

WebTransfer: Access SOAP Web Service

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Overview

The APLNext WebTransfer product can be used to access an industry-standard web service. WebTransfer is exposed as an ActiveX component so it can be used by APL+Win or APL64. Contact sales@apl2000.com for more information about licensing WebTransfer

A [SOAP](#) web service exposes a [WSDL](#) which documents the web service location and available methods.

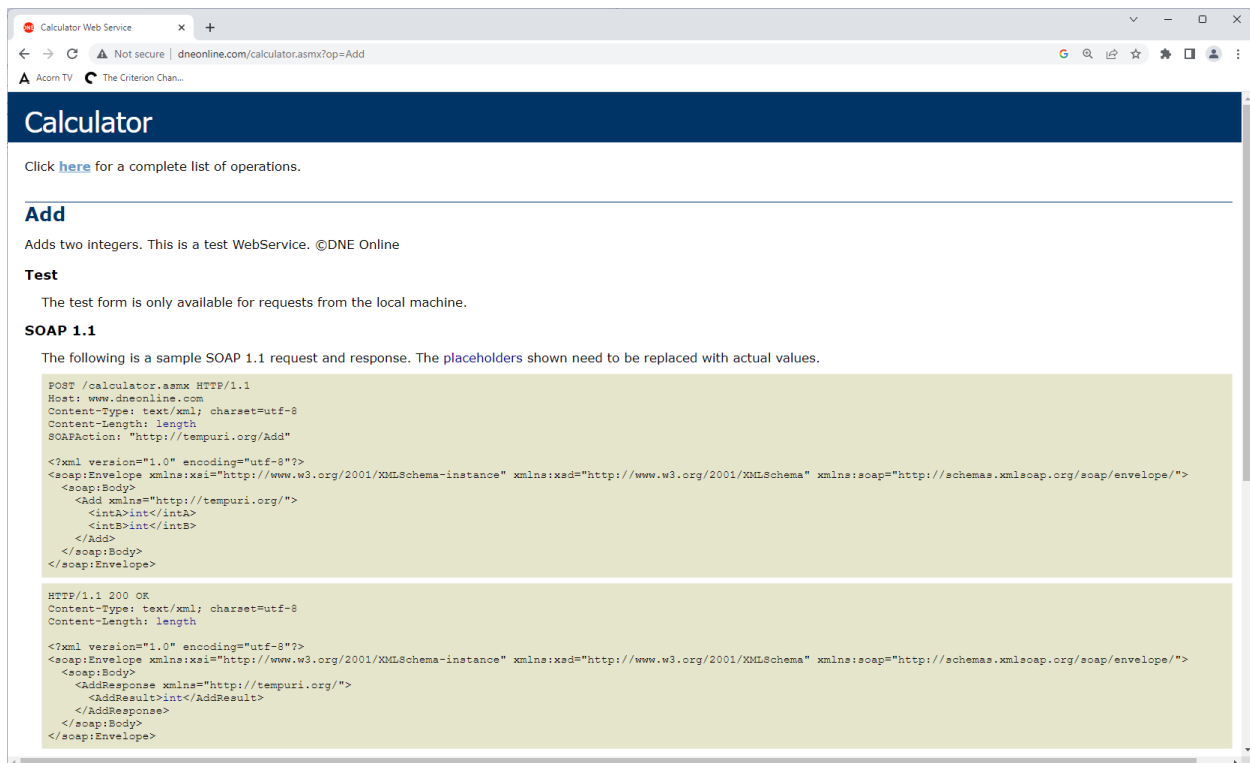
Requests made to a SOAP web service and responses received from a SOAP service are xml-format text which enclose the web service-specific information in a [SOAP envelope](#).

For purposes of this document a public example SOAP web service is used:

<http://www.dneonline.com/calculator.asmx>

Determining the Request and Response Format

If the SOAP web service exposes a WSDL, a web browser can display the request and response formats:



APL User Defined Function to Access the SOAP Web Service

The example APL function has remarks describing each operation necessary to access the example SOAP web service.

```
res←SoapExample intArgs;res;intArgA;intArgB;request;soapBody;wt
```

⌈ APLNextLLC 20230218

⌈ intArgs: 2-element Int32 vector

⌈ res : xml-format response from the sample Soap web service

⌈ which calculates the sum of intArgs

⌈ The format of the web request and response is obtained by browsing to

http://www.dneonline.com/calculator.asmx

⌈ and viewing the WSDL (web service definition language) information for the sample web service

```
wt←'wt' □ wi 'Create' 'APLNext.WebTransfer'
```

⌈ APLNext.WebTransfer is an APLNextLLC product which exposes an ActiveX interface

⌈ to access industry-standard web services

```
res←wt □ wi 'XOpen' 'http://www.dneonline.com/calculator.asmx'
```

⌈ Open a 'channel' to the sample Soap web service with url:

```
http://www.dneonline.com/calculator.asmx
```

⌈ res is a 2-element APL vector:

⌈ 1st element: 0/OK errCode/Exception

⌈ 2nd element: "/OK errMsg/Exception

```
:if 0≠1⊃res
```

```
□←'Unable to open url: ',2⊃res
```

```

:return
:endif

intArgA←1⊃intArgs
intArgB←2⊃intArgs

⌚↓ Prepare the web request
request←'<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:tem="http://tempuri.org/">'
request←request,'<soapenv:Header/>'
request←request,'<soapenv:Body>'

soapBody←'<tem:Add>'
soapBody←soapBody,'<tem:intA>',⌘ intArgA
soapBody←soapBody,'</tem:intA>'
soapBody←soapBody,'<tem:intB>',⌘ intArgB
soapBody←soapBody,'</tem:intB>'
soapBody←soapBody,'</tem:Add>'

request←request,soapBody
request←request,'</soapenv:Body>'
request←request,'</soapenv:Envelope>'
⌚↑ The web request is an xml-format text vector using the industry-standard SOAP protocol

wt ⌘wi 'xcontentType' 'text/xml'
⌚↑ Set the content type of the web request

:TRY
  res←wt ⌘wi 'XSend' '' request
  ⌚↑ path argument of XSend is not set because the only the base url is required
  ⌚↑ Send the web request to the sample web service and obtain the response
  ⌚ The response is a 2-element APL vector:
  ⌚ 1st element: 0/OK errorCode/Exception
  ⌚ 2nd element: xml-format text vector using the industry-standard SOAP protocol
  :IF 0≠1⊃res
    ⌘←'Web request failed with exception: ',2⊃res
  :ELSE
    res←2⊃res
  :ENDIF
:CATCHALL
  ⌘←'Web request failed with exception: ',⌘EM
:FINALLY
  wt ⌘wi 'Delete'
:ENDTRY
⌚ Once the response is received, the APL+Win programmer must parse the xml-format response to
⌚ determine the computed value or the web server exception message
⌚ Tools available in APL+Win to parse xml-format text are:

```

⌚ (a) Microsoft ActiveX XML document object model: <http://msdn.microsoft.com/en-us/library/aa468547.aspx>.

⌚ (b) APL+Win user-provided tools: <http://forum.apl2000.com/viewtopic.php?t=43>.

⌚ If this function is run in APL64 the creation of request xml and the parsing of the response xml can be

⌚ be done using the APL64 ☐XML system function:

⌚ Parsing of the response xml using APL64 ☐XML system function:

⌚ 'keyXElt' ☐XML 'EltParse' res 1

⌚ ↑ Parse the response text into a .Net XElement object

⌚ ☐DR ☐←☐XML 'NDescendants' 'keyXElt' 'AddResult' 'http://tempuri.org/'

⌚ ↑ Determine the number of XElement descendants with name 'AddResult' associated with the XNamespace 'http://tempuri.org/'

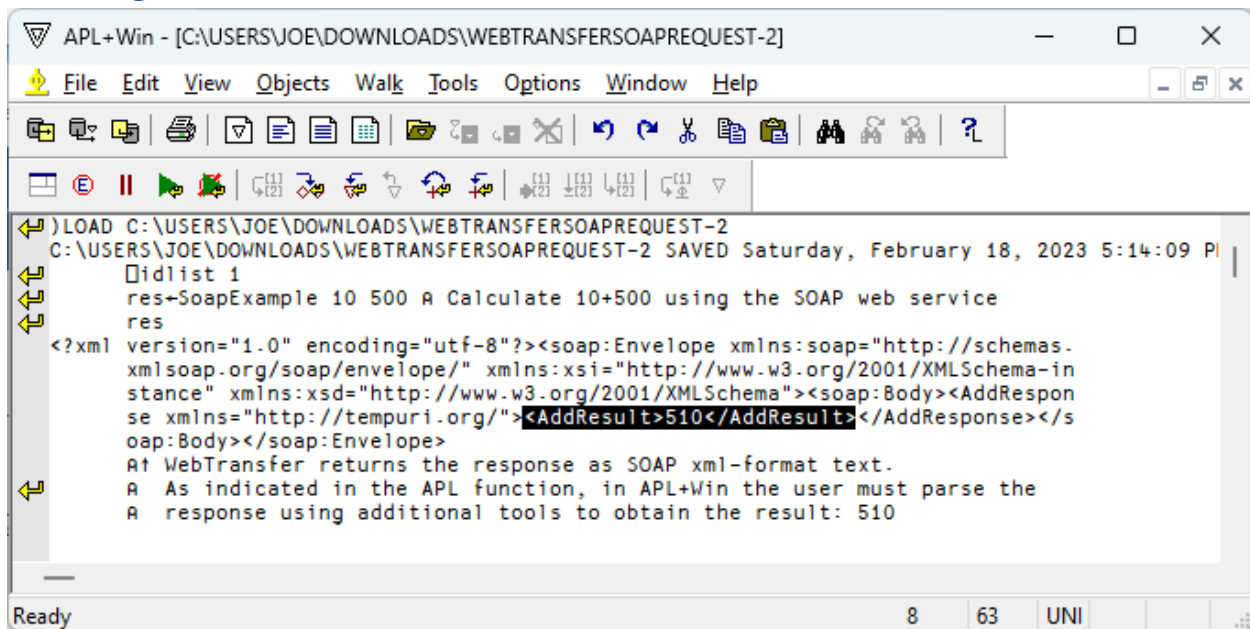
⌚ 'keyXEltDesc' ☐XML 'Descendant' 'keyXElt' 'AddResult' 'http://tempuri.org/' 0

⌚ ↑ Obtain the 0th (index origin 0) XElement descendant

⌚ ☐DR ☐←☐XML 'EltGetVal' 'keyXEltDesc' 1

⌚ ↑ Obtain the XElement descendant's name and datatype-parsed value

Running the APL Function in APL+Win



The screenshot shows the APL+Win application window with the title bar "APL+Win - [C:\USERS\JOE\DOWNLOADS\WEBTRANSFERSOAPREQUEST-2]". The menu bar includes File, Edit, View, Objects, Walk, Tools, Options, Window, and Help. The toolbar contains various icons for file operations and execution. The main text area displays the following content:

```
)LOAD C:\USERS\JOE\DOWNLOADS\WEBTRANSFERSOAPREQUEST-2
C:\USERS\JOE\DOWNLOADS\WEBTRANSFERSOAPREQUEST-2 SAVED Saturday, February 18, 2023 5:14:09 PM
  ⍺idlist 1
  res←SoapExample 10 500 A Calculate 10+500 using the SOAP web service
  res
  <?xml version="1.0" encoding="utf-8"?><soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><AddResponse xmlns="http://tempuri.org/"><AddResult>510</AddResult></AddResponse></soap:Body></soap:Envelope>
  A⍤ WebTransfer returns the response as SOAP xml-format text.
  A As indicated in the APL function, in APL+Win the user must parse the
  A response using additional tools to obtain the result: 510
```

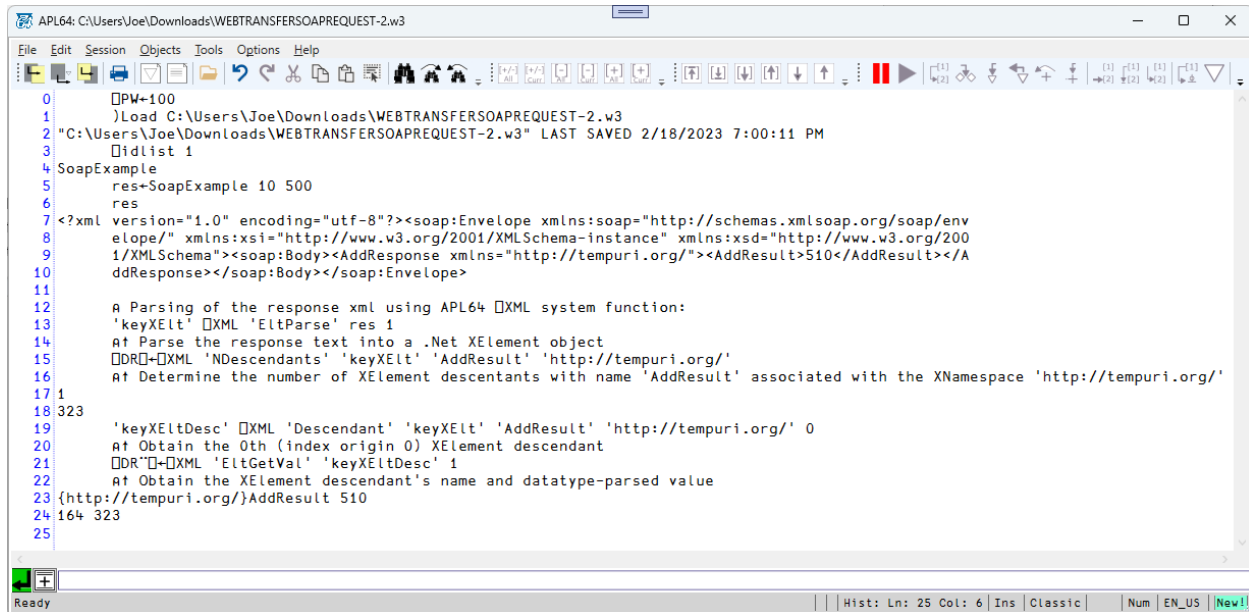
The status bar at the bottom shows "Ready", "8", "63", and "UNI".

In APL+Win the SOAP web service response is an xml-format text vector. The APL+Win programmer must parse xml-format text using additional tools available here:

- Microsoft ActiveX XML document object model: <http://msdn.microsoft.com/en-us/library/aa468547.aspx>.
- APL+Win user-provided tools: <http://forum.apl2000.com/viewtopic.php?t=43>.

Running the APL function in APL64

In APL64 the `⎕XML` system function is available to create the xml-format request and parse the xml-format response to obtain the result. After running the same user-defined APL+Win function in APL64, the parsing of the xml-format result is illustrated using the `⎕XML` system function:



```
APL64: C:\Users\Joe\Downloads\WEBTRANSFERSOAPREQUEST-2.w3
File Edit Session Objects Tools Options Help
0 ⎕PW+100
1 )Load C:\Users\Joe\Downloads\WEBTRANSFERSOAPREQUEST-2.w3
2 "C:\Users\Joe\Downloads\WEBTRANSFERSOAPREQUEST-2.w3" LAST SAVED 2/18/2023 7:00:11 PM
3 ⎕idlist 1
4 SoapExample
5 res=SoapExample 10 500
6 res
7 <?xml version="1.0" encoding="utf-8"?><soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/env
8 elope/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/200
9 1/XMLSchema"><soap:Body><AddResponse xmlns="http://tempuri.org/"><AddResult>510</AddResult></A
10 ddResponse></soap:Body></soap:Envelope>
11
12 A Parsing of the response xml using APL64 ⎕XML system function:
13 'keyXElt' ⎕XML 'EltParse' res 1
14 A Parse the response text into a .Net XElement object
15 ⎕DR⎕⎕XML 'NDescendants' 'keyXElt' 'AddResult' 'http://tempuri.org/'
16 A Determine the number of XElement descendants with name 'AddResult' associated with the XNamespace 'http://tempuri.org/'
17 1
18 323
19 'keyXEltDesc' ⎕XML 'Descendant' 'keyXElt' 'AddResult' 'http://tempuri.org/' 0
20 A Obtain the 0th (index origin 0) XElement descendant
21 ⎕DR⎕⎕XML 'EltGetVal' 'keyXEltDesc' 1
22 A Obtain the XElement descendant's name and datatype-parsed value
23 {http://tempuri.org/}AddResult 510
24 164 323
25
Ready | Hist: Ln: 25 Col: 6 | Ins | Classic | Num | EN_US | New!
```

Tool to Understand a Web Service WSDL

Many software vendors have published software tools to expose detailed information about a SOAP web service. Here is one such software tool:

