Lightning Talk

Use of CA Plex Model API

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Customer Infrastructure

Client / Server:

- IBM i (AS400) Servers
- Windows PC Clients

Software Updates Distribution (DevOps)

Development:

- Portugal

Tests/QA/Production Environments:

- Portugal
- Greece
- Egypt
- Saudi Arabia
- Morocco
- Spain

Object Collection and Distribution

Server Objects:

- Collected and distributed manually
- Manually updated by SysAdmin

Client Objects:

- DLLs / PNLs / EXEs
- How to collect the correct objects in a controlled way ?
- Deployed objects would have to be fetched by a “check for updates” mechanism

Know what objects to collect

Plex Lists:

– Are the main repository for logical object collection at development time

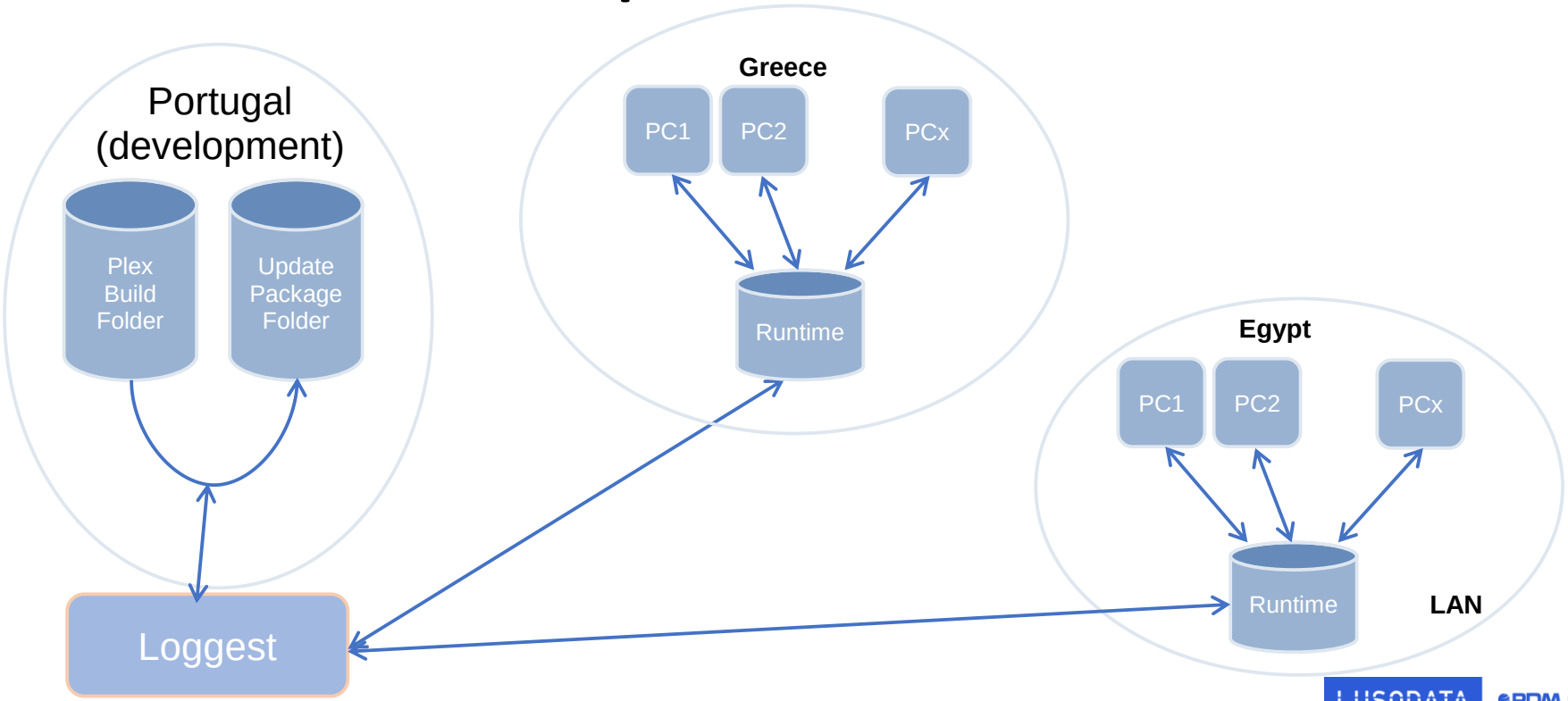
– Functions in the list are compiled, analyzed and their DLLs/PNLs stored inside “Update Packages”.

Solution:

- Make use of “CA Plex Model API” to process those lists

- Developed a Plex App, called: “LogGest”

Software Updates Distribution



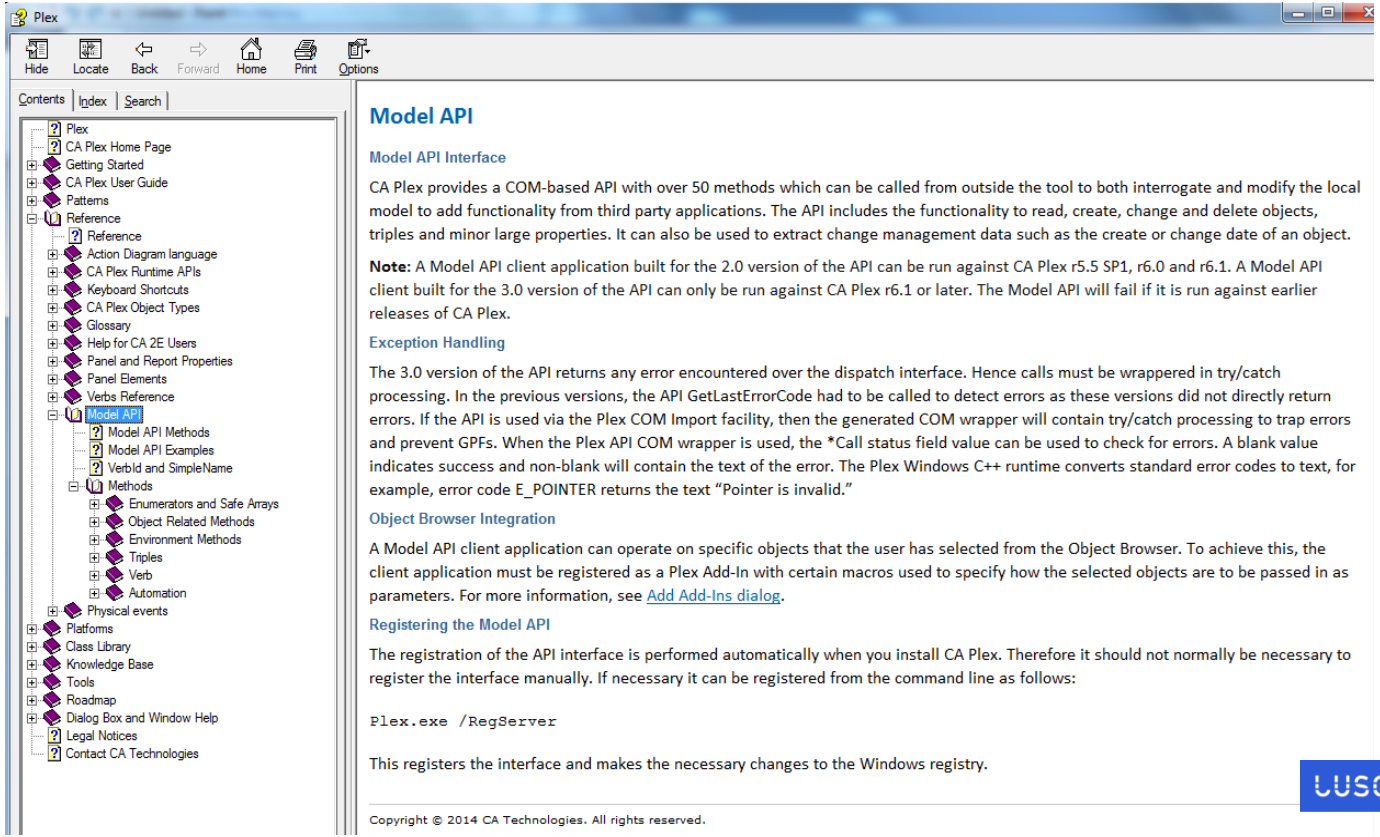
The Model API (using C++)

Plex Model API: COM-based API with over 50 methods

- Allows external applications to interrogate and even modify Local Models.
- Can be used to extract “Change Management” data
- Documented in Plex Help
- Used version 1.0 back in 2007

Current Version is 3.0, has better exception handling.

Plex Model API Documentation



Plex Model API – the source codes

Step 1: initialize the COM Framework.

```
#include <wizardapidefs.h>
#include "import.h"

&(3:) = (ObLongFld)CoInitializeEx(NULL,(DWORD)&(2:));
```

Parameters
- &(1:) MDDebugOn ?
- &(2:) dwCoInit
- &(3:) hrReturnCode

```
&(2:) -> Concurrency Level (usually, COINIT_MULTITHREADED)
&(3:) -> Return Code (S_OK is good)
```

Step 2: get a pointer for the List object, specified by its name.

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long listobject = 0;

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));
        ret_val = p->FindObj((LPCTSTR)&(1:), _TypeList, &listobject);

        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }


    &(2:) = (ObLongFld)listobject;
}
```

List Name (parameter 1)

List object pointer (used by other APIs)

Parameters

- &(1:) LG List Name
- &(2:) LG List Ptr

Enumerate List Objects (fncs)

Step 3: get “Verb” pointer and “VerbID” (from simple Verb: “LstContainsFnc”)

```
#include <wizardapidefs.h>
#include "import.h"
{
&(4:) = " ";


    int ret_val;
    long enumerator = 0;
    long verb = 0L;
    long verbID = 0L;

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));

        // Get Verb object...
        ret_val = p->FindVerbByName((LPCSTR)&(1:), SimpleName, &verb, &verbID);

        p = NULL;
    }
    catch (_com_error e) {
        &(4:) = (LPCSTR)e.ErrorMessage();
       //AfxMessageBox(e.ErrorMessage());
    }


    &(2:) = (ObLongFld)verb;
    &(3:) = (ObLongFld)verbID;
}
```

Verb name (simple format)
In this case, we use "LstContainsFnc"

Verb pointer

VerbID (will be used by the List enumerator)

Parameters
- &[1:] LG Simple Verb
- &[2:] LG Verb Ptr
- &[3:] LG Verb ID Ptr
- &[4:] *Message text

Enumerate List Objects (fncs)

Step 4: use “VerbID” from step 3 and get enumerator pointer:

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long enumerator = 0;
    &(4:) = " ";

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));

        ret_val = p->EnumTriplesBySource((long)&(1:), (long)&(2:), &enumerator);

        p = NULL;
    }
    catch (_com_error e) {
       //AfxMessageBox(e.ErrorMessage());
        &(4:) = (LPCSTR)e.ErrorMessage();
    }


    &(3:) = (ObLongFld)enumerator;
}
```

List object pointer (obtained in the first place)

VerbID (ListContainsFnc)

Pointer to the enumerator object

Parameters

- &(1:) LG Object Ptr
- &(2:) LG Verb ID Ptr
- &(3:) LG Enumerator Ptr
- &(4:) *Message text

Enumerate List Objects (fncs)

Step 5: get the number of objects in the enumerator (using the enumerator pointer returned before):

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long count = 0L;

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));

        ret_val = p->GetCountOfItemsInEnumerator((long)&(1:), &count);
        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }


    &(2:) = (ObLongFld)count;
}
```

Pointer to the enumerator

Nr of objects in the enumerator

Parameters
- &(1:) LG Enumerator Ptr
- &(2:) LG Nr of Objects

Process “LstContainsFNC” element:

Step 6: get first object’s pointer (should be a triple whose target is a Function):

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long triple = 0;
    &(3:) = " ";

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));
        ret_val = p->GetFirstTriple((long)&(1:), &triple);

        p = NULL;
    }
    catch (_com_error e) {
       //AfxMessageBox(e.ErrorMessage());
        &(3:) = (LPCSTR)e.ErrorMessage();
    }


    &(2:) = (ObLongFld)triple;
}
```

Enumerator pointer

Pointer to the first triple object (Lists contain triples and their targets are the Functions we need to collect and process)

Parameters

- &(1:) LG Enumerator Ptr
- &(2:) LG Triple Ptr
- &(3:) *Message text

Process “LstContainsFNC” element:

Step 7: inside a While, obtain the triple’s target, which is a pointer to a Function object:

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long object = 0;

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));
        long listriple = 0;
        ret_val = p->GetTripleTarget((long)&(1:), &object, &listriple);

        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }


    &(2:) = (ObLongFld)object;
}
```

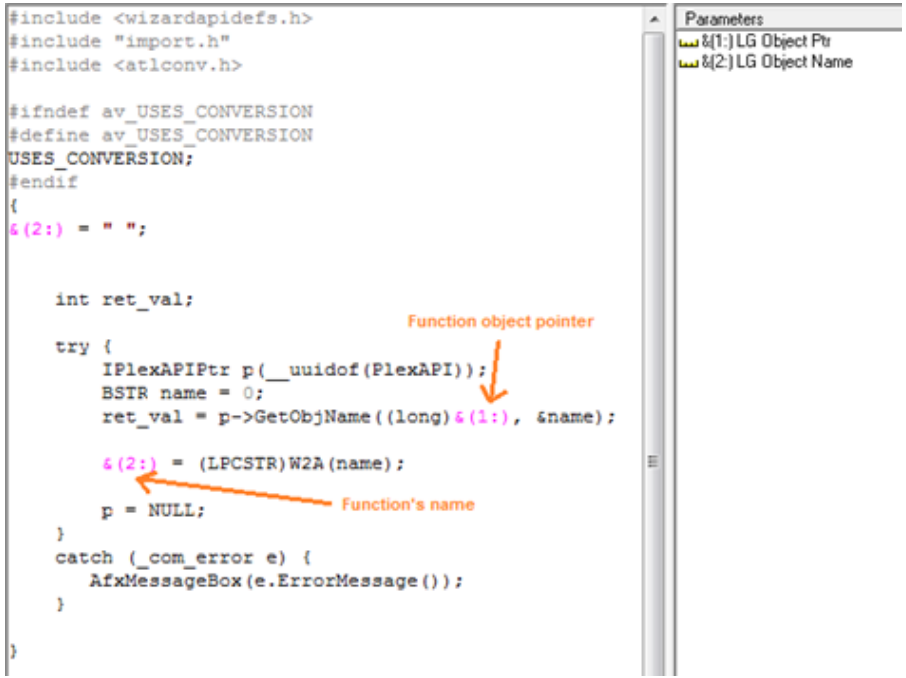
Triple pointer (obtained in the previous step)

Pointer to our Function object (which is a member of the Plex List we used to collect changed objs)

Parameters
- &(1:) LG Triple Ptr
- &(2:) LG Object Ptr

Process Target Object (FNC):

Step 8: get target object's (Function's) name:



W2A macro: is used to convert widechar (COM) into ansi (Windows 1252)

Process Target Object (FNC):

Step 9: get object's (Function's) type:

```
#include <wizardapidefs.h>
#include "import.h"
#include <atlconv.h>

#ifndef av_USES_CONVERSION
#define av_USES_CONVERSION
USES_CONVERSION;
#endif
{
&(2:) = " ";


    int ret_val;

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));
        BSTR sObjType = 0;
        ret_val = p->GetObjTypeAsText((long)&(1:), &sObjType);

        &(2:) = (LPCSTR)W2A(sObjType);

        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }

}
```

Function obj pointer

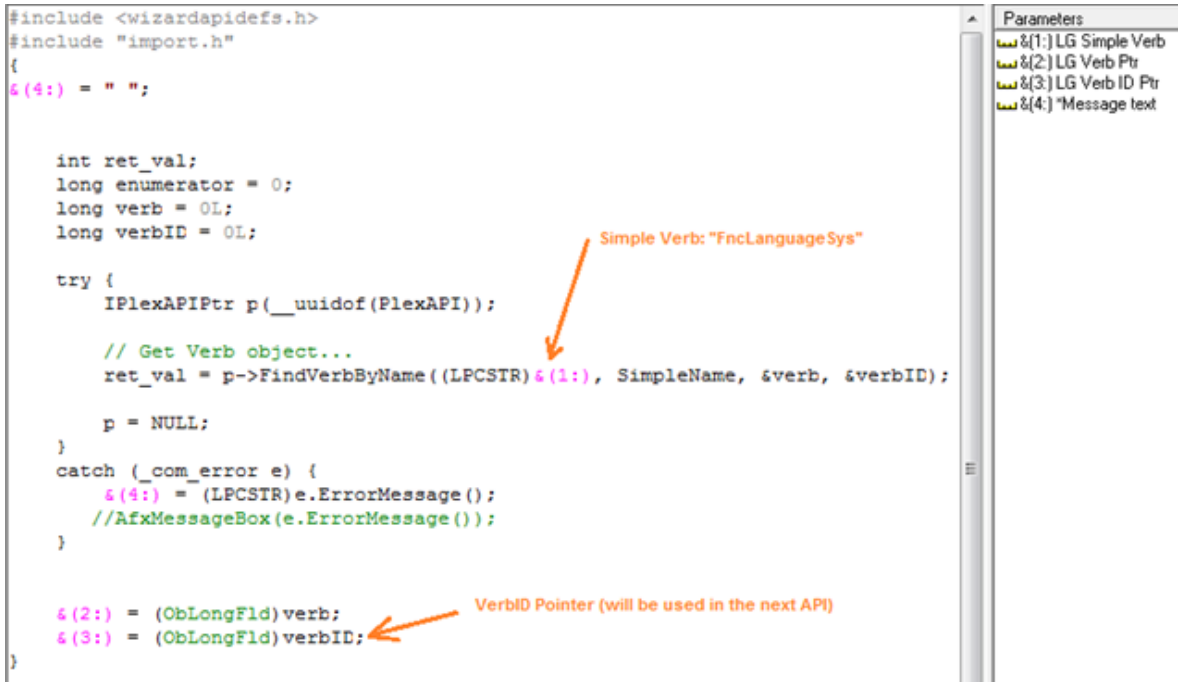
Object type ("Function")

Parameters

- &(1:) LG Object Ptr
- &(2:) LG Object Type

Process Target Object (FNC):

Step 10: get Function's language (1st, get VerbID: "FncLanguageSys" *):



* actually, function's language is another triple, needs a VerbID to start another enumeration. Obviously, it should occur only once.

Process Target Object (FNC):

Step 11: get Function's language (start another enumeration using VerbID obtained in previous step):

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long enumerator = 0;
    &(4:) = " ";

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));

        ret_val = p->EnumTriplesBySource((long)&(1:), (long)&(2:), &enumerator);

        p = NULL;
    }
    catch (_com_error e) {
       //AfxMessageBox(e.ErrorMessage());
        &(4:) = (LPCSTR)e.ErrorMessage();
    }


    &(3:) = (ObLongFld)enumerator;
}
```

Function object ptr

VerbID ptr ("FncLanguageSys") (from previous step)

Enumeration ptr

Parameters

- &(1:) LG Object Ptr
- &(2:) LG Verb ID Ptr
- &(3:) LG Enumerator Ptr
- &(4:) *Message text

NOTE: the enumeration pointer must be stored in another field, must not spoil the List enumerator pointer, which was obtained in the step number 4.

Process Target Object (FNC):

Step 12: get enumerator's first (and only) triple "FNC Language SYS":

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long triple = 0;
    &(3:) = " ";

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));
        ret_val = p->GetFirstTriple((long)&(1:), &triple);

        p = NULL;
    }
    catch (_com_error e) {
       //AfxMessageBox(e.ErrorMessage());
        &(3:) = (LPCSTR)e.ErrorMessage();
    }


    &(2:) = (ObLongFld)triple;
}
```

Enumerator ptr

Pointer to a triple object (will be used next to get its target)

Parameters

- &(1:) LG Enumerator Ptr
- &(2:) LG Triple Ptr
- &(3:) *Message text

Process Target Object (FNC):

Step 13: get triple's target object (language):

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long object = 0;

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));
        long listriple = 0;
        ret_val = p->GetTripleTarget((long)&(1:), &object, &listriple);

        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }


    &(2:) = (ObLongFld)object;
}
```

Triple's pointer (obtained in previous step)

Pointer to the target object from which we can obtain its text (the fnc's language)

Parameters
- &(1:) LG Triple Ptr
- &(2:) LG Object Ptr

Process Target Object (FNC):

Step 14: get triple's target object name (fnc's language):

```
#include <wizardapidefs.h>
#include "import.h"
#include <atlconv.h>

#ifndef av_USES_CONVERSION
#define av_USES_CONVERSION
USES_CONVERSION;
#endif
{
&(2:) = " ";


    int ret_val;

    try {                                   Triple's target object pointer
        IPlexAPIPtr p(__uuidof(PlexAPI));
        BSTR name = 0;
        ret_val = p->GetObjName((long)&(1:), &name);

        &(2:) = (LPCSTR)W2A(name);
                Triple's target object name (fnc's language)
        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }

}
```

Parameters
- &(1:) LG Object Ptr
- &(2:) LG Object Name

Process Target Object (FNC):

Step 15: get rid of the FncLanguageSys enumerator (free the ptr):

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long enumerator = (long)&(1:);

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));

        ret_val = p->EndEnum(&enumerator);

        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }

}
```

"FncLanguageSys" triple enumerator pointer

Parameters

&(1:) LG Enumerator Ptr

Process Target Object (FNC):

Step 16: get next (LstContainsFnc) triple, then repeat all previous steps until there are no more triples:

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long triple = 0;

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));
        ret_val = p->GetNextTriple((long)&(1:), &triple);

        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }


    &(2:) = (ObLongFld)triple;
}
```

Triple enumerator pointer (LstContainsFnc)

Pointer to the next "LstContainsFnc" triple

Parameters

- &(1:) LG Enumerator Ptr
- &(2:) LG Triple Ptr

Head back to step 7 (slide 15) and do it all again. Step 7 API will be fed with this triple pointer.

Clean up:

Step 17: deallocate triples enumerator:

```
#include <wizardapidefs.h>
#include "import.h"
{

    int ret_val;
    long enumerator = (long)&(1:);

    try {
        IPlexAPIPtr p(__uuidof(PlexAPI));

        ret_val = p->EndEnum(&enumerator);

        p = NULL;
    }
    catch (_com_error e) {
       AfxMessageBox(e.ErrorMessage());
    }

}
```

Pointer to the "LstContainsFnc" triple enumerator

Clean up:

Last Step: Unitialize (free) COM

```
CoUninitialize();
```


LogGest DEMO

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