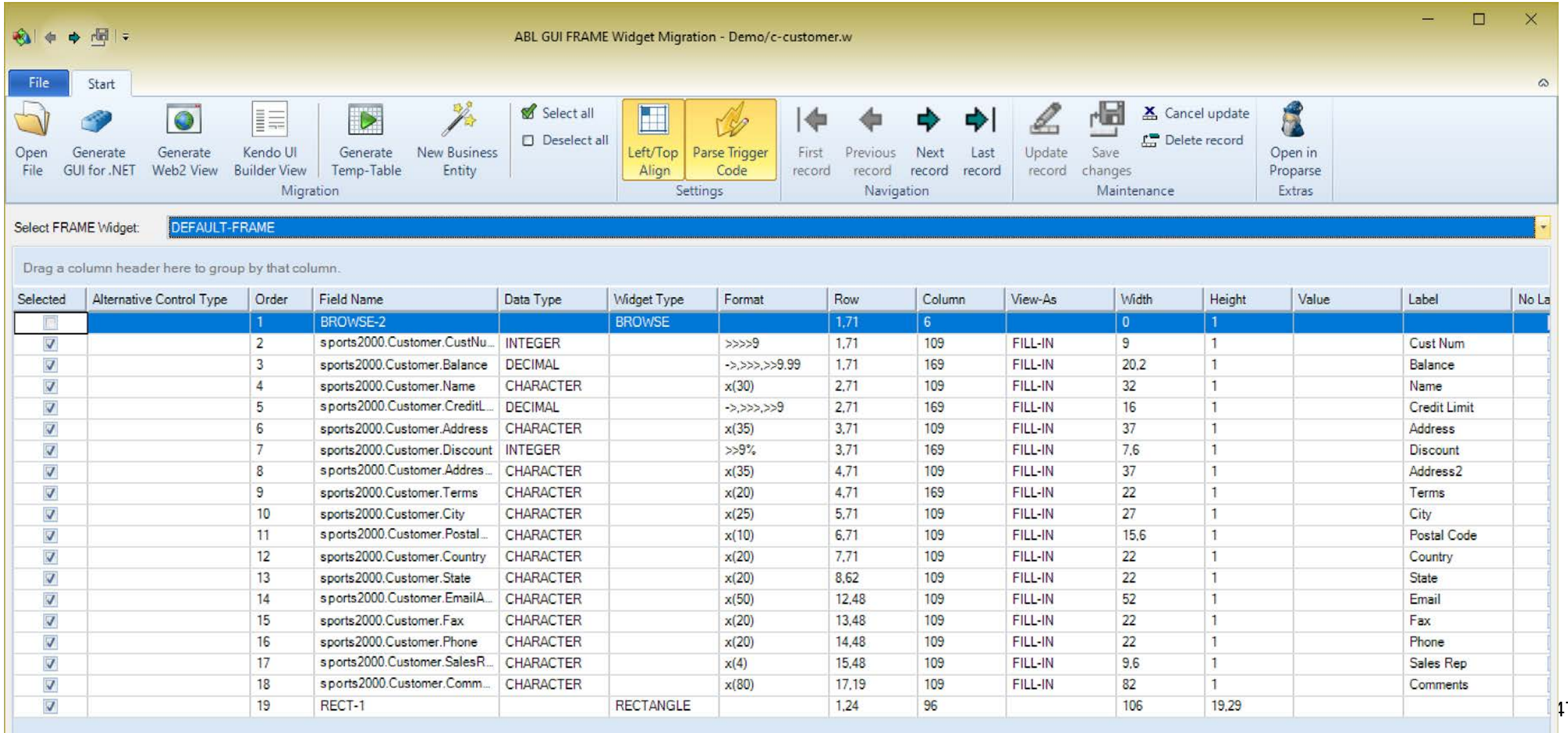
- Existing GUI (or TTY) screen layout may serve as a starting point for new UI's
  - Highly dependent on UX of new application
  - Highly dependent on "quality" of layout of new application


<insert window title> - c-customer.w
Cust Num
Name
Address
Cust Num: 0
Name:
Address:
Address2:
City:
Postal Code:
Country: USA
State:
Balance: 0,00
Credit Limit: 1.500
Discount: 0%
Terms: Net30
Email:
Fax:
Phone:
Sales Rep:
Comments:

Screen layout migration

- Screen layout from static code can be refactored based on Proparse
  - FRAME definitions sometimes tricky to understand
  - Multiple FRAME Statements for a single FRAME
  - VIEW-AS phrase from Data Dictionary
  - Default properties of widgets
- Walking the widget tree typically simpler – however this requires changes to application runtime and is not trivial when building general purpose tools

Abstract view on screen layout



Selected	Alternative Control Type	Order	Field Name	Data Type	Widget Type	Format	Row	Column	View-As	Width	Height	Value	Label	No La
☐		1	BROWSE-2		BROWSE		1,71	6		0	1			
☑		2	sports2000.Customer.CustNu...	INTEGER		>>>>9	1,71	109	FILL-IN	9	1		Cust Num	
☑		3	sports2000.Customer.Balance	DECIMAL		->,>>>,>>9.99	1,71	169	FILL-IN	20,2	1		Balance	
☑		4	sports2000.Customer.Name	CHARACTER		x(30)	2,71	109	FILL-IN	32	1		Name	
☑		5	sports2000.Customer.CreditL...	DECIMAL		->,>>>,>>9	2,71	169	FILL-IN	16	1		Credit Limit	
☑		6	sports2000.Customer.Address	CHARACTER		x(35)	3,71	109	FILL-IN	37	1		Address	
☑		7	sports2000.Customer.Discount	INTEGER		>>9%	3,71	169	FILL-IN	7,6	1		Discount	
☑		8	sports2000.Customer.Addres...	CHARACTER		x(35)	4,71	109	FILL-IN	37	1		Address2	
☑		9	sports2000.Customer.Terms	CHARACTER		x(20)	4,71	169	FILL-IN	22	1		Terms	
☑		10	sports2000.Customer.City	CHARACTER		x(25)	5,71	109	FILL-IN	27	1		City	
☑		11	sports2000.Customer.Postal...	CHARACTER		x(10)	6,71	109	FILL-IN	15,6	1		Postal Code	
☑		12	sports2000.Customer.Country	CHARACTER		x(20)	7,71	109	FILL-IN	22	1		Country	
☑		13	sports2000.Customer.State	CHARACTER		x(20)	8,62	109	FILL-IN	22	1		State	
☑		14	sports2000.Customer.EmailA...	CHARACTER		x(50)	12,48	109	FILL-IN	52	1		Email	
☑		15	sports2000.Customer.Fax	CHARACTER		x(20)	13,48	109	FILL-IN	22	1		Fax	
☑		16	sports2000.Customer.Phone	CHARACTER		x(20)	14,48	109	FILL-IN	22	1		Phone	
☑		17	sports2000.Customer.SalesR...	CHARACTER		x(4)	15,48	109	FILL-IN	9,6	1		Sales Rep	
☑		18	sports2000.Customer.Comm...	CHARACTER		x(80)	17,19	109	FILL-IN	82	1		Comments	
☑		19	RECT-1		RECTANGLE		1,24	96		106	19,29			

Abstract view on screen layout

- Allows generation of various UI's
  - GUI for .NET
  - Angular
  - Kendo UI Builder
  - Meta-Data for UI repository database
  - …

GUI Trigger Code

- Typically used for validation or control of the UI
- Contains references using widget attributes (:SCREEN-VALUE or :SENSITIVE, etc.) or INPUT <fieldref>
- May contain business logic that should be moved to Business Entity (typically when accessing DB records), LEAVE Triggers typical prospect for validation

Section Editor - Window - C:\Work_STREAM\SmartComponentLibrary\Develop\ABL\Demo...

File Edit Insert Search Compile Help

Section: Triggers List... Insert Call...

ON: VALUE-CHANGED New... OF: sports2000.Customer.Country <DEFAULT-FRAME

```
DO:
  | DO WITH FRAME {&frame-name}:

        IF Customer.Country:SCREEN-VALUE = "USA" THEN
            Customer.State:VISIBLE = TRUE .
        ELSE
            Customer.State:VISIBLE = FALSE .


    END.
END.
```

Migrated Trigger Code

```
METHOD PRIVATE VOID Customer_Country_ValueChanged (sender AS System.Object, e AS System.EventArgs):

    /* Trigger code from ON VALUE-CHANGED OF sports2000.Customer.Country IN FRAME DEFAULT-FRAME
       C:\Work_STREAM\SmartComponentLibrary\Develop\ABL\Demo\c-customer.w - 30.05.2018 13:09:24
    */

    DEFINE VARIABLE Customer_Country AS Consultingwerk.Windows.LegacyGuiMigration.Widgets.IWidgetFacade NO-UNDO .
    DEFINE VARIABLE Customer_State AS Consultingwerk.Windows.LegacyGuiMigration.Widgets.IWidgetFacade NO-UNDO .

    Customer_Country = Consultingwerk.Windows.LegacyGuiMigration.Widgets.Infragistics.InfragisticsWidgetFactory:FromControl (THI
    Customer_State = Consultingwerk.Windows.LegacyGuiMigration.Widgets.Infragistics.InfragisticsWidgetFactory:FromControl (THIS-

    DO /* WITH FRAME DEFAULT-FRAME */:

        IF Customer_Country:SCREEN-VALUE = "USA" THEN
            Customer_State:VISIBLE = TRUE .
        ELSE
            Customer_State:VISIBLE = FALSE .


    END.

END METHOD.
```

Widget Façade classes allow mapping of widget attributes to control properties

Agenda

- Introduction / Application Modernization
- Modern OpenEdge Application Architecture
- ADM2 SDO migration
- TTY Update editing migration
- ABL GUI migration
- **OSIV3G Modernization example**

OSIV / OSC

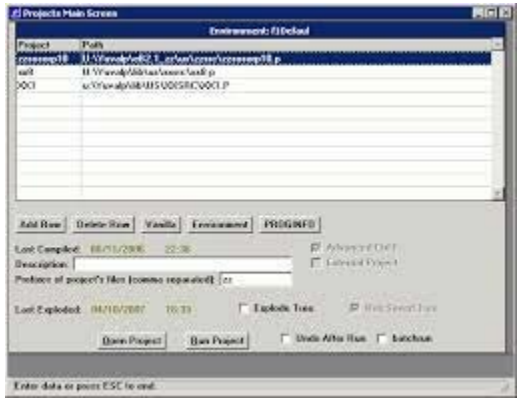
- OSIV Service Center: Joint venture of 7 Swiss counties (cantons)
- Maintaining state insurance for occupational disabilities
- Approval of therapies
- Perform Disability and treatment Assessments
- Billing (by doctors, clinics, opticians, occupational disabilities, etc.)
- Document management
- 1300 users
- Very specific domain functionality
- Accepted by the user base, no real competition




Why “refactoring”

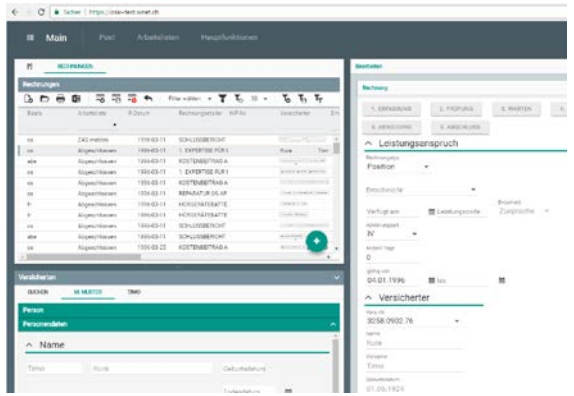
- Maintenance effort high
- Training of new users and developers hard
- Aged technology
- Resources / Motivation of developers / Agile methods

OSIV3G: Soft Migration



Current OSIV 5.x

Harvesting of existing Code

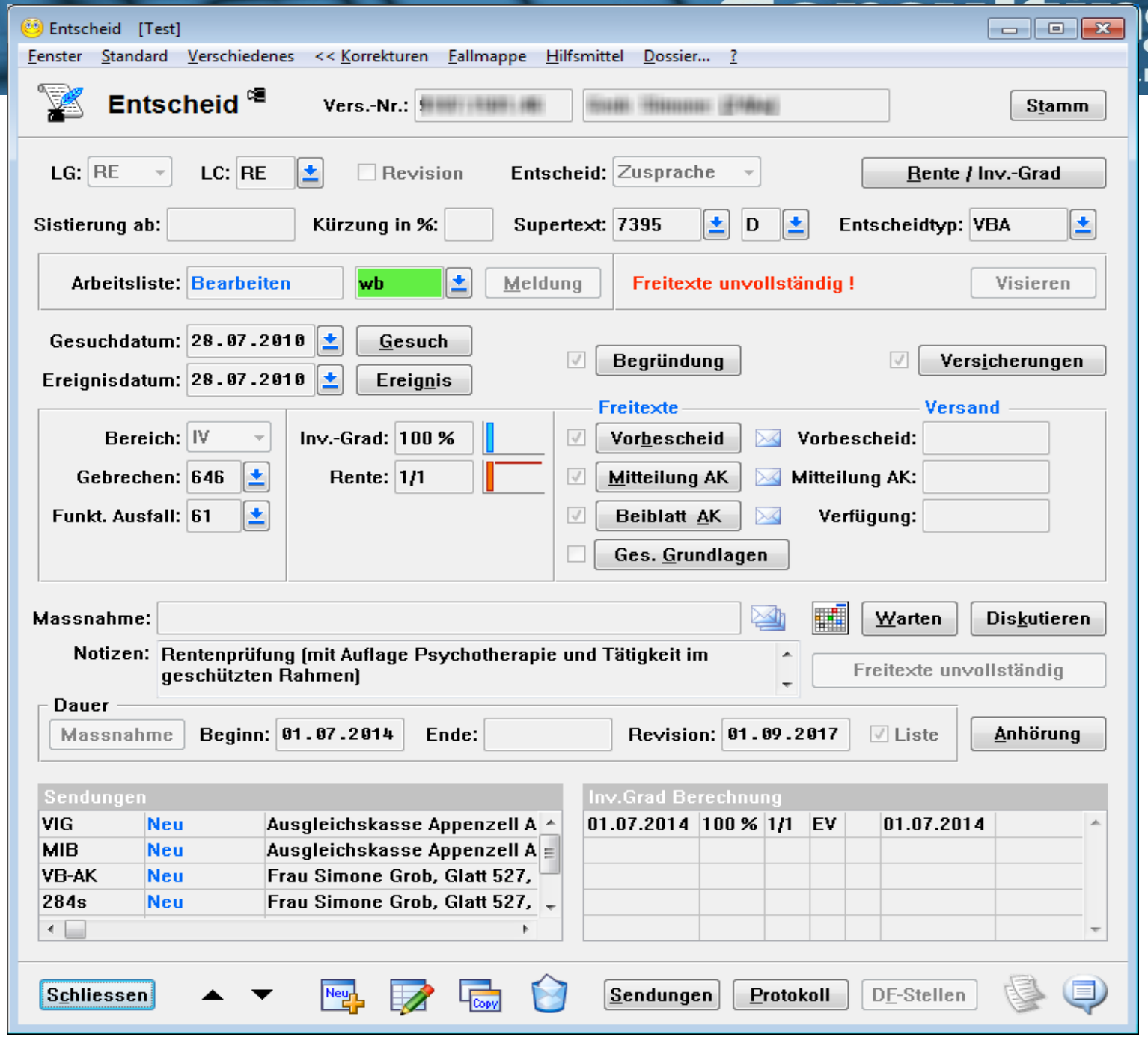


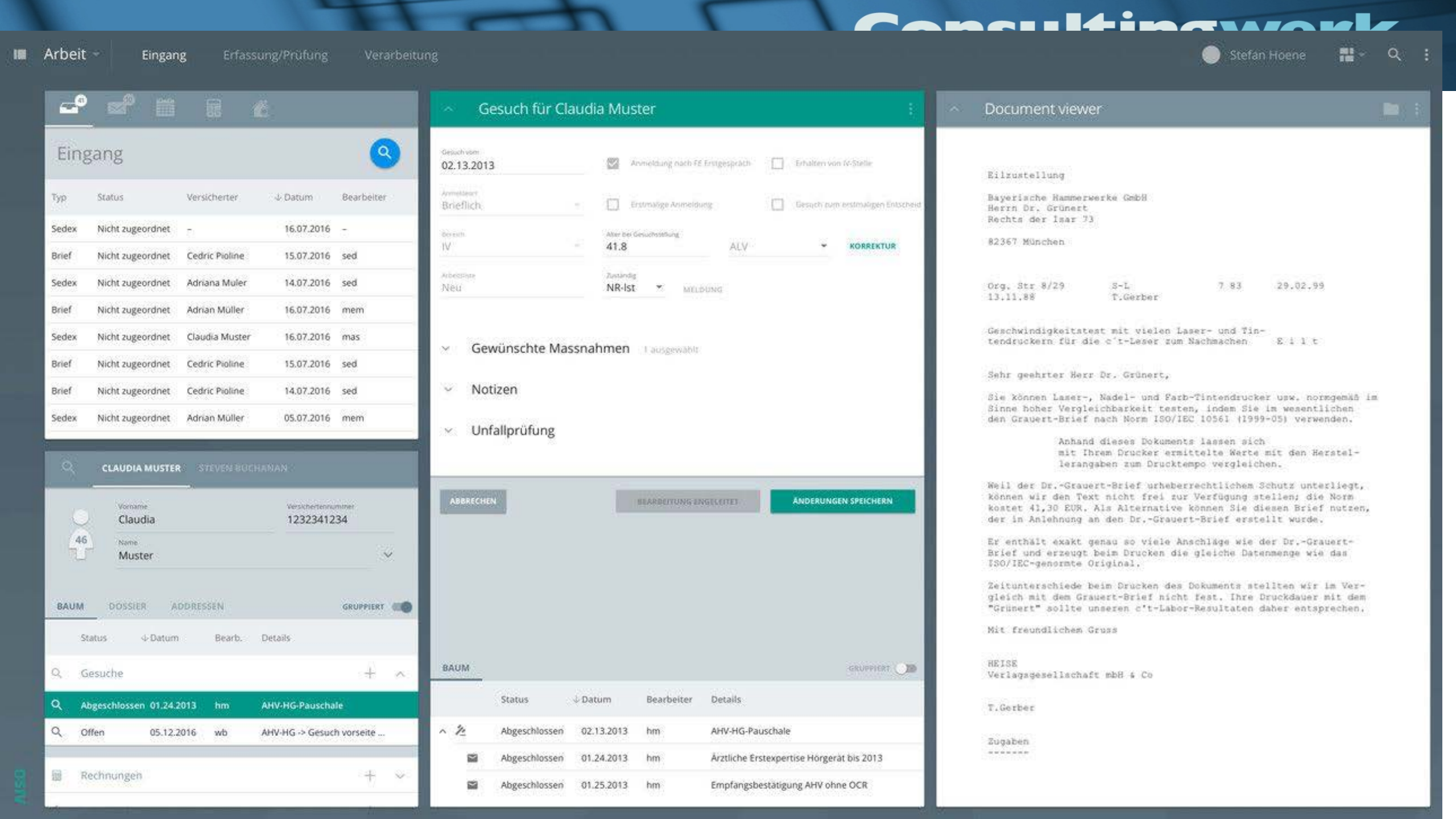
Migrated Application Modules

OSIV-DB

+ additional Fields and Tables e.g. GUID‘s

Framework DB‘s


Entscheid [Test]
Fenster Standard Verschiedenes << Korrekturen Fallmappe Hilfsmittel Dossier... ?
Entscheid
Vers.-Nr.:
Stamm
LG: RE
LC: RE
Revision
Entscheid: Zusprache
Rente / Inv.-Grad
Sistierung ab:
Kürzung in %:
Supertext: 7395 D
Entscheidtyp: VBA
Arbeitsliste: Bearbeiten wb
Meldung
Freitexte unvollständig !
Visieren
Gesuchdatum: 28.07.2010
Gesuch
Ereignisdatum: 28.07.2010
Ereignis
Begründung
Versicherungen
Freitexte
Versand
Bereich: IV
Gebrechen: 646
Funkt. Ausfall: 61
Inv.-Grad: 100 %
Rente: 1/1
Vorbescheid
Mitteilung AK
Beiblatt AK
Ges. Grundlagen
Vorbescheid:
Mitteilung AK:
Verfügung:
Massnahme:
Warten
Diskutieren
Notizen: Rentenprüfung (mit Auflage Psychotherapie und Tätigkeit im geschützten Rahmen)
Freitexte unvollständig
Dauer
Massnahme
Beginn: 01.07.2014
Ende:
Revision: 01.09.2017
Liste
Anhörung
Sendungen
VIG Neu Ausgleichskasse Appenzell A
MIB Neu Ausgleichskasse Appenzell A
VB-AK Neu Frau Simone Grob, Glatt 527,
284s Neu Frau Simone Grob, Glatt 527,
Inv.Grad Berechnung
01.07.2014 100 % 1/1 EV 01.07.2014
Schliessen
Neu
Copy
Sendungen
Protokoll
DE-Stellen


Arbeit
Eingang
Erfassung/Prüfung
Verarbeitung
Stefan Hoene
Eingang
Typ Status Versicherter Datum Bearbeiter
Sedex Nicht zugeordnet – 16.07.2016 –
Brief Nicht zugeordnet Cedric Pioline 15.07.2016 sed
Sedex Nicht zugeordnet Adriana Muler 14.07.2016 sed
Brief Nicht zugeordnet Adrian Müller 16.07.2016 mem
Sedex Nicht zugeordnet Claudia Muster 16.07.2016 mas
Brief Nicht zugeordnet Cedric Pioline 15.07.2016 sed
Brief Nicht zugeordnet Cedric Pioline 14.07.2016 sed
Sedex Nicht zugeordnet Adrian Müller 05.07.2016 mem
CLAUDIA MUSTER
STEVEN BUCHANAN
Vorname
Claudia
Versichertennummer
1232341234
Name
Muster
46
BAUM
DOSSIER
ADRESSEN
GRUPPIERT
Status Datum Bearb. Details
Gesuche
Abgeschlossen 01.24.2013 hm AHV-HG-Pauschale
Offen 05.12.2016 wb AHV-HG -> Gesuch vorseite ...
Rechnungen
Gesuch für Claudia Muster
Gesuch vom
02.13.2013
Anmeldung nach FE Erstgespräch
Erhalten von IV-Stelle
Anmeldeart
Brieflich
Erstmalige Anmeldung
Gesuch zum erstmaligen Entscheid
Bereich
IV
Alter bei Gesuchstellung
41.8
ALV
KORREKTUR
Arbeitsliste
Neu
Zuständig
NR-Ist
MELDUNG
Gewünschte Massnahmen
1 ausgewählt
Notizen
Unfallprüfung
ABBRECHEN
BEARBEITUNG EINGELEITET
ÄNDERUNGEN SPEICHERN
BAUM
GRUPPIERT
Status Datum Bearbeiter Details
Abgeschlossen 02.13.2013 hm AHV-HG-Pauschale
Abgeschlossen 01.24.2013 hm Ärztliche Erstexpertise Hörgerät bis 2013
Abgeschlossen 01.25.2013 hm Empfangsbestätigung AHV ohne OCR
Document viewer
Eilzustellung
Bayerische Hammerwerke GmbH
Herrn Dr. Grünert
Rechts der Isar 73
82367 München
Org. Str 8/29 S-L 7 83 29.02.99
13.11.88 T.Gerber
Geschwindigkeitstest mit vielen Laser- und Tin-
tendruckern für die c't-Leser zum Nachmachen E i l t
Sehr geehrter Herr Dr. Grünert,
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lerangaben zum Drucktempo vergleichen.
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HEISE
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T.Gerber
Zugaben

Example challenge: Interaction between Back and Frontend

- Existing OSIV Business Logic in large parts suitable as foundation for new OSIV3G (functional and structural), especially validation
- Validation may also provide color coding to represent field status etc.
- Validation may have to prompt the user
- Web applications typically:
  Request (from browser) – Response (from server)
- No Input-Blocking (not possible to wait for user input in Business Logic)

Sample: Yes/No PROMPT in validation

- Demand is to keep the validation flow in major parts „as is“
- Validation may encounter question requiring user input: “Are you sure?” etc.

Sample: Yes/No PROMPT in validation

```
/* ---------- */
/* Verstorben */
/* ---------- */
if (date(Stamm.Todes_Dat:screen-value) <> ?) then do:
  /* Testen, ob Versicherter gerade eben verstorben ist. */
  if (EDIT_MODE = "UPDATE") then do:
    find Stamm no-lock where recid(Stamm) = MAIN_REC_ID.
    if (Stamm.Todes_Dat = ?) then do:
      /* Versicherter wurde soeben auf verstorben gesetzt. */
      run set_message_param(Stamm.Todes_Dat:screen-value).
      run user_warning("Der Versicherte ist am $1 verstorben. ~n~n" +
                       "Die zugehörigen Wohnadressen werden gesperrt.~n" +
                       "Überprüfen Sie, ob noch Revisionen vorgesehen sind~n" +
                       "und/oder Hilfsmittel zurückgenommen werden müssen.~n",
                       output continue).
      if not continue then return error.
    end.
  end.

end. /* if verstorben */
```

Sample: Yes/No PROMPT in validation

```
MSG = {Consultingwerk/get-service.i IMsg} .
SYS = {Consultingwerk/get-service.i ISys} .
MOD_ADD = {Consultingwerk/get-service.i IModAdd} .

if (eStammBefore.Todes_Dat = ?) then do:
    /* Versicherter wurde soeben auf verstorben gesetzt. */
    MSG:set_message_param(string (eStamm.Todes_Dat) /*:screen-value*/).

    continue = MSG:user_warning("Der Versicherte ist am $1 verstorben. ~n~n" +
                                "Die zugehörigen Wohnadressen werden gesperrt.~n" +
                                "Überprüfen Sie, ob noch Revisionen vorgesehen sind~n" +
                                "und/oder Hilfsmittel zurückgenommen werden müssen.~n",
                                this-object:GetClass():TypeName,
                                "eb09af84b1e2197b:4cb274e8:15608162bb6:-8000",
                                string (eStamm.SelfHdl)).

    if not continue then do:
        DatasetHelper:AddErrorString(buffer eStamm:handle, "_CANCEL") .
        return .
    end.

    /*if not continue then return error.*/
end.
```

Migration using MessagePrompt API (SCL)

- Backend – API maintains list of questions (unanswered and answered)
- Same API Call may ask a new question of return an existing answer
- Supports multiple questions per routine: Questions are flagged with GUID identifying thise location in code
- Support for multiple iterations (Loops, FOR EACH, …): Each question is also flagged with a return PUK value

Migration using MessagePrompt API of SCL

- Questions will be returned to UI in a standard temp-table field
- Current Update-Request will be cancelled (typically before the DB transaction is started)
- UI presents unanswered questions to the user and repeats the same update request
- Repeat this flow if additional questions are required

JSON Representation of the question

```
{
  "SerializedType": "Consultingwerk.Framework.MessageInteraction.Question",
  "MessageText": "Der Versicherte ist am 24\/12\/50 verstorben. \n\n
                  Die zugehörigen Wohnadressen werden gesperrt.\n
                  Überprüfen Sie, ob noch Revisionen vorgesehen sind\n
                  und\/oder Hilfsmittel zurückgenommen werden müssen.\n",
  "MessageButtons": "YesNo",
  "MessageReply": "Unanswered",
  "DefaultReply": "ReplyYes",
  "MessageID": "eb09af84b1e2197b:4cb274e8:15608162bb6:-8000",
  "MessageContext": "ac54bf82-56c4-bab2-2514-8e3d5c34775d"
}
```

Questions