Scripting Apache OpenOffice

Introductory Nutshell Programs (Writer, Calc, Impress)

Rony G. Flatscher

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Overview

- Overview of AOO
  - Bird eye's view of AOO's architecture
- Scripting AOO
- Nutshell examples
  - “swriter” (word processor), “scalc” (spreadsheet), “sdraw” (drawing), “simpress” (presentation)
- Roundup
- Links

Bird Eye's View, 1

- Set of *services* that may contain *interfaces* with *attributes*, other *services*, *structs* and *properties*
- All common functionality of all types of documents is extracted and organized as a set of *interfaces* that define *methods* and possibly *attributes*
  - E.g. loading, saving, printing documents, …
- *Services* are created and get managed by *service managers*

Bird Eye's View, 2

- Client-/Server-Architecture
  - Communication via TCP/IP
  - Employing distributable components (“UNO”)
    - Server can run on any computer in the world!
    - Operating systems of the server and the client are irrelevant for the purpose of communication!
  - Client may run on the same machine as the server
    - Default installation and configuration

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Bird Eye's View, 3

- “UNO”
  - **U**niversal **N**etwork **O**bjects
  - Distributable, interconnected infrastructure
  - All functionality is organized in the form of classes (“UNO classes”)
  - UNO classes (types) get defined in an IDL (Interface Description Language)
- “urp”
  - **U**NO **r**emote **p**rotocol
  - CORBA-like

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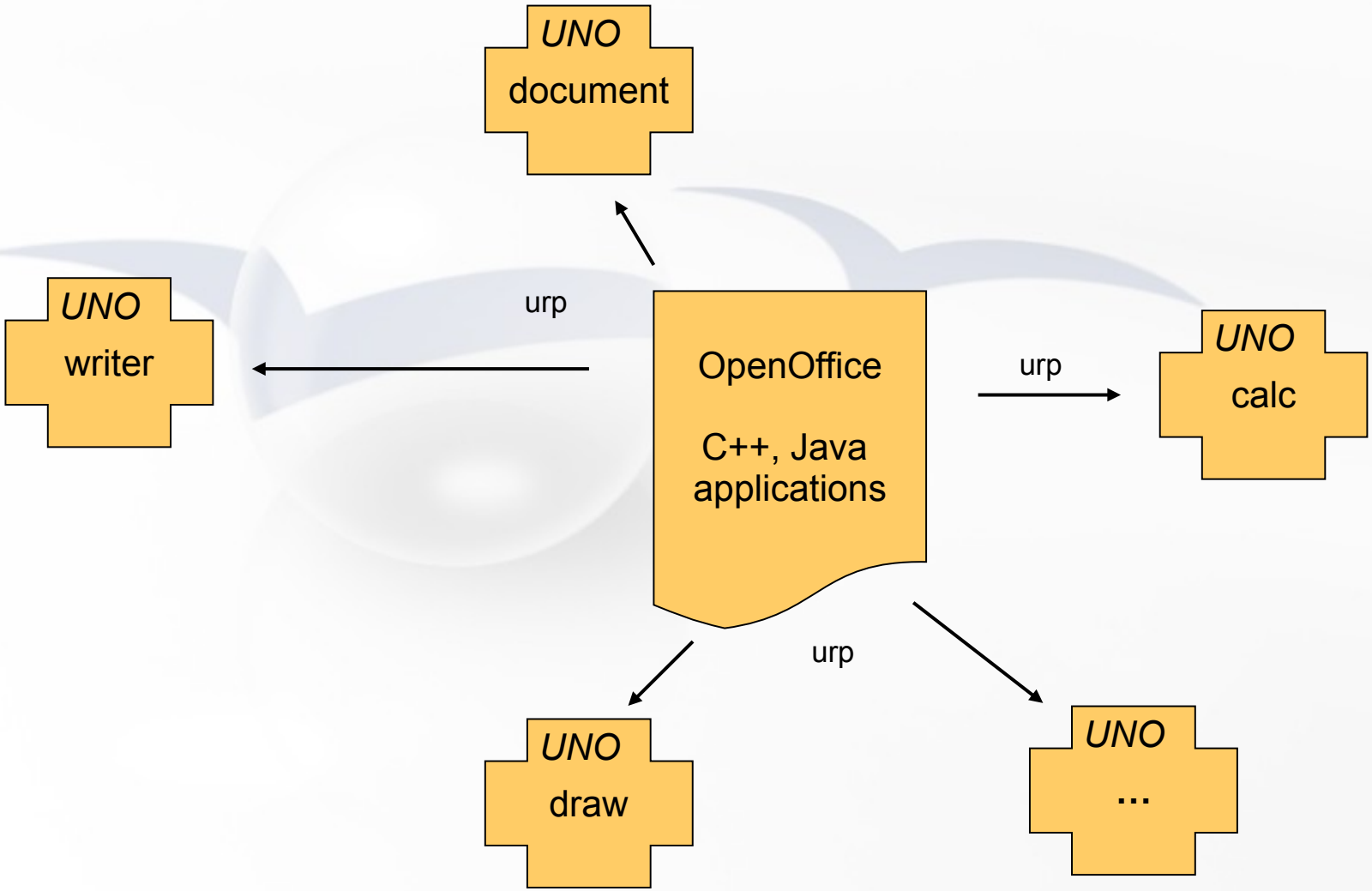
Bird Eye's View, 4



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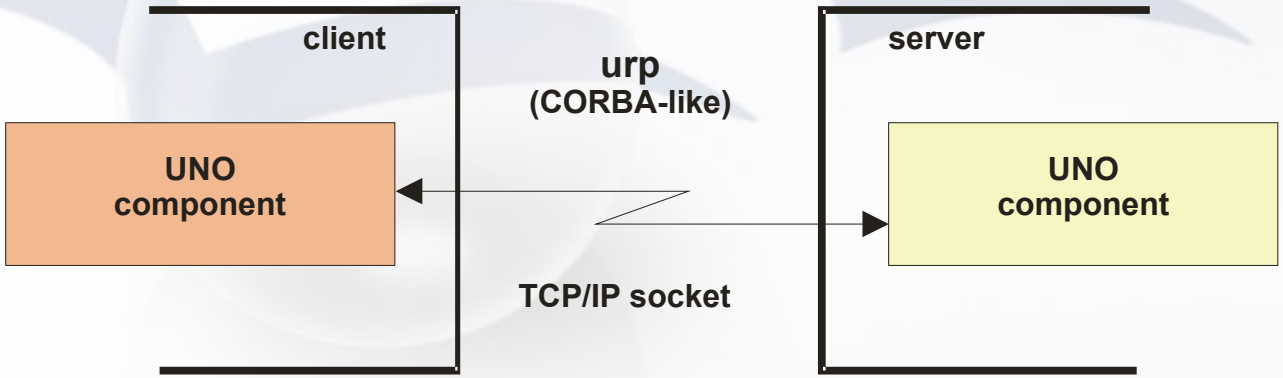
Bird Eye's View, 5



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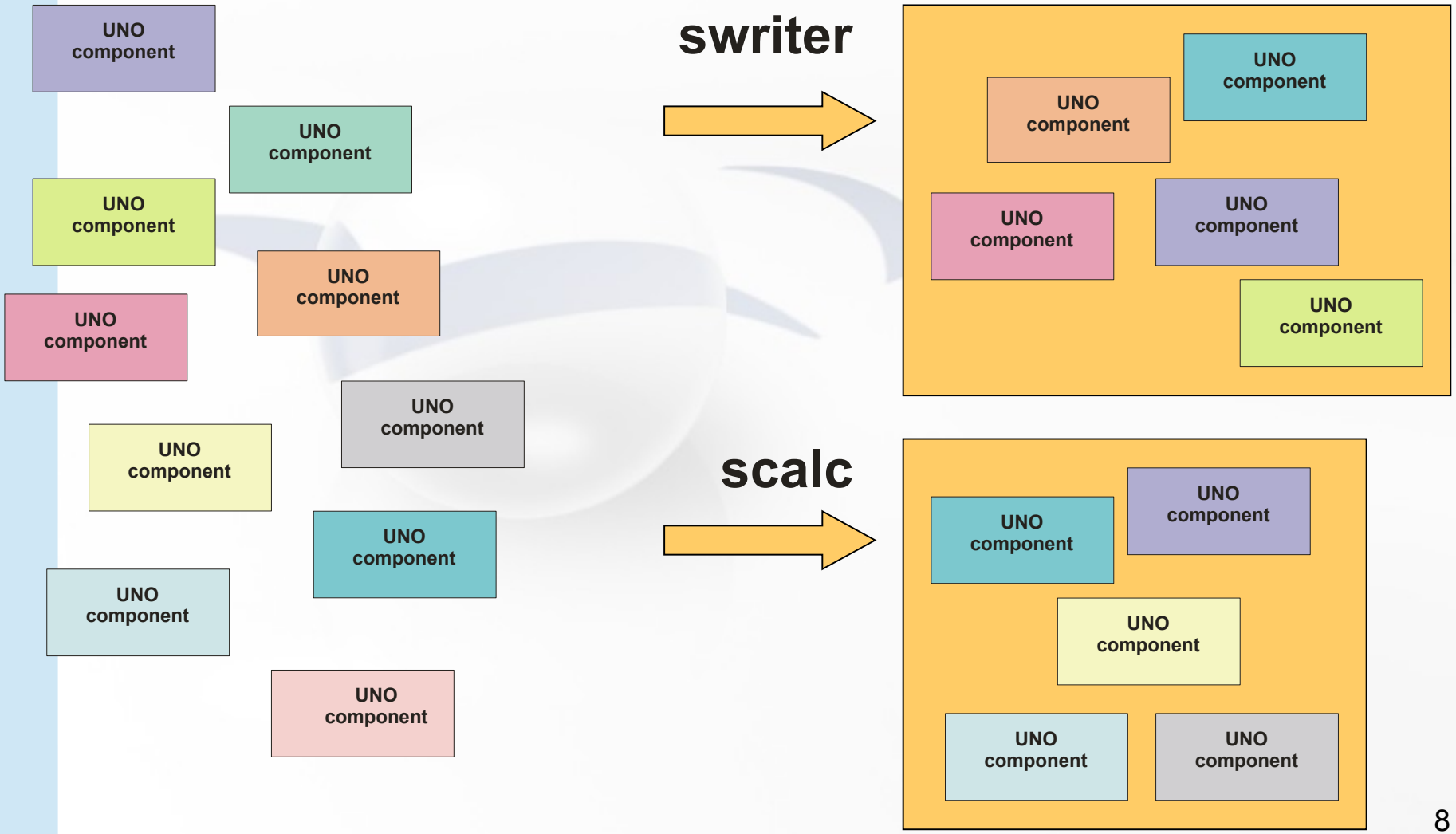
Bird Eye's View, 6



Bird Eye's View, 7

- “Service Managers” (a.k.a. “factories”)
  - Supplied by servers
    - Also cf. XComponentContext.getServiceManager()
  - Can be used to request/create *services*
  - Returned *service* allows access to a part of the "office" functionality, e.g.
    - com.sun.star.frame.*Desktop*
    - com.sun.star.configuration.*ConfigurationProvider*
    - com.sun.star.sdb.*DatabaseContext*

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Bird Eye's View, 8

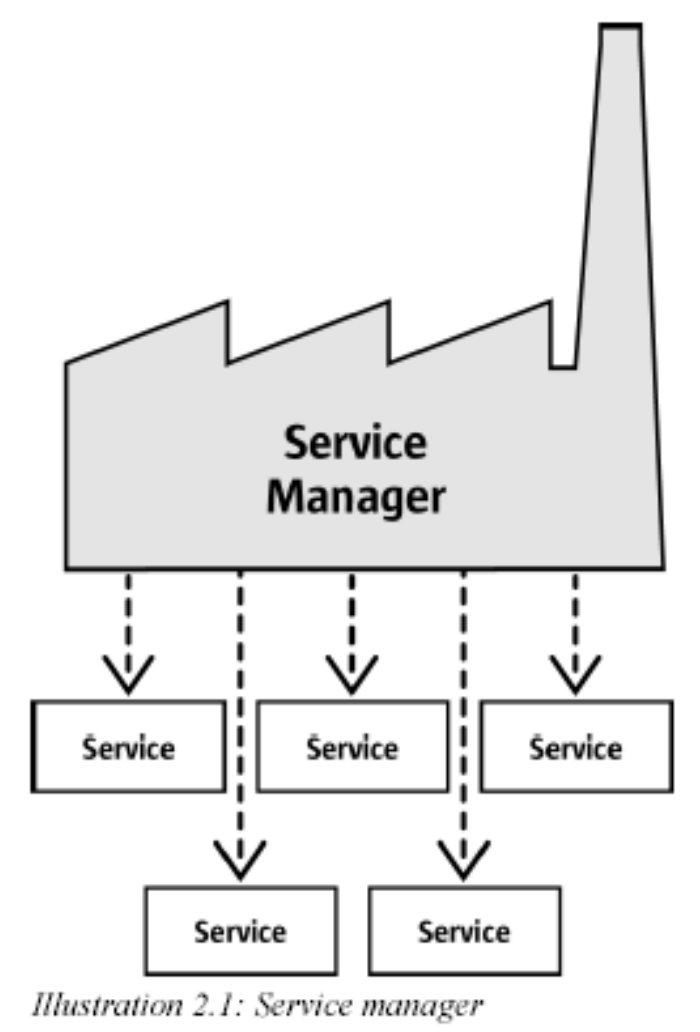

Illustration 2.1: Service manager

Bird Eye's View, 9

- “Services”
  - Can be comprehensive
  - May contain
    - "Interfaces" (group of *methods* and *attributes*)
    - Other "Services"
    - “properties” (com.sun.star.beans.*PropertyValue*)
  - Depending on the desired task you need to query (request) the appropriate interface, e.g.
    - com.sun.star.view.*XPrintable*
    - com.sun.star.frame.*XStorable*
    - com.sun.star.text.*XTextDocument*

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Bird Eye's View, 10

- An example
  - Two services with seven interfaces
    - "OfficeDocument"
      - Four interfaces
    - "TextDocument"
      - Three interfaces

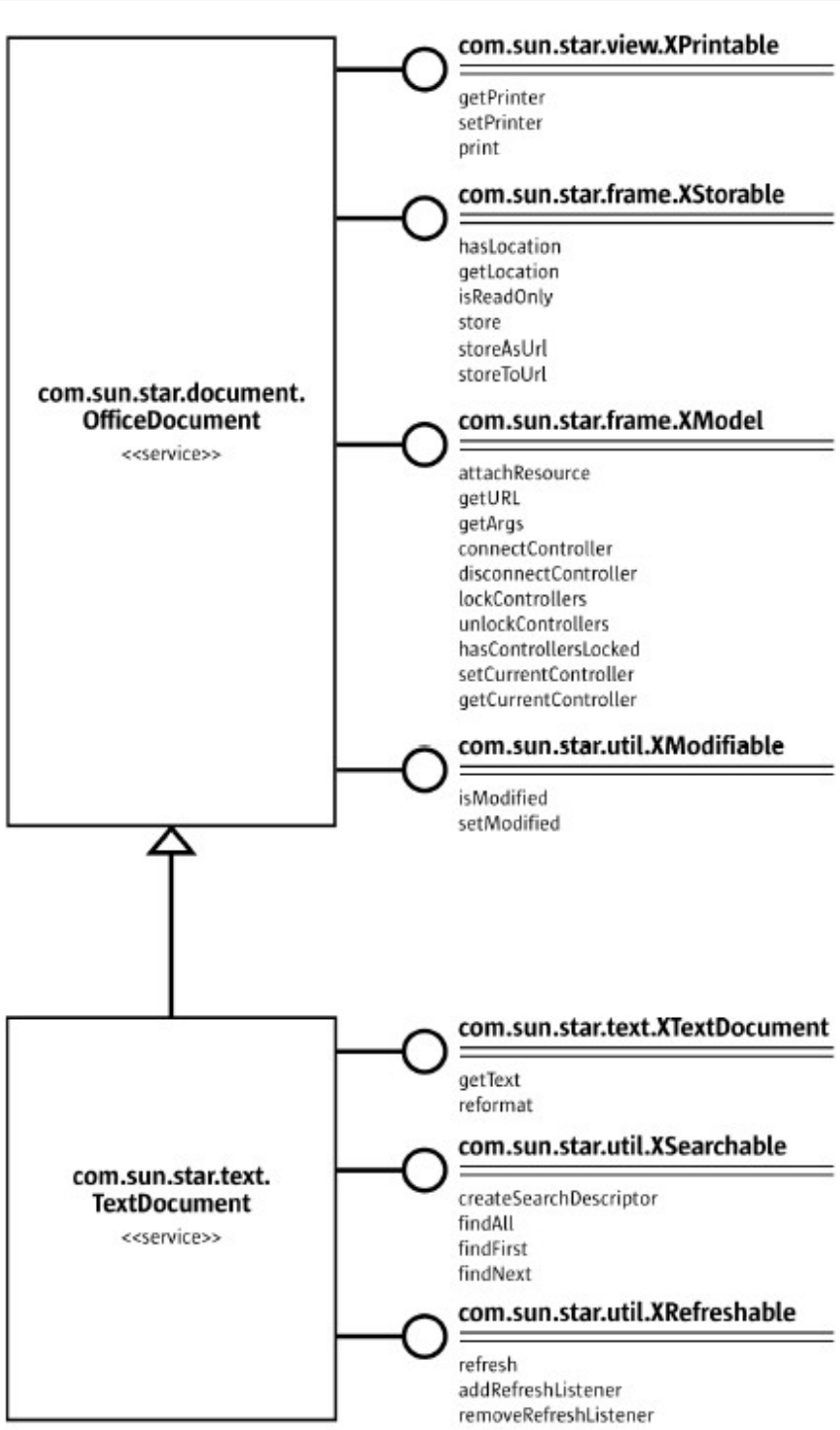

Illustration 2.3: Text Document

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Scripting AOO Programming Languages

- Programming languages
  - C++ (*queryInterface*)
  - Java (*queryInterface*)
  - Basic (implicit *queryInterface*)
  - Python (implicit *queryInterface*)
- Java-based scripting framework
  - BeanShell (*queryInterface*)
  - JavaScript (*queryInterface*)
  - ooRexx (*queryInterface*)
  - …

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Scripting AOO Documentation

- *Extremely* important
  - Wealth of services and interfaces
  - Created in pure German ;) engineering style
    - To miss the the forest for the trees!
- AOO API documentation
  - http://www.openoffice.org/api/
    - Developer's guide, API wiki, UNO wiki, extensions, examples, tutorials
  - http://www.openoffice.org/api/docs/common/ref/com/sun/star/module-ix.html
    - Extensive, HTML-linked API reference
    - Use its Index to locate services, interfaces, etc.

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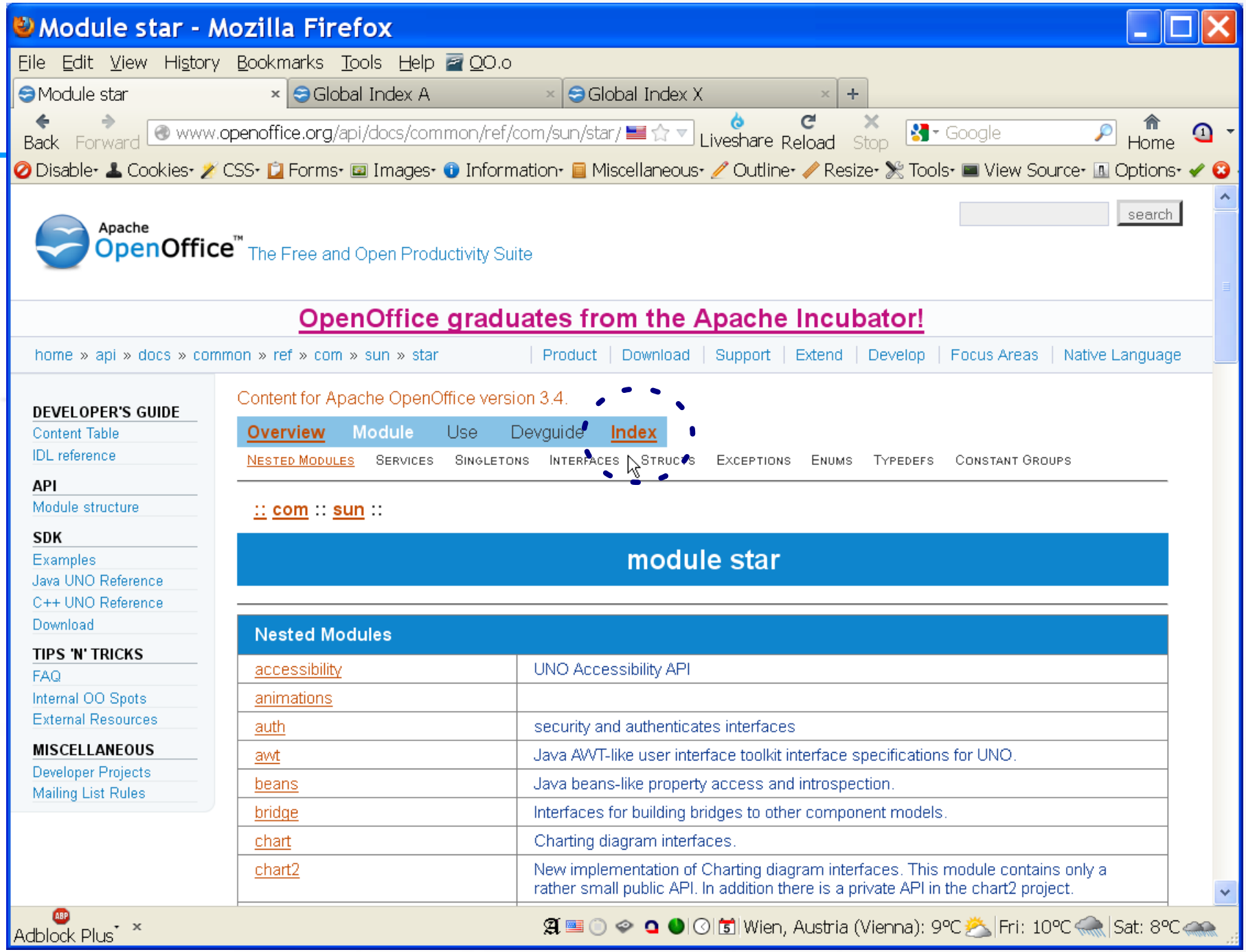

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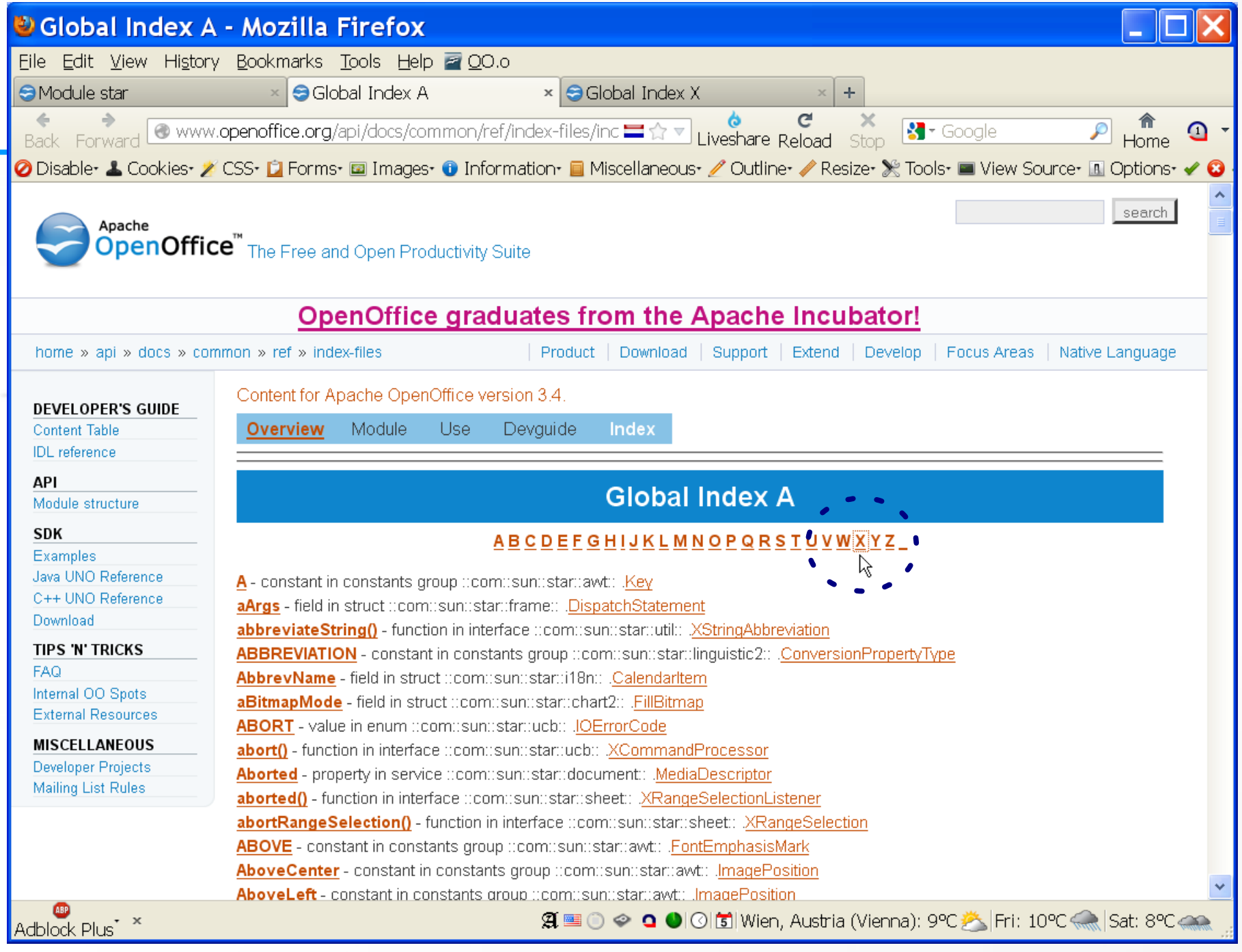

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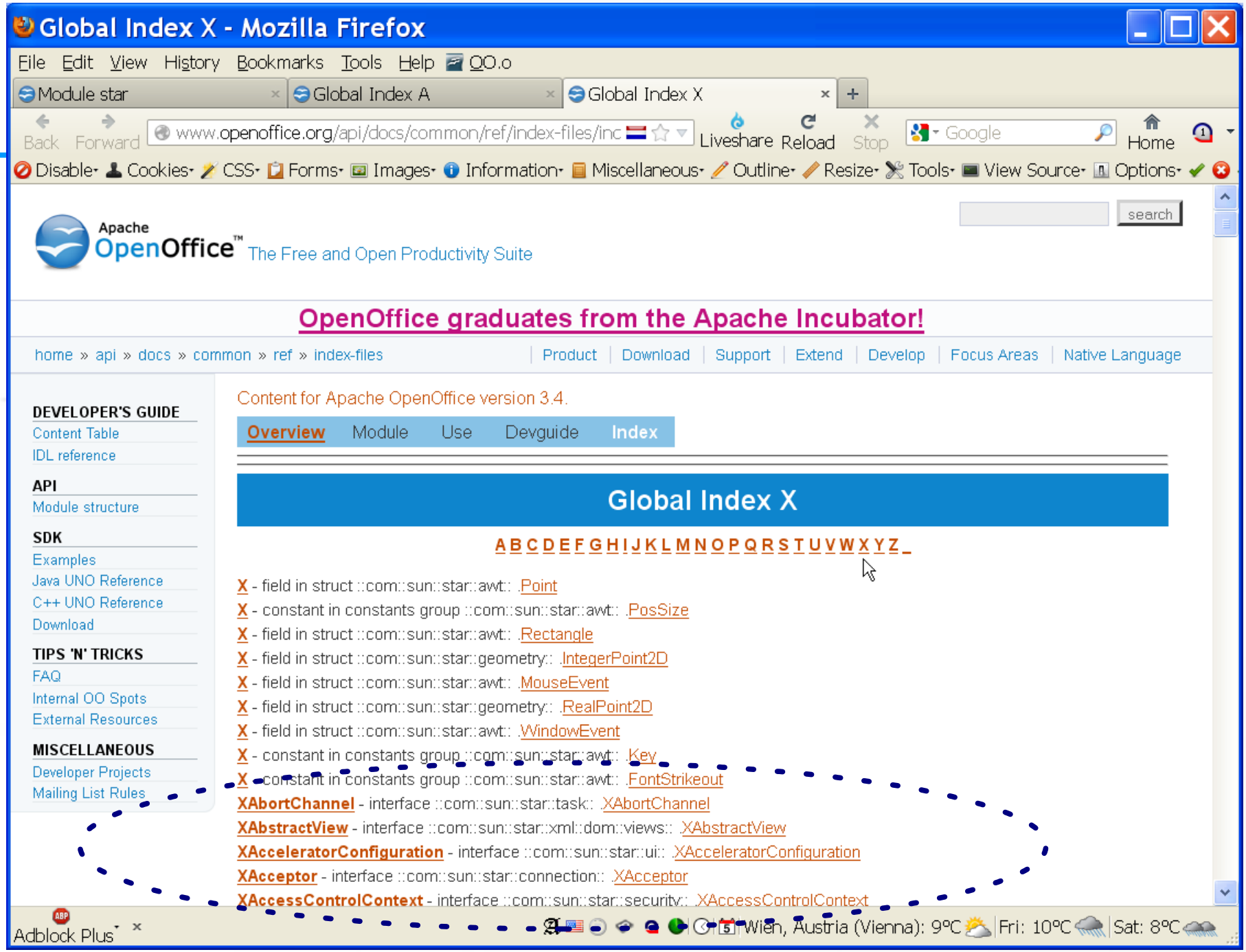

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Scripting AOO
Querying an Interface

- *queryInterface() examples*
  - *sDispatchHelper, a service of type com.sun.star.frame.DispatchHelper*
- *queryInterface()* in Java

```
import com.sun.star.frame.XDispatchHelper;
// ...
XDispatchHelper xDispatchHelper=(XDispatchHelper)
   UnoRuntime.queryInterface(XDispatchHelper.class, sDispatchHelper);
```

- *queryInterface()* in JavaScript

```
importClass(Packages.com.sun.star.frame.XDispatchHelper);
// ...
xDispatchHelper = UnoRuntime.queryInterface(XDispatchHelper, sDispatchHelper);
```

- *queryInterface()* in ooRexx

```
xDispatchHelper=sDispatchHelper~com.sun.star.frame.XDispatchHelper
-- or simpler:
xDispatchHelper=sDispatchHelper~XDispatchHelper
```

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Scripting AOO

- Two kinds of scripting (programming)
  - **Stand-alone**
    - Need to bootstrap OpenOffice in order to initialize the AOO environment to interact with
    - Full control about addressing different AOO servers, if needed
  - Dispatched by AOO (“macro”)
    - AOO supplies a script context that allows access to the initialized AOO environment (*getDesktop*, *getComponentContext*) and to the document (*getDocument*) for which the dispatch occurred

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Scripting AOO Bootstrapping in Java

```
// import ...
XComponentContext xLocalContext =
com.sun.star.comp.helper.Bootstrap.createInitialComponentContext(null);
  // initial serviceManager
XMultiComponentFactory xLocalServiceManager = xLocalContext.getServiceManager();
  // create a URL resolver
Object urlResolver = xLocalServiceManager.createInstanceWithContext(
        "com.sun.star.bridge.UnoUrlResolver", xLocalContext);
  // query for the XUnoUrlResolver interface
XUnoUrlResolver xUrlResolver = (XUnoUrlResolver)
UnoRuntime.queryInterface(XUnoUrlResolver.class, urlResolver);
  // Import the object
Object rInitialObject = xUrlResolver.resolve(
        "uno:socket,host=localhost,port=8100;urp;StarOffice.ServiceManager");
  // test whether we got a reference to the remote ServiceManager
if (null != rInitialObject) {
     System.out.println("initial object successfully retrieved");
} else {
     System.out.println("given initial-object name unknown at server side");
}

… cut …
```

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Scripting AOO Bootstrapping in ooRexx

```
url="uno:socket,host=localhost,port=8100;urp;StarOffice.ServiceManager"
rInitialObject=uno.connect(url)

if rInitialObject<>.nil then
   say "initial object successfully retrieved"
else
   say "given initial-object name unknown at server side"
-- … cut …

::requires UNO.CLS   -- get UNO support
```

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Scripting AOO Creating/Loading Documents

scalc
swriter
simpress
sdraw

```
xDesktop=uno.createDesktop()  -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader -- get XComponentLoader interface

uri="private:factory/swriter" -- new swriter document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

-- ... now do whatever you want or need to do ...

::requires UNO.CLS            -- get UNO support
```

"file:///c:/docs/aFile.odt"
"http://www.RexxLA.org/aFile.ods"
"ftp://www.OpenOffice.org/aFile.odp"

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Nutshell examples Word Processor (“swriter”), 1

- 3 Services

  GenericTextDocument (com.sun.star.text.*GenericTextDocument*), OfficeDocument (com.sun.star.document.*OfficeDocument*), TextDocument (com.sun.star.text.*TextDocument*)

- 35 Interfaces (unqualified)

  XBookmarksSupplier, XChapterNumberingSupplier, XDocumentEventBroadcaster, XDocumentIndexesSupplier, XDocumentInfoSupplier, XDocumentPropertiesSupplier, XEmbeddedScripts, XEndnotesSupplier, XEventBroadcaster, XEventsSupplier, XFootnotesSupplier, XLineNumberingSupplier, XModel, XModifiable, XMultiServiceFactory, XNumberFormatsSupplier, XPagePrintable, XPrintJobBroadcaster, XPrintable, XPropertySet, XReferenceMarksSupplier, XRefreshable, XReplaceable, XSearchable, XStorable, XStyleFamiliesSupplier, XTextDocument, XTextEmbeddedObjectsSupplier, XTextFieldsSupplier, XTextFramesSupplier, XTextGraphicObjectsSupplier, XTextSectionsSupplier, XTextTablesSupplier, XUndoManagerSupplier, XViewDataSupplier

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Nutshell examples Word Processor (“swriter”), 2

- 37 Properties

ApplyFormDesignMode, ApplyWorkaroundForB6375613, AutomaticControlFocus, BasicLibraries, BuildId, CharFontCharSet, CharFontCharSetAsian, CharFontCharSetComplex, CharFontFamily, CharFontFamilyAsian, CharFontFamilyComplex, CharFontName, CharFontNameAsian, CharFontNameComplex, CharFontPitch, CharFontPitchAsian, CharFontPitchComplex, CharFontStyleName, CharFontStyleNameAsian, CharFontStyleNameComplex, CharLocale, **CharacterCount**, DialogLibraries, ForbiddenCharacters, HasValidSignatures, HideFieldTips, IndexAutoMarkFileURL, LockUpdates, ParagraphCount, RecordChanges, RedlineDisplayType, RedlineProtectionKey, RuntimeUID, ShowChanges, TwoDigitYear, WordCount, WordSeparator

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Nutshell examples Word Processor (“swriter”), 3

- Interface com.sun.star.text.*XTextDocument*
  - Get access to the text object representing the text of the entire document using getText()
    - Returns XText, which is derived from XSimpleText, which is derived from XRangeText, hence the methods of all three interfaces are available!
- Concept of “cursors”, e.g.
  - Paragraphs, Sentences, Words, Characters
- Possible to also insert tables, fields, pictures, drawings, …

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Nutshell examples Word Processor, Example 1/1

- Example 1
  - Create a word processor document
  - Add text “Hello, ApacheCon NA 2013!”
  - Closing the word processor document manually will cause the “Save”-dialog to appear

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Nutshell examples
Word Processor, Example 1/2

```
xDesktop=uno.createDesktop()      -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader     -- get XComponentLoader interface

uri="private:factory/swriter"     -- new swriter document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xText=doc~XTextDocument~getText   -- get text object
xText~setString("Hello, ApacheCon NA 2013!")

::requires UNO.CLS                -- get UNO support
```

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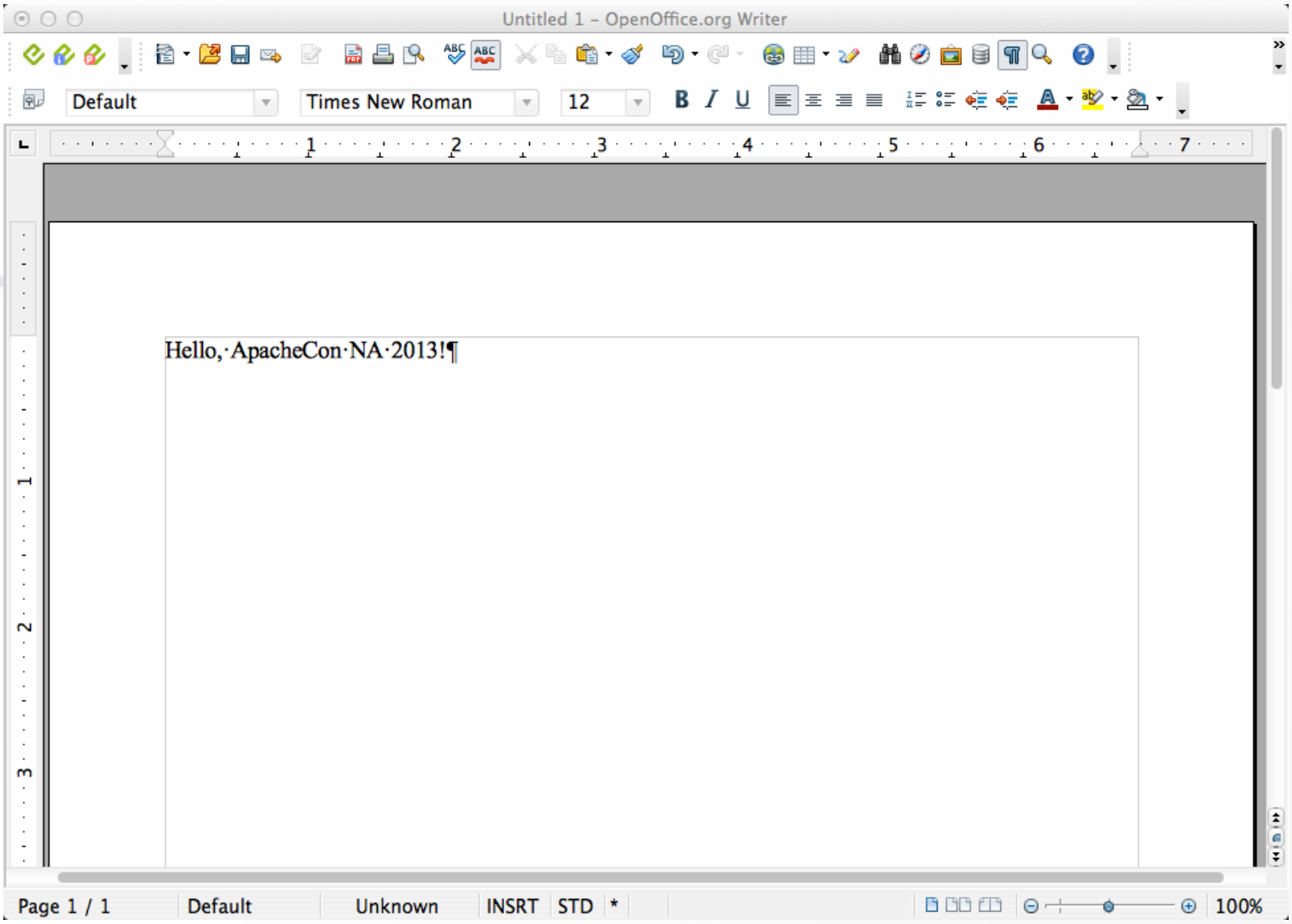
Nutshell examples
Word Processor, Example 1/3



Nutshell examples Word Processor, Example 2/1

- Example 2
  - Create a word processor document
  - Add text “Hello, ApacheCon NA 2013!”
  - Change state of document to “unmodified”
    - Leftover document can be closed without a save dialog
    - Using interface com.sun.star.util.*XModifiable*
  - Sleep five seconds, then close document
    - Using interface com.sun.star.util.*XCloseable*

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Nutshell examples
Word Processor, Example 2/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/swriter"         -- new swriter document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xText=doc~XTextDocument~getText       -- get text object
xText~setString("Hello, ApacheCon NA 2013!")

doc~XModifiable~setModified(.false) -- set document to unmodified
call SysSleep 5                       -- sleep 5 seconds
doc~XCloseable~close(.false)          -- close document (window)

::requires UNO.CLS                    -- get UNO support
```

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Nutshell examples Word Processor, Example 3/1

- Example 3
  - Create a word processor document
  - Add text “Hello, ApacheCon NA 2013!”
  - Access and show property CharacterCount
  - Change state of document to “unmodified”
    - Leftover document can be closed without a save dialog
    - Using interface com.sun.star.util.*XModifiable*
  - Sleep five seconds, then close document
    - Using interface com.sun.star.util.*XCloseable*

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Nutshell examples
Word Processor, Example 3/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/swriter"         -- new swriter document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xText=doc~XTextDocument~getText       -- get text object
xText~setString("Hello, ApacheCon NA 2013!")

xprops=doc~XPropertySet               -- get access to the properties
say "character count:" xprops~getPropertyValue("CharacterCount")

doc~XModifiable~setModified(.false) -- set document to unmodified
call SysSleep 5                       -- sleep 5 seconds
doc~XCloseable~close(.false)          -- close document (window)

::requires UNO.CLS                    -- get UNO support
```

```
E:\rony\Vortraege\2013\ApacheConNA\code>rexx swriter3.rxo
character count: 25
```

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Nutshell examples Word Processor, Example 4/1

- Example 4
  - Create a word processor document
  - Add text “Hello, ApacheCon NA 2013!”
  - Replace “ApacheCon NA” with “ApacheCon North America Conference”
    - Change the color to red
    - Change the font name to “DejaVus Sans Mono”

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Nutshell examples Word Processor, Example 4/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/swriter"         -- new swriter document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xText=doc~XTextDocument~getText       -- get text object
xText~setString("Hello, ApacheCon NA 2013!")

   -- change second word
xTextCursor=xText~createTextCursor    -- character based cursor
xTextCursor~gotoStart(.false)         -- make sure we are at start

xWordCursor=xTextCursor~XWordCursor -- get the XWordCursor interface
xWordCursor~gotoNextWord(.false)      -- XTextRange represents first word
xWordCursor~gotoNextWord(.true)       -- select second word, includes blank!
xWordCursor~gotoNextWord(.true)       -- select third word, includes blank!
xWordCursor~setString("Apache Conference North America ")  -- note trailing blank

   -- change color
red=box("int", "FF 00 00"x ~c2d)      -- color red (RGB color) as integer
xWordCursor~XPropertySet~setPropertyValue("CharColor", red)

   -- change font
fontName="DejaVu Sans Mono"
xWordCursor~XPropertySet~setPropertyValue("CharFontName", fontName)
say ppd(xWordCursor~uno.getDefinition)

::requires UNO.CLS    -- get UNO support
```

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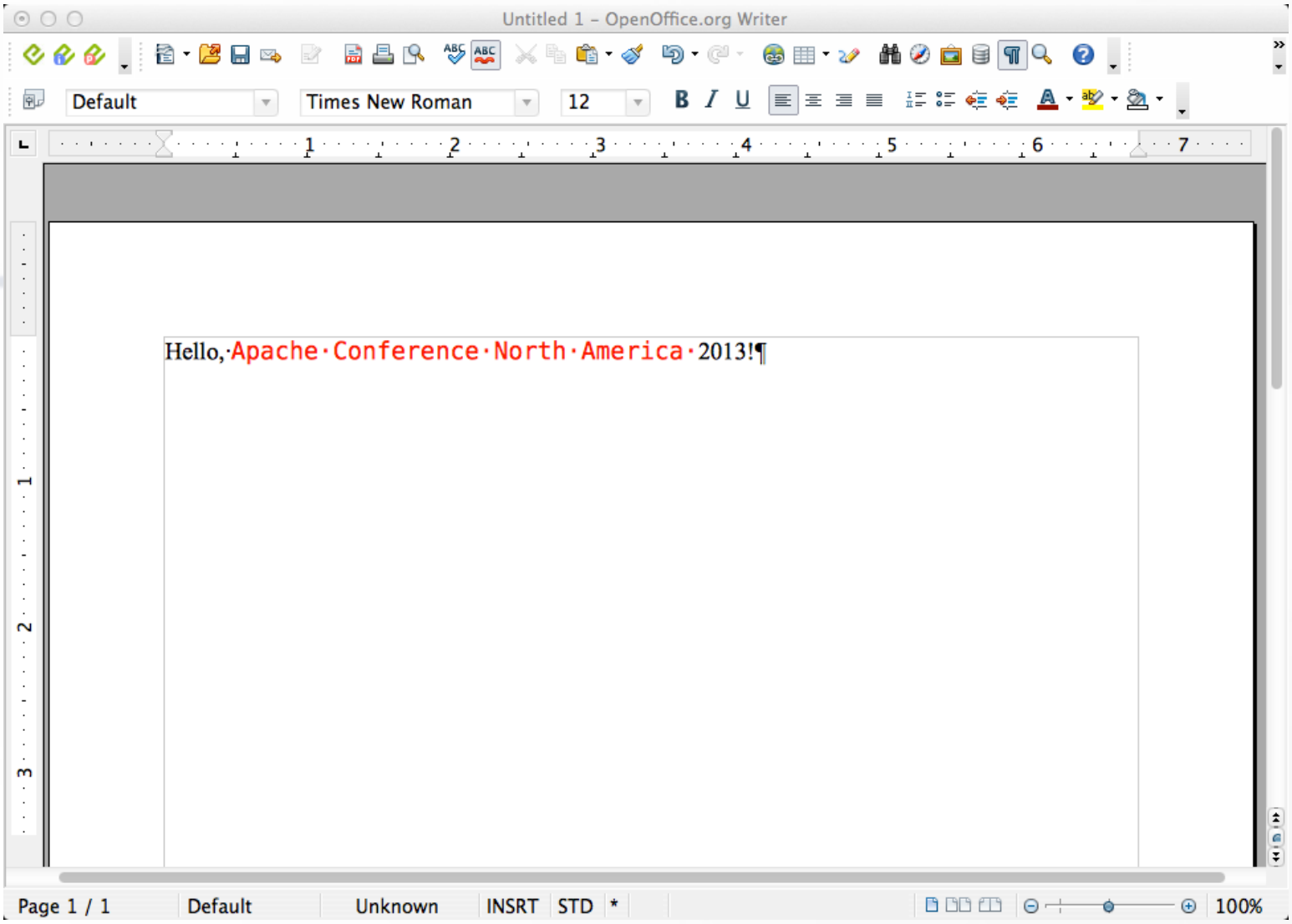
Nutshell examples
Word Processor, Example 4/3



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Nutshell examples Word Processor, Example 5/1

- Example 5
  - Create a word processor document
  - Add text “Hello, ApacheCon NA 2013!”
  - Demonstrate creating and styling paragraphs
    - Get access to the paragraph properties
    - Access com.sun.star.text.ControlCharacter constants
    - Access to com.sun.star.style.ParagraphAdjust enums
    - Demonstrate adjusting paragraphs to “right”, “center”, “block”, “left” using a string that contains the adjustment verb

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Nutshell examples
Word Processor, Example 5/2

```
xDesktop=uno.createDesktop()         -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader        -- get XComponentLoader interface

uri="private:factory/swriter"        -- new swriter document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xText=doc~XTextDocument~getText      -- get text object
xText~setString("Hello, ApacheCon NA 2013!")

xTextCursor=xText~createTextCursor  -- create the character based cursor
   -- make paragraph's properties accessible:
xParaProps=xTextCursor~XParagraphCursor~XPropertySet

ctlChars=.uno_constants~new("com.sun.star.text.ControlCharacter") -- UNO_CONSTANT
paraBreak=ctlChars~paragraph_break  -- get paragraph break constant

paraAdj =.uno_enum~new("com.sun.star.style.ParagraphAdjust")      -- UNO_ENUM

arr=.array~of("right", "center", "block", "left")  -- adjustments
do adj over arr   -- iterate over adjustments, create string, adjust
   xTextCursor~gotoEnd(.false)       -- position at end
   xText~insertControlCharacter(xTextCursor, paraBreak, .false)
   string=("This paragraph will be" adj"-adjusted. ")~copies(8)
   xText~insertString(xTextCursor, string, .true)
   xParaProps~setPropertyValue("ParaAdjust", paraAdj~send(adj))
end

::requires UNO.CLS   -- get UNO support
```

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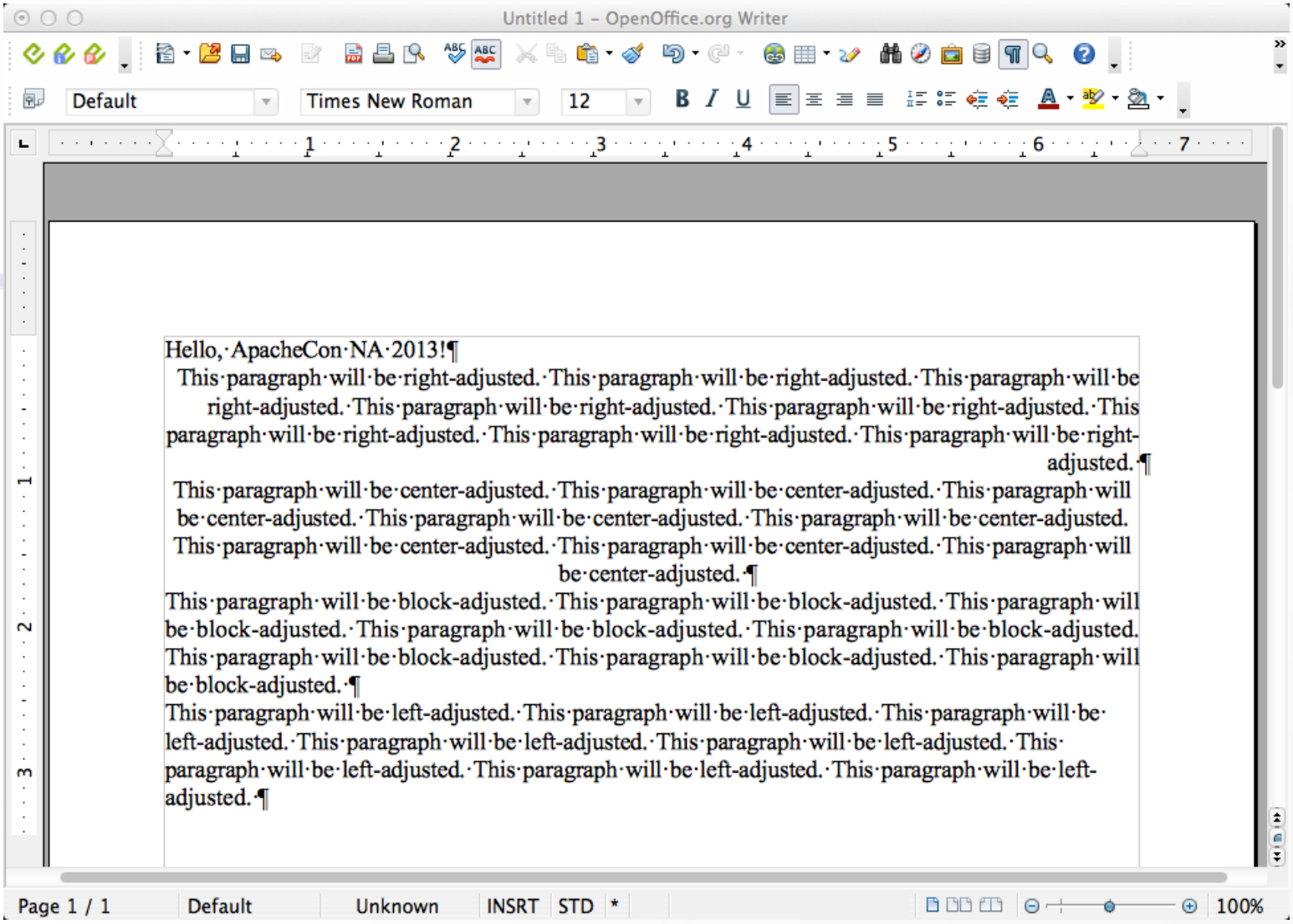
Nutshell examples
Word Processor, Example 5/3



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Nutshell examples Spreadsheet (“scalc”), 1

- 3 Services

  OfficeDocument (com.sun.star.document.*OfficeDocument*),
  SpreadsheetDocument (com.sun.star.sheet.*SpreadsheetDocument*),
  SpreadsheetDocumentSettings
  (com.sun.star.sheet.*SpreadsheetDocumentSettings*)

- 26 Interfaces (unqualified)

  XActionLockable, XCalculatable, XConsolidatable, XDocumentAuditing,
  XDocumentEventBroadcaster, XDocumentInfoSupplier,
  XDocumentPropertiesSupplier, XDrawPagesSupplier, XEmbeddedScripts,
  XEventBroadcaster, XEventsSupplier, XGoalSeek, XLinkTargetSupplier, XModel,
  XModifiable, XMultiServiceFactory, XNumberFormatsSupplier,
  XPrintJobBroadcaster, XPrintable, XPropertySet, XProtectable,
  XSpreadsheetDocument, XStorable, XStyleFamiliesSupplier,
  XUndoManagerSupplier, XViewDataSupplier

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Nutshell examples Spreadsheet (“scalc”), 2

- 40 Properties

ApplyFormDesignMode, AreaLinks, AutomaticControlFocus, BasicLibraries, BuildId, CalcAsShown, CharLocale, CharLocaleAsian, CharLocaleComplex, CodeName, ColumnLabelRanges, DDELinks, DatabaseRanges, DefaultTabStop, DialogLibraries, ExternalDocLinks, ForbiddenCharacters, HasDrawPages, HasValidSignatures, IgnoreCase, IsAdjustHeightEnabled, IsChangeReadOnlyEnabled, IsExecuteLinkEnabled, IsIterationEnabled, IsLoaded, IsUndoEnabled, IterationCount, IterationEpsilon, LookUpLabels, MatchWholeCell, NamedRanges, NullDate, ReferenceDevice, RegularExpressions, RowLabelRanges, RuntimeUID, SheetLinks, SpellOnline, StandardDecimals, VBAGlobalConstantName

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Nutshell examples Spreadsheet (“scalc”), 3

- Interface com.sun.star.sheet.XSpreadsheetDocument
  - Get name access to the collection of XSpreadsheets
  - Numeric (0-based) access with XIndexAccess
- Concept of “table” consisting of a collection of *rows*, which each have *columns*
  - XCellRange (a tabular area of a spreadsheet)
  - Origin “0,0” represents upper left-hand corner
    - Offsets relative to upper left-hand corner

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Nutshell examples Spreadsheet (“scalc”), 4

- Addressing a cell
  - Numerically (0-based) representing offsets from origin
    - e.g. “0,1” (first column, second row)
      - getCellByPosition(columnOffset,rowOffset) returns a XCell
  - By name
    - a named range, or
    - column: a name, row: a 1-based number), e.g. “A2”
    - getCellRangeByName(Name) returns a XCellRange, then
    - getCellByPosition(0,0) returns a XCell
  - Possible to also insert charts, drawings, …

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Nutshell examples Spreadsheet, Example 1/1

- Example 1
  - Create a spreadsheet document
  - Add text “Hello, ApacheCon NA 2013!” to A1
  - Demonstrate how to store a document

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Nutshell examples Spreadsheet, Example 1/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/scalc"           -- new scalc document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xSheets=doc~XSpreadSheetDocument~getSheets~XIndexAccess
xSheet =xSheets~getByIndex(0)~XSpreadSheet   -- get first spreadsheet
                                      -- add entry to "A1"
xSheet~getCellByPosition(0,0)~setFormula("Hello, ApacheCon NA 2013!")

storeURL=directory()"/scalc1.ods"     -- save document in local directory
storeURL=uno.convertToUrl(storeURL) -- change path to URL-style
doc~XStorable~storeAsURL(storeURL,.UNO~noProps) -- save document

doc~XCloseable~close(.false)          -- close document (window)

::requires UNO.CLS                    -- get UNO support
```

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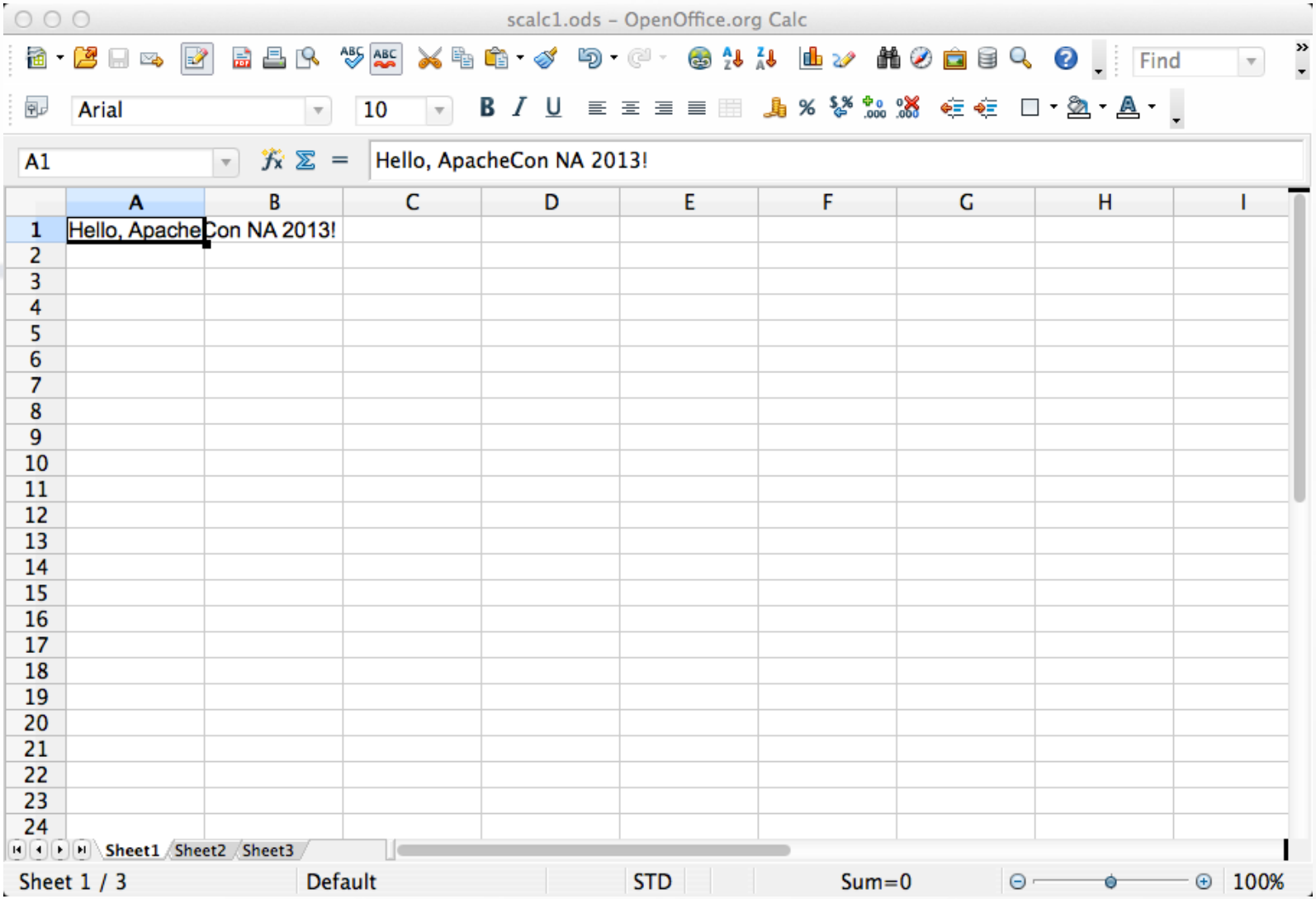
Nutshell examples Spreadsheet, Example 1/3



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Nutshell examples Spreadsheet, Example 2/1

- Example 2
  - Create a spreadsheet document
  - Add text “Hello, ApacheCon NA 2013!” to A1
  - Demonstrate how to change the height of table rows

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Nutshell examples Spreadsheet, Example 2/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/scalc"           -- new scalc document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xSheets=doc~XSpreadSheetDocument~getSheets~XIndexAccess
xSheet =xSheets~getByIndex(0)~XSpreadSheet   -- get first spreadsheet
                                      -- add entry to "A1"
xSheet~getCellByPosition(0,0)~setFormula("Hello, ApacheCon NA 2013!")

xRows=xSheet~XColumnRowRange~getRows-- get XTableRows

do i=1 to 5                           -- 0-based, hence lines # 2 through # 6
   xRow=xRows~getByIndex(i)           -- fetch XRow
   props=xRow~XPropertySet            -- get access to its properties
   oldHeight=props~getPropertyValue("Height")   -- get current value
   newHeight=oldHeight+i*250          -- increase by i*0.250 cm
   props~setPropertyValue("Height", box("int",newHeight))   -- set new Height
   text="oldHeight="oldHeight", newHeight="newHeight  -- create info text
   xSheet~getCellByPosition(0,i)~setFormula(text)     -- set cell to info text
end

::requires UNO.CLS                    -- get UNO support
```

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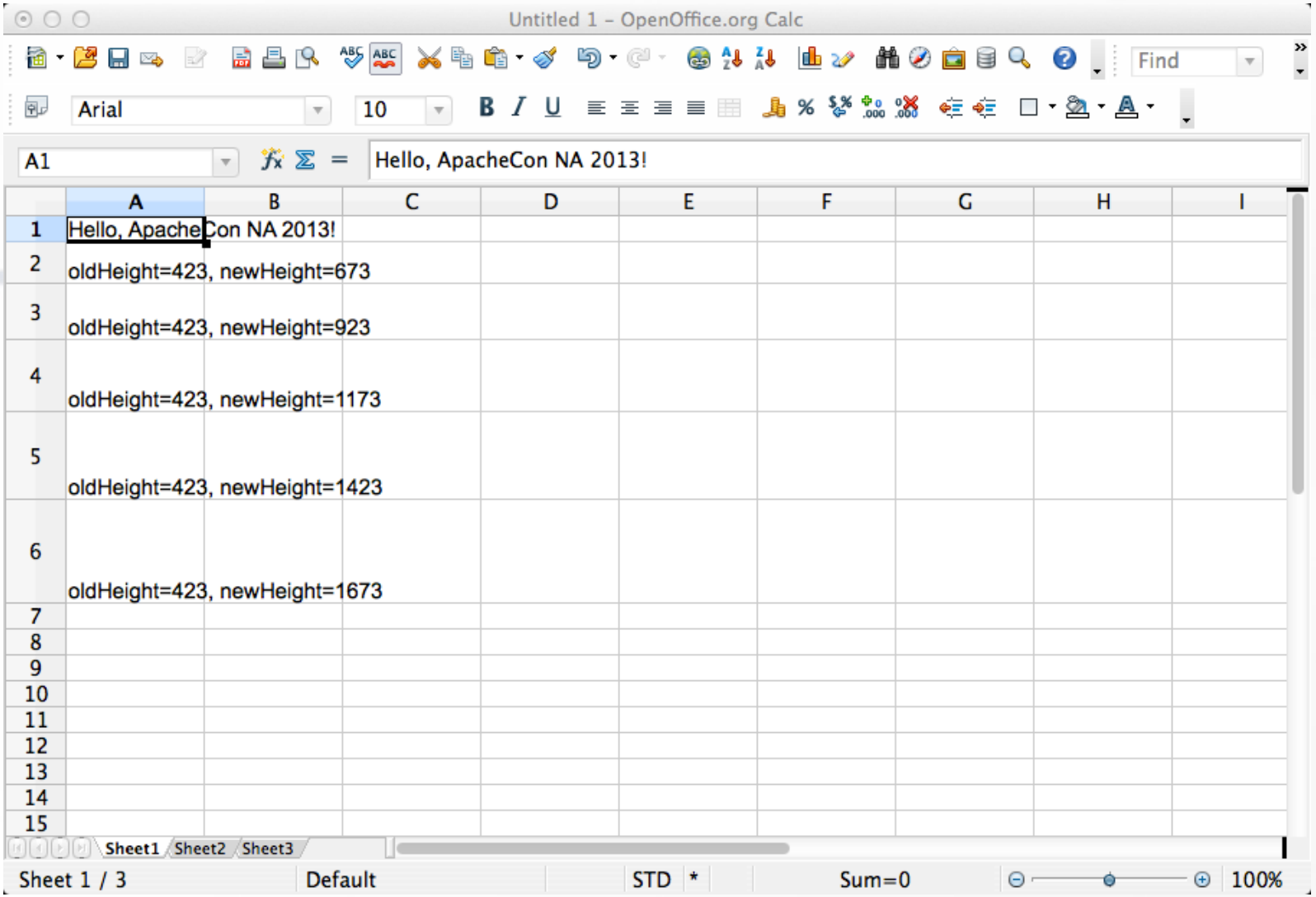
Nutshell examples Spreadsheet, Example 2/3



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Nutshell examples Spreadsheet, Example 3/1

- Example 3
  - Create a spreadsheet document
  - Add text “Hello, ApacheCon NA 2013!” to A1
  - Demonstrate how to change the width of table columns

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Nutshell examples Spreadsheet, Example 3/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/scalc"           -- new scalc document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xSheets=doc~XSpreadSheetDocument~getSheets~XIndexAccess
xSheet =xSheets~getByIndex(0)~XSpreadSheet   -- get first spreadsheet
                                      -- add entry to "A1"
xSheet~getCellByPosition(0,0)~setFormula("Hello, ApacheCon NA 2013!")

xCols=xSheet~XColumnRowRange~getColumns-- get XTableColumns

do i=1 to 5                           -- 0-based, hence columns # 2 (B) through # 6 (F)
   xCol=xCols~getByIndex(i)           -- fetch xCol
   props=xCol~XPropertySet            -- get access to its properties
   oldWidth=props~getPropertyValue("Width")  -- get current value
   newWidth=oldWidth-i*250            -- decrease by i*0.250 cm
   props~setPropertyValue("Width", box("int",newWidth))  -- set new Width
   text="oldWidth="oldWidth", newWidth="newWidth  -- create info text
   xSheet~getCellByPosition(i,i)~setFormula(text) -- set cell to info text
end

::requires UNO.CLS                    -- get UNO support
```

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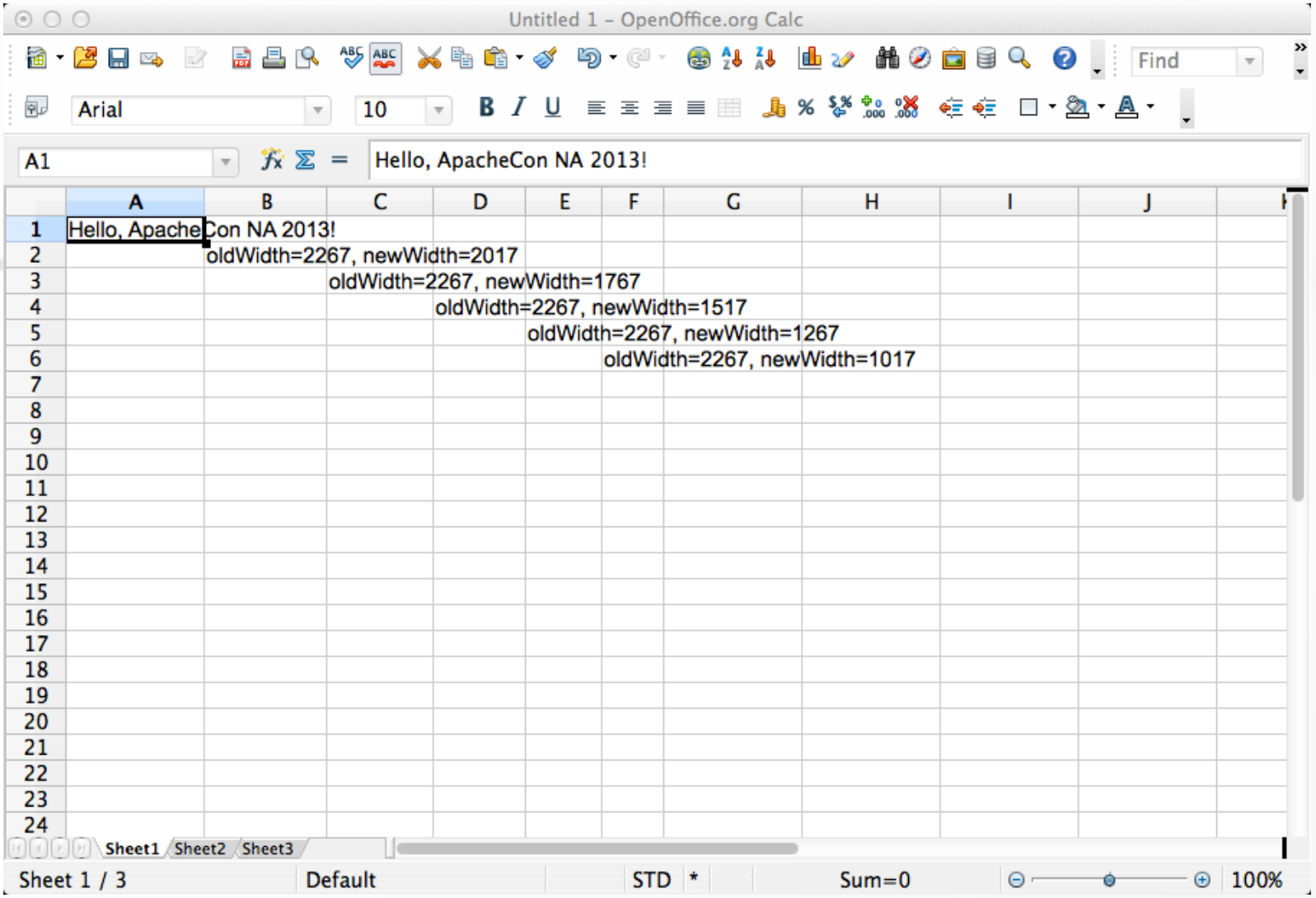
Nutshell examples Spreadsheet, Example 3/3



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Nutshell examples Spreadsheet, Example 4/1

- Example 4
  - Create a spreadsheet document
  - Add text and a date
  - Demonstrate how to format individual cells and a cell range

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Nutshell examples Spreadsheet, Example 4/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/scalc"           -- new scalc document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xSheets=doc~XSpreadSheetDocument~getSheets~XIndexAccess
xSheet =xSheets~getByIndex(0)~XSpreadSheet   -- get first spreadsheet

call uno.setCell xSheet, 0, 0, "Name:"       -- cell "A1"
call uno.setCell xSheet, "B1", "John Doe"    -- cell "B1"
call uno.setCell xSheet, "A2", "Date:"       -- cell "A2"
call uno.setCell xSheet, 1, 1, "=TODAY()"    -- cell "B2"
   -- format individual cells
xCellA2=xSheet~getCellByPosition(1, 0)       -- get access to cell "B1"
cbc=box("int", "CF E7 F5"x ~c2d)             -- define a RGB color
xCellA2~XPropertySet~setPropertyValue("CellBackColor", cbc) -- set color

xCellB1=xSheet~getCellByPosition(1, 1)       -- get access to cell "B2"
cc=box("int", "c5 00 0b"x ~c2d)              -- define a RGB color
props=xCellB1~XPropertySet
props~setPropertyValue("CharColor", cc)      -- set color
fontWeight=.uno_constants~new("com.sun.star.awt.FontWeight")
props~setPropertyValue("CharWeight", fontWeight~semiBold)

   -- format using the properties of a XCellRange for "A1:A2"
props=xSheet~XCellRange~getCellRangeByName("A1:A2")~XPropertySet
props~setPropertyValue("CharWeight", fontWeight~bold)

::requires UNO.CLS                    -- get UNO support
```

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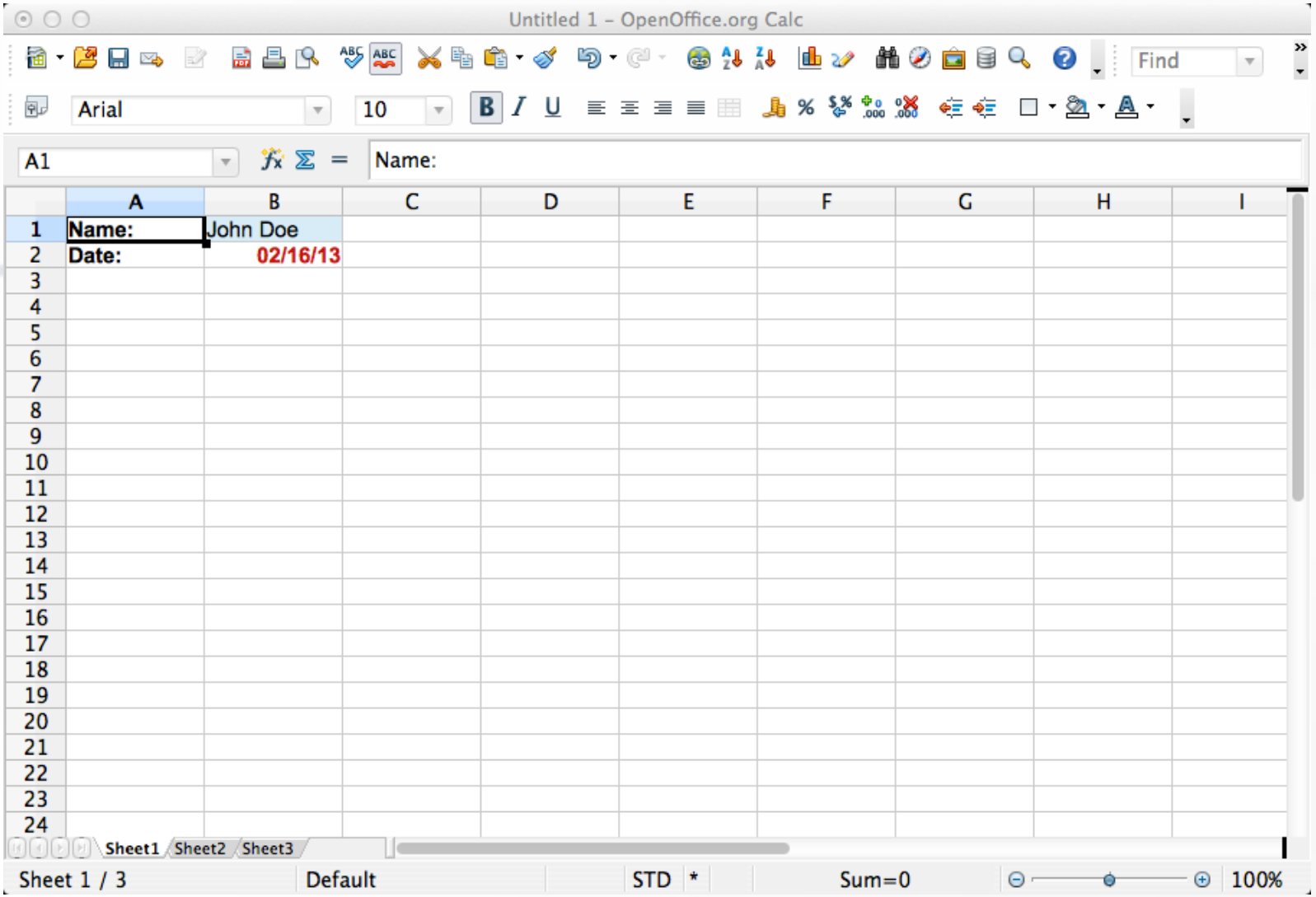
Nutshell examples Spreadsheet, Example 4/3



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Nutshell examples Spreadsheet, Example 5/1

- Example 5
  - Create a spreadsheet document
  - Generate data for four quarters for 2011 and 2012
    - Format column headings
    - Format numbers
  - Create a chart from the generated data

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Nutshell examples Spreadsheet, Example 5/2a

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/scalc"           -- new scalc document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xSheets=doc~XSpreadSheetDocument~getSheets~XIndexAccess
xSheet =xSheets~getByIndex(0)~XSpreadSheet   -- get first spreadsheet

call uno.setCell xSheet, "A1", "Quarter"
call uno.setCell xSheet, "B1", "2011"
call uno.setCell xSheet, "C1", "2012"
do i=1 to 4
   call uno.setCell xSheet, 0, i, "Q"i
   call uno.setCell xSheet, 1, i, random(0,5000)
   call uno.setCell xSheet, 2, i, random(0,5000)
end

props=xSheet~XCellRange~getCellRangeByName("A1:C1")~XPropertySet  -- column headings
fontWeight=.uno_constants~new("com.sun.star.awt.FontWeight")
props~setPropertyValue("CharWeight", fontWeight~bold)

props=xSheet~XCellRange~getCellRangeByName("B2:C5")~XPropertySet  -- format numbers
props~setPropertyValue("NumberFormat", 4) -- predefined style, format: "#,##0.00"

--> … code to create a chart on next slide …

::requires UNO.CLS                    -- get UNO support
```

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Nutshell examples Spreadsheet, Example 5/2b

```
 --> … continued from previous slide: create a chart …

structRect = .bsf~new("com.sun.star.awt.Rectangle")  -- position & size of chart
structRect~X      =   300           -- x-offset:  0.300 cm
structRect~Y      =  2250           -- y-offset:  2.250 cm
structRect~Width  = 16000           -- width:    16.000 cm
structRect~Height =  8000           -- height:    8.000 cm

xRange=xSheet~XCellRange ~getCellRangeByName("A1:C5")    -- data to be used for chart
rangeAddr = xRange~XCellRangeAddressable~getRangeAddress
arrAddr=bsf.createArrayOf(rangeAddr~getClass, rangeAddr) -- create array

xTableCharts = xSheet~XTableChartsSupplier~getCharts  -- get Chart collection & insert
xTableCharts~addNewByName("FirstChart", structRect, arrAddr, .true, .true)

::requires UNO.CLS                  -- get UNO support
```

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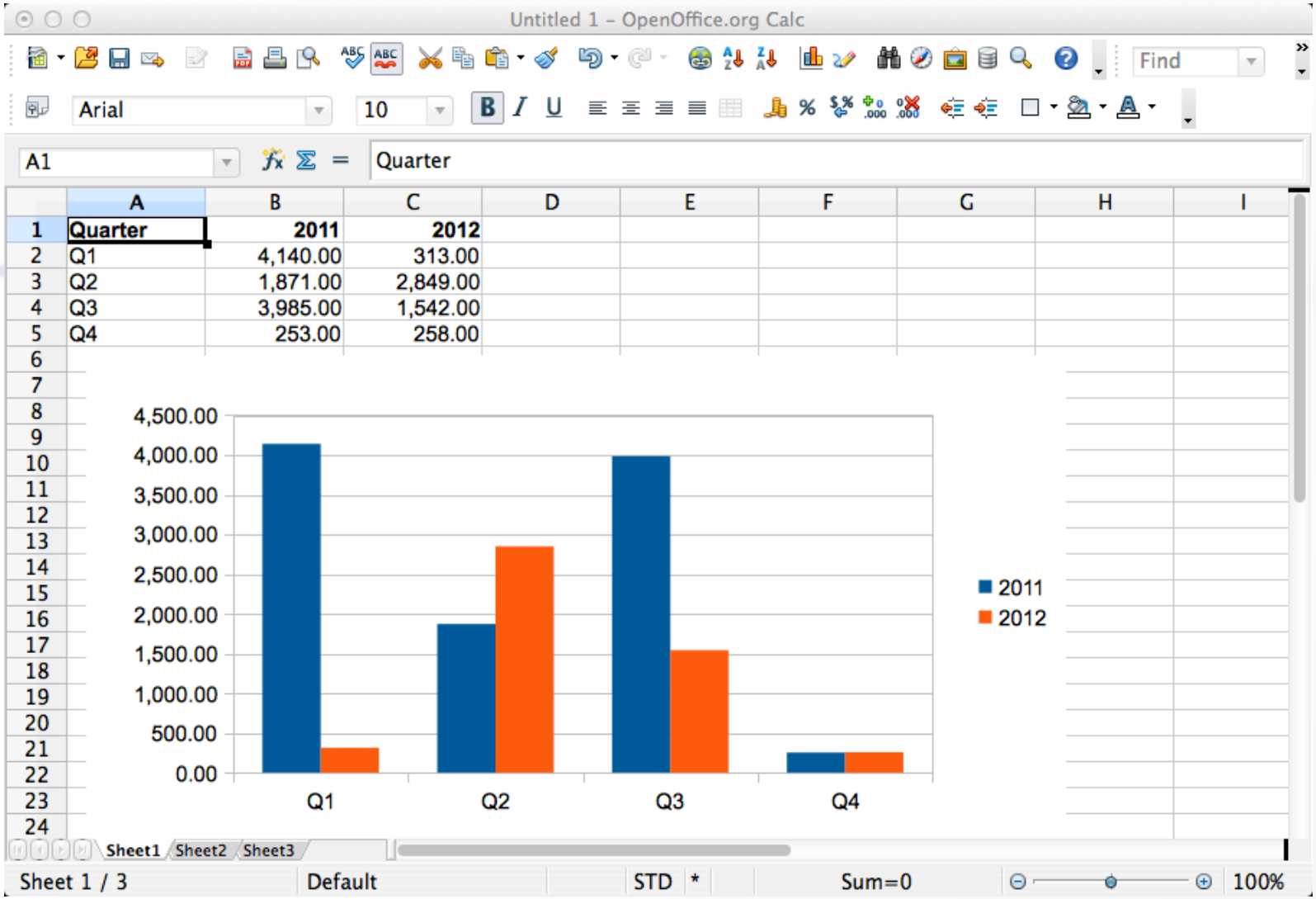
Nutshell examples Spreadsheet, Example 5/3



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Nutshell examples Drawing (“sdraw”), 1

- 4 Services

  DrawingDocument (com.sun.star.drawing.DrawingDocument),
  DrawingDocumentFactory (com.sun.star.drawing.DrawingDocumentFactory),
  GenericDrawingDocument (com.sun.star.drawing.GenericDrawingDocument),
  OfficeDocument (com.sun.star.document.OfficeDocument)

- 20 Interfaces (unqualified)

  XDocumentEventBroadcaster, XDocumentInfoSupplier,
  XDocumentPropertiesSupplier, XDrawPageDuplicator, XDrawPagesSupplier,
  XEmbeddedScripts, XEventBroadcaster, XEventsSupplier, XLayerSupplier,
  XMasterPagesSupplier, XModel, XModifiable, XMultiServiceFactory,
  XPrintJobBroadcaster, XPrintable, XPropertySet, XStorable,
  XStyleFamiliesSupplier, XUndoManagerSupplier, XViewDataSupplier

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Nutshell examples Drawing (“sdraw”), 2

- 12 Properties

  ApplyFormDesignMode, AutomaticControlFocus, BasicLibraries, BuildId, CharLocale, DialogLibraries, ForbiddenCharacters, HasValidSignatures, MapUnit, RuntimeUID, TabStop, VisibleArea

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Nutshell examples Drawing (“sdraw”), 3

- A collection of draw pages
- Each draw page
  - Allows any kind of drawing
  - Allows animation effects to be applied
- The draw concepts are fully reused for presentation documents!

Nutshell examples Drawing, Example 1/1

- Example 1
  - Create a drawing document
  - Fetch the drawing component's service manager
    - Used to create shapes that can be stored with the document
  - Create and draw a rectangular shape, add it to the document
    - Set the shape's text to “Hello, ApacheCon NA 2013!”
    - Break up the text such that it fits into the rectangle

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Nutshell examples Drawing, Example 1/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/sdraw"           -- new sdraw document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xsf=doc~XMultiServiceFactory          -- get the service manager (factory)
   -- get access to the first draw page
xDrawPage = doc~XDrawPagesSupplier~getDrawPages~getByIndex(0)~XDrawPage

   -- create a Rectangle shape and determine its position and size, add it to the page
xShape=xsf~createInstance("com.sun.star.drawing.RectangleShape") ~XShape
xShape~setPosition(.bsf~new("com.sun.star.awt.Point", 3000, 3000))
xShape~setSize(.bsf~new("com.sun.star.awt.Size", 5000, 2500))
xDrawPage~add(xShape)                 -- add new shape to first draw page

cr="0d"x                              -- ASCII carriage return char
xShape~XText~setString("Hello,"cr"ApacheCon NA"cr"2013!")  -- now set string

::requires UNO.CLS                    -- get UNO support
```

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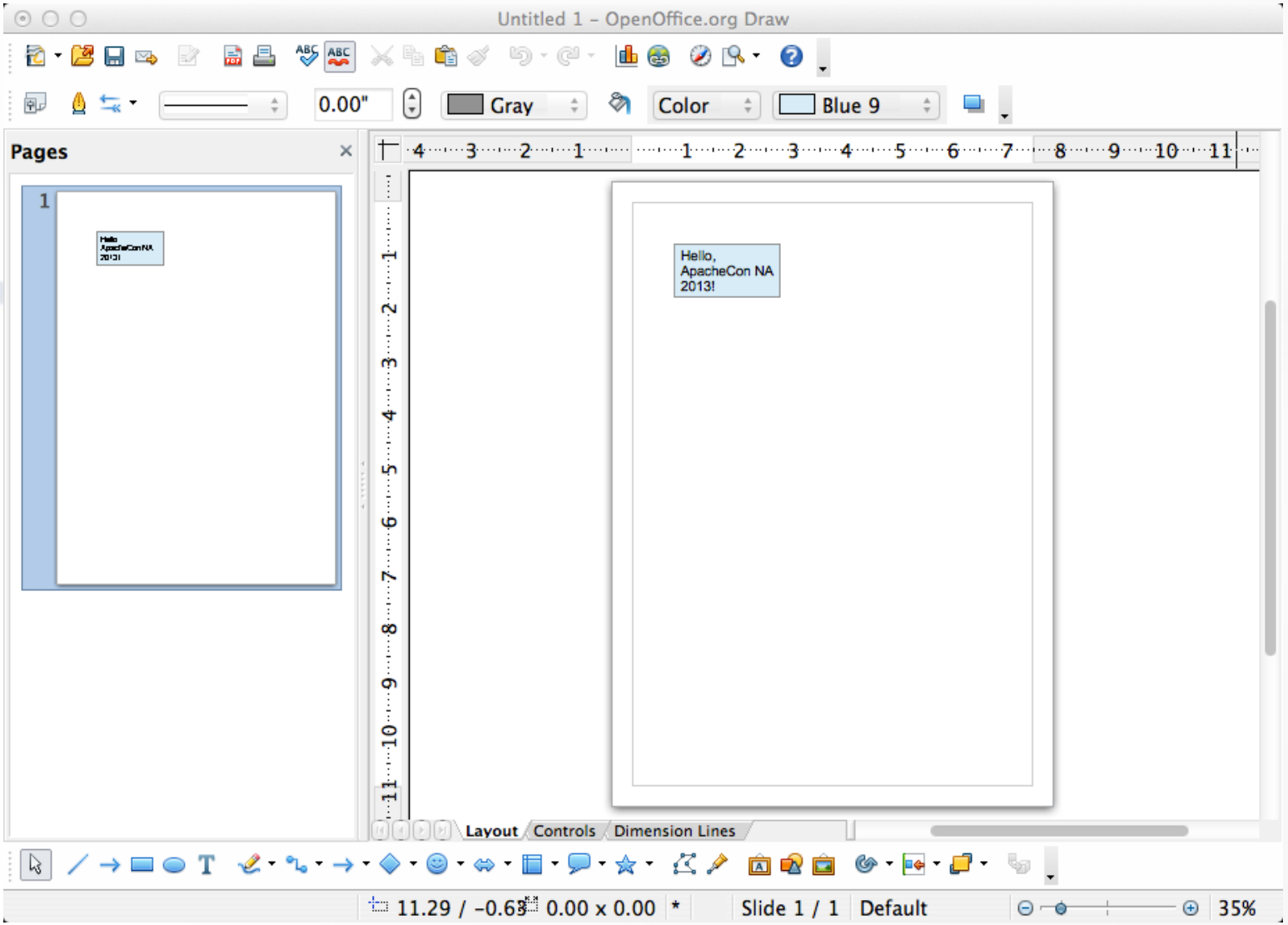
Nutshell examples Drawing, Example 1/3



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Nutshell examples Presentation (“simpress”), 1

- 4 Services

  DrawingDocumentFactory (com.sun.star.drawing.DrawingDocumentFactory), GenericDrawingDocument (com.sun.star.drawing.GenericDrawingDocument), OfficeDocument (com.sun.star.document.OfficeDocument), PresentationDocument (com.sun.star.presentation.PresentationDocument)

- 23 Interfaces (unqualified)

  XCustomPresentationSupplier, XDocumentEventBroadcaster, XDocumentInfoSupplier, XDocumentPropertiesSupplier, XDrawPageDuplicator, XDrawPagesSupplier, XEmbeddedScripts, XEventBroadcaster, XEventsSupplier, XLayerSupplier, XLinkTargetSupplier, XMasterPagesSupplier, XModel, XModifiable, XMultiServiceFactory, XPresentationSupplier, XPrintJobBroadcaster, XPrintable, XPropertySet, XStorable, XStyleFamiliesSupplier, XUndoManagerSupplier, XViewDataSupplier

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Nutshell examples Presentation (“simpress”), 2

- 12 Properties

  ApplyFormDesignMode, AutomaticControlFocus, BasicLibraries, BuildId, CharLocale, DialogLibraries, ForbiddenCharacters, HasValidSignatures, MapUnit, RuntimeUID, TabStop, VisibleArea

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Nutshell examples Presentation ("simpress"), 3

- A collection of draw pages
- Each draw page
  - Allows any kind of drawing
  - Allows animation effects to be applied
- Concept of "Master Pages"
  - Allows definition of specific layouts
- Layouts for title, listings, charts, etc.
- Presentation mode

Nutshell examples Presentation, Example 1/1

- Example 1
  - Create a presentation document
  - Fetch its component's service manager
    - Used to create shapes that can be stored with the document
  - Create and draw a rectangular shape, add it to the document
    - Set the shape's text to “Hello, ApacheCon NA 2013!”
    - Break up the text such that it fits into the rectangle
  - Except for URL, the same code as for “sdraw”!

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Nutshell examples Presentation, Example 1/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/simpress"        -- new simpress document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xsf=doc~XMultiServiceFactory          -- get the service manager (factory)
   -- get access to the first draw page
xDrawPage = doc~XDrawPagesSupplier~getDrawPages~getByIndex(0)~XDrawPage

   -- create a Rectangle shape and determine its position and size
xShape=xsf~createInstance("com.sun.star.drawing.RectangleShape") ~XShape
xShape~setPosition(.bsf~new("com.sun.star.awt.Point", 3000, 3000))
xShape~setSize(.bsf~new("com.sun.star.awt.Size", 5000, 2500))

xDrawPage~add(xShape)                 -- add new shape to first draw page
cr="0d"x                              -- ASCII carriage return char
xShape~XText~setString("Hello,"cr"ApacheCon NA"cr"2013!")  -- now set string

::requires UNO.CLS                    -- get UNO support
```

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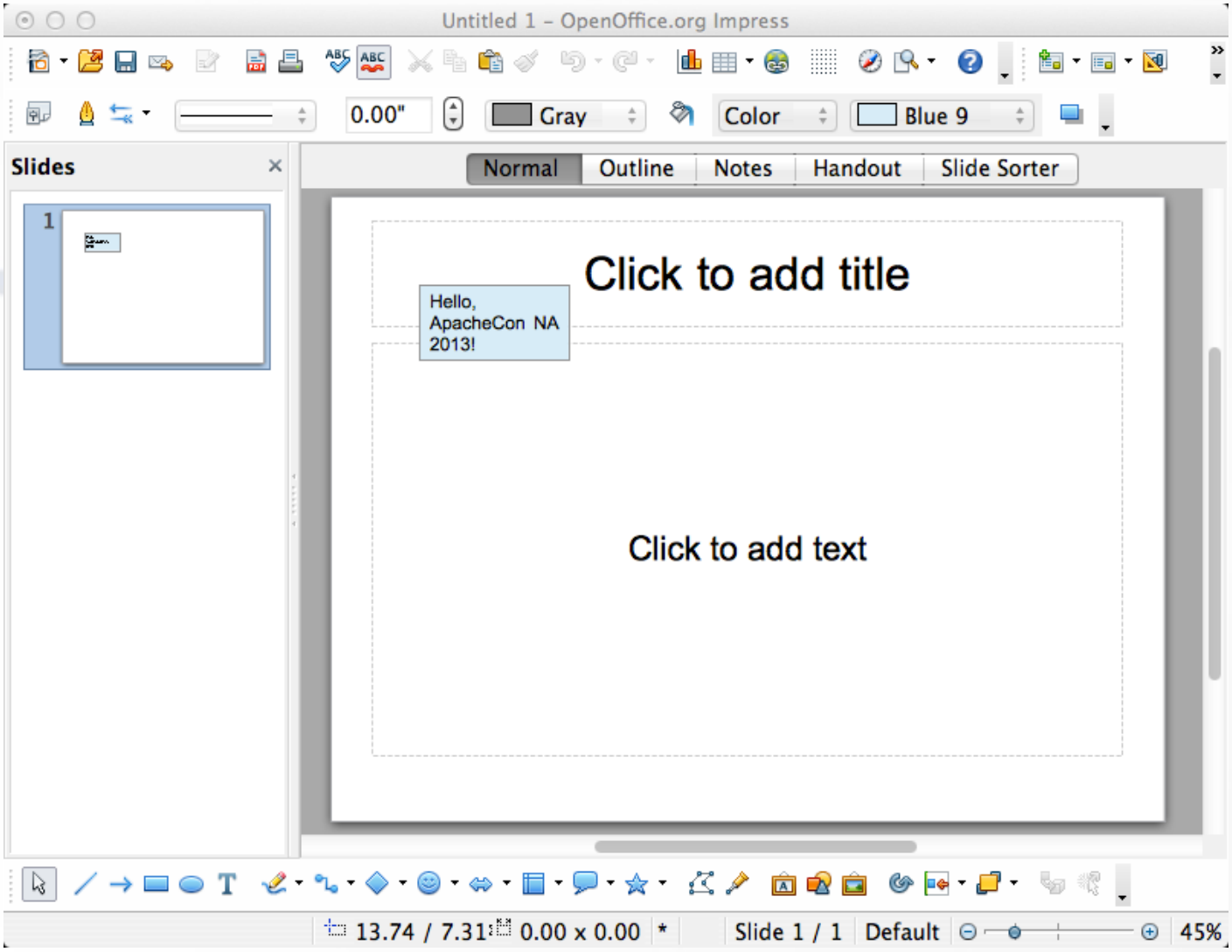
Nutshell examples Presentation, Example 1/3



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Nutshell examples Presentation, Example 2/1

- Example 2
  - Create a presentation document
  - Create two pages with different layouts
    - One “Title Slide” page, layout number: 0
    - One “Title, Content” page, layout number: 1
  - Start the presentation at the end

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Nutshell examples Presentation, Example 2/2

```
xDesktop=uno.createDesktop()          -- bootstrap & get access to XDesktop
xcl=xDesktop~XComponentLoader         -- get XComponentLoader interface

uri="private:factory/simpress"        -- new simpress document
doc=xcl~loadComponentFromURL(uri,"_blank",0,.uno~noProps)

xDrawPages = doc~XDrawPagesSupplier~getDrawPages   -- get DrawPages

xDrawPage=xDrawPages~getByIndex(0)  -- get first (empty) page
xDrawPage~XPropertySet~setPropertyValue("Layout", box("short",0))  -- "Title Slide"
xShapes=xDrawPage~XShapes             -- get access to its shapes
xShapes~getByIndex(0)~XText~setString("ApacheCon NA 2013")
xShapes~getByIndex(1)~XText~setString("Scripting Apache OpenOffice")

xDrawPage=xDrawPages~~insertNewByIndex(1)~getByIndex(1) -- insert at end, get access
xDrawPage~XPropertySet~setPropertyValue("Layout", box("short",1))  -- "Title Content"
xShapes=xDrawPage~XShapes             -- get access to its shapes
xShapes~getByIndex(0)~XText~setString("Scripting Apache OpenOffice")

lf="0a"x                              -- define line-feed character
tab="09"x                             -- define tabulator character
str="First" lf"Second" lf tab "Second, 1" lf tab "Second, 2" lf"Third"
xShapes~getByIndex(1)~XText~setString(str)

doc~XPresentationSupplier~getPresentation~~bsf.dispatch("start")  -- start presentation

::requires UNO.CLS                    -- get UNO support
```

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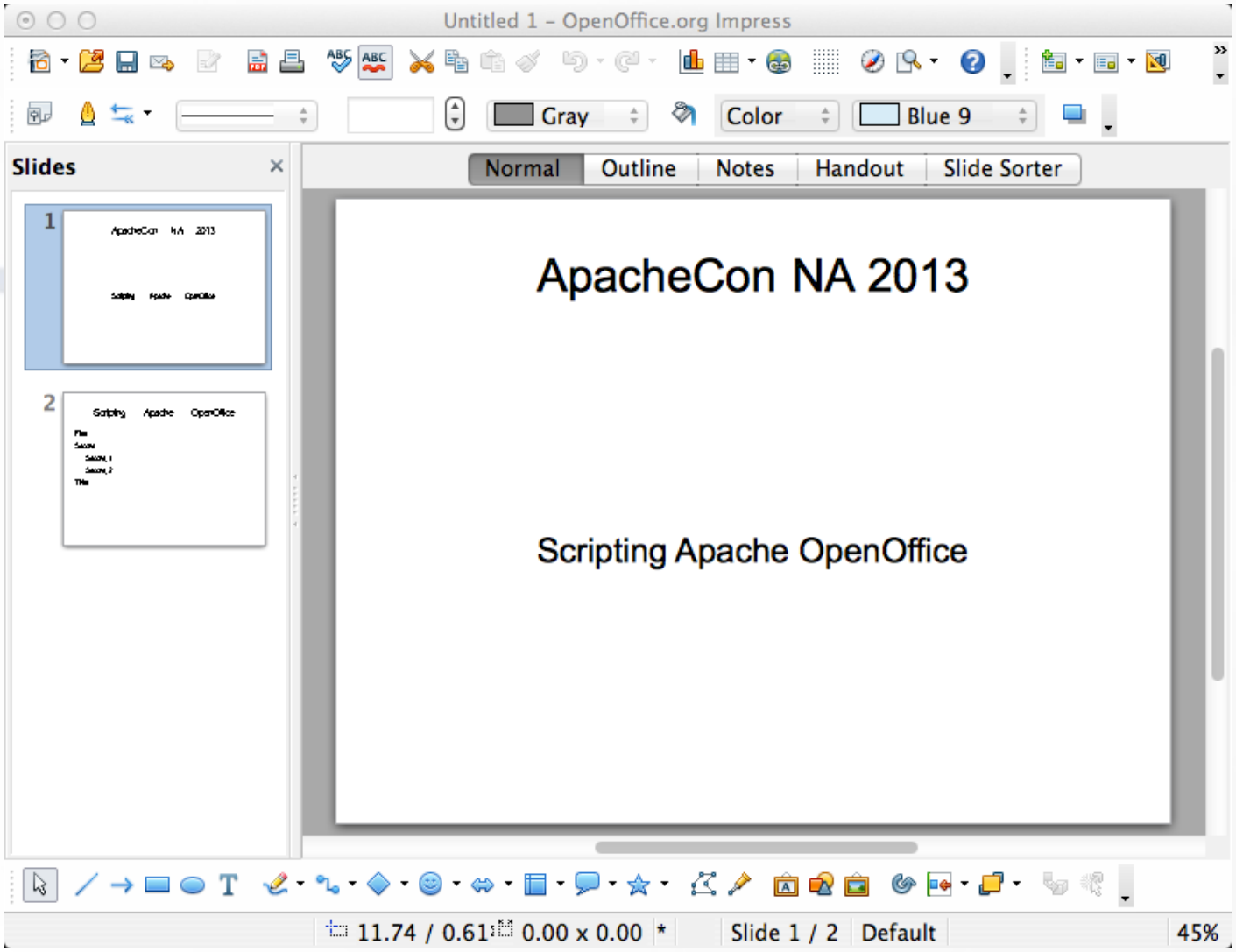
Nutshell examples Presentation, Example 2/3a



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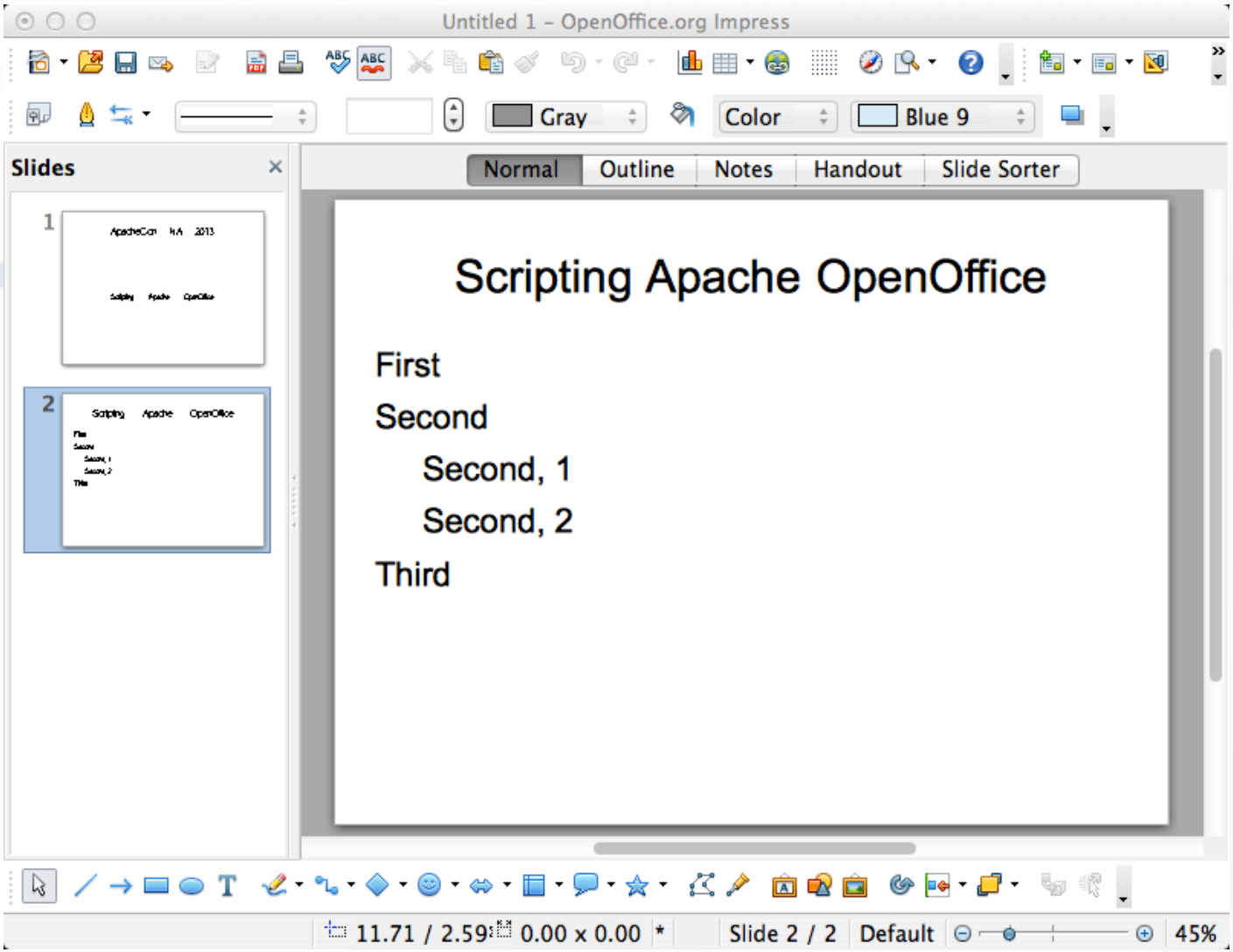
Nutshell examples Presentation, Example 2/3b



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Nutshell examples Presentation, Example 3/1

- Example 3
  - Create a presentation document
  - Create two pages with different layouts
    - One “Title Slide” page, layout number: 0
    - One “Title, Content” page, layout number: 1
      - Use AOO's impress outline levels!
      - Kudos to Christoph Jopp, who found the property to use!
  - Start the presentation at the end

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Nutshell examples Presentation, Example 3/2

```
...
xText=xShapes~getByIndex(1)~XText    -- content's XText
call addItem xText, "First",            0  -- add string, determine level
call addItem xText, "Explored by many", 0
call addItem xText, "Kudos! go to",     1
call addItem xText, "Christoph Jopp!",  1
call addItem xText, "On 2012-11-07",    0, .false
...

::routine addItem                       -- adds string at the given (0-based outline) level
  use arg xText, string, level, bNewParagraph=.true

  xTR=xText~XTextRange~getEnd           -- get end, a XTextRange
  xTR~XPropertySet~setPropertyValue("NumberingLevel",level) -- set XTextRange level
  xTR~setString(string)                 -- set string

  if bNewParagraph=.true then           -- add new paragraph
     xTR~getEnd~setString("0a"x)        -- add linefeed character -> new paragraph

::routine dumpItems                     -- show level and string from XText
  use arg xText

  enum=xText~XEnumerationAccess~createEnumeration -- enumerate paragraphs
  do i=1 while enum~hasMoreElements
    xtr=enum~nextElement~XTextRange -- we need XTextRange's string & properties

    nl=xtr~XPropertySet~getPropertyValue("NumberingLevel")
    say "     item #" i": NumberingLevel="pp(nl) pp(xtr~getString)
  end
```

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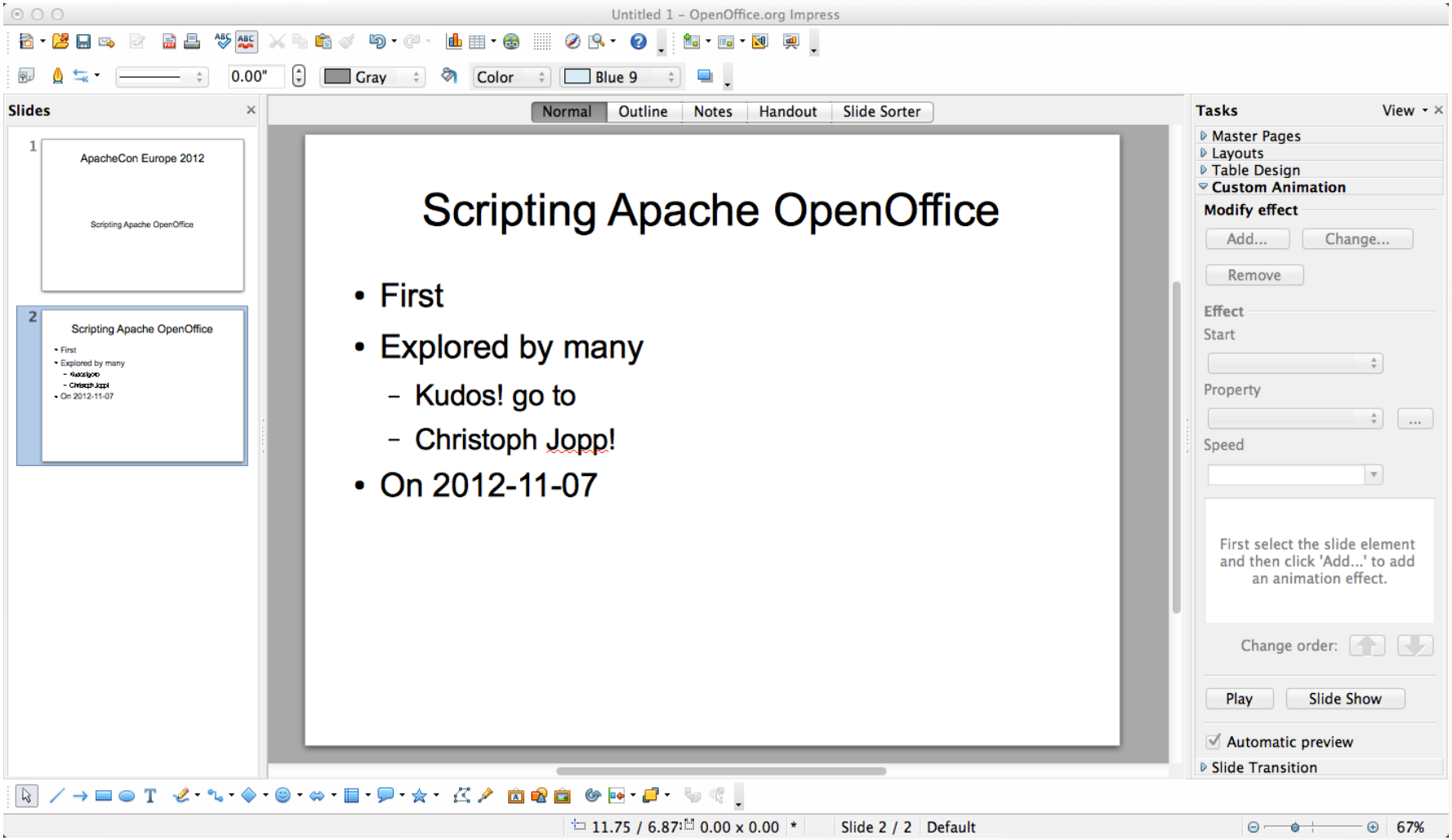
Nutshell examples Presentation, Example 2/3



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Nutshell examples URE (UNO Runtime Environment)

- There are UNO types that can be used independently of the AOO GUI! E.g.
  - "com.sun.star.lang.Locale"
  - "com.sun.star.linguistic2.LinguServiceManager"
- Can therefore be used by/incorporated into any other application!
- Need to bootstrap and connect to the UNO runtime environment (URE)
  - Fetch its service manager
  - Instantiate services
    - Use services, request their interfaces

Nutshell examples URE, Spellchecker Example 1/1

- Example “Spellchecker”
  - Create a connection to URE
  - Get its service manager
    - Used to create the spellchecker service via "com.sun.star.linguistic2.LinguServiceManager"
  - Use all locales available to the spellchecker
    - In this example: some English locales
  - Spellcheck the word “thru” with the different English locales
    - If not correct, list the alternatives of the locale

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Nutshell examples
URE, Spell Checker Example 1/2

```
xContext = UNO.connect()              -- bootstrap and connect to URE
xSM = xContext~getServiceManager      -- get the service manager

serviceName="com.sun.star.linguistic2.LinguServiceManager"
lsm=xsm~createInstanceWithContext(serviceName, xContext) -- create the service
xSpellChecker = lsm~XLinguServiceManager~getSpellChecker -- get the spell checker
locales=xSpellChecker~XSupportedLocales~getLocales       -- get all supported locales

word="thru"                           -- word to spellcheck
do locale over locales                -- iterate over all available Locales
   str=locale~language"/"locale~country"/"locale~variant "-> word:" pp(word)":"
   ok=xSpellChecker~isValid(word, locale, .UNO~noProps)  -- check word
   if ok then str=str "correct"
         else str=str "NOT correct! Available alternatives:"
   say str

   if \ok then                        -- not correct, get & show alternatives
   do
      alternatives=xSpellChecker~spell(word, locale, .UNO~noProps)
      if alternatives <> .nil then
      do
         do a over alternatives~getAlternatives
             say "0909"x pp(a)
         end
      end
   end
end

::requires UNO.CLS                    -- get UNO support
```

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Nutshell examples
URE, Spell Checker Example 1/3

```
E:\2013\ApacheConNA\vortrag\code>rexx spellcheck1.rxo
en/US/ -> word: [thru]: correct
en/GB/ -> word: [thru]: NOT correct! Available alternatives:
                [thrum]
                [thou]
                [thrush]
                [thrust]
                [Thur]
                [truth]
                [three]
                [threw]
en/AU/ -> word: [thru]: NOT correct! Available alternatives:
                [threw]
                [throe]
                [through]
                [thrum]
                [thou]
en/CA/ -> word: [thru]: correct
en/NZ/ -> word: [thru]: NOT correct! Available alternatives:
                [through]
                [thrum]
                [thou]
en/ZA/ -> word: [thru]: NOT correct! Available alternatives:
                [thrum]
                [thou]
                [thrush]
                [thrust]
                [Thur]
                [truth]
                [through]
                [three]
```

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Roundup

- UNO
- Very Powerful
  - Complex
  - Documentation, examples very important
- Creating, editing AOO documents
  - swriter, scalc, sdraw, simpress
- URE
- Need for many more nutshell examples in all programming languages!

Links to ooRexx/BSF4ooRexx

- ooRexx (as of 2013-02-15, version: 4.1.2)
  - An easy to learn and easy to use scripting language
    - Compatible to ("classic") Rexx
    - Developped originally by IBM ("Object REXX")
  - Source code was received by the non-for-profit SIG "Rexx Language Association (http://www.RexxLA.org)"
    - Opensourced as "Open Object Rexx (ooRexx)"
  - Home: http://www.ooRexx.org
  - Downloads: http://sourceforge.net/projects/oorexx/files/oorexx/
  - Brief overview (since opensourcing a lot got added): http://wi.wu.ac.at/rgf/rexx/misc/ecoop06/ECOOP2006_RDL_Workshop_Flatscher_Paper.pdf
  - Authoring a brand new book that introduces ooRexx: http://www.RonyRexx.at

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Links to ooRexx/BSF4ooRexx

- BSF4ooRexx (with built-in AOO/LO support)
  - Allows to use all of Java from ooRexx as if it was an interpreted, typeless and caseless language!
    - "Camouflaging Java as ooRexx" (package "BSF.CLS")
      - All Java classes and Java objects look like ooRexx' ones!
    - Includes specific AOO support (package "UNO.CLS")
  - Developed since 2000 to allow the creation of platform independent Rexx and ooRexx scripts
    - Using Apache's "Bean Scripting Framework (BSF)", cf. http://commons.apache.org/bsf/
  - Home: http://sourceforge.net/projects/bsf4oorexx/
  - Downloads: http://sourceforge.net/projects/bsf4oorexx/files/GA/