

## Welcome to an advanced SPECTO tutorial (rel 1.0)

This tutorial will show how to implement a monitoring chain for a more complex process.

As demonstrator we take GMX ([www.gmx.net](http://www.gmx.net)), a provider of web based emailing.

Why GMX ?

- Because it is available free of charge, and
- its sessions handling, redirection and load balancing make monitoring quite complex so that it is a good example for how to setup a monitoring chain (and of SPECTO's capabilities...).

# Recording of web-Sessions using the SPECTO web recorder

We start with the SPECTO web recorder to record the web session.

The web recorder is an SPECTO auxiliary product for the Windows platform, used to record actions an user performs using a web browser (Internet explorer).

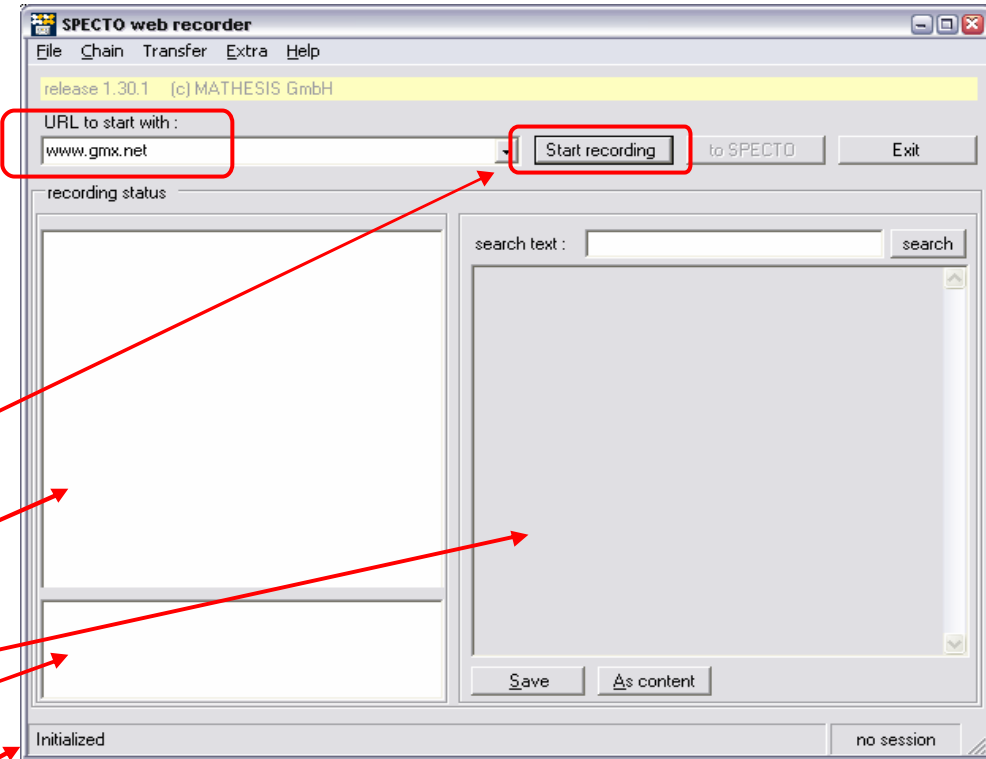
[ You must have installed SPECTO web recorder on your local PC – SPECTO web recorder is part of the SPECTO distribution and may be installed on as many PCs at the customer's location as necessary ]

Launch the web recorder from the Windows menu, enter the URL (www.gmx.net) in the 'URL to start with:' line and press the 'start recording' button.

The recorded web-pages are shown in the URL-frame, and their content (and probable documentation) in the text frame.

The current Internet sessions (= open browsers) are displayed in the session frame.

Note that relevant processing steps are shown in the status line; the full log may be displayed by double-clicking on the status line.



# Recording of web-Sessions using the SPECTO web recorder

A new instance of the Internet explorer is started and points to the entered web site.

In the web recorder's result window a node describing the web site appears.

You can expand the node by selecting the '+' symbol. (Or right-click in the result area and select 'expand all nodes')

Selecting the 'URL result...' sub node displays the HTML code of the recorded page in the content frame of the web recorder.

Also the 'start recording' button is changed to 'stop recording' and allows to stop the recording (closing all browser sessions opened by the recorder), the 'to SPECTO' button is enabled and allows transferring results to the SPECTO engine.

The 'session' frame denotes the number of open browser sessions; the status line shows the last action performed; you may click on it to get the log history in a separate window

The screenshot shows the SPECTO web recorder interface. At the top, there is a menu bar with 'File', 'Chain', 'Transfer', 'Extra', and 'Help'. Below the menu bar, the version 'release 1.30.1' and the user '(c) MATHESIS GmbH' are displayed. The 'URL to start with' field contains 'www.gmx.net'. There are three buttons: 'Stop recording', 'to SPECTO', and 'Exit'. The 'recording status' section shows a tree view with a '+' symbol next to 'URL: http://www.gmx.net/ [0]'. The selected node is 'URL result: (DCRP) HTML-Dokument'. The content frame displays the HTML code of the recorded page, including the title 'GMX - Homepage' and various meta tags. The status bar at the bottom shows 'starting Internet Explorer: Success' and 'active: 1'. A small window in the foreground shows the GMX homepage with a login form and a DSL advertisement.

# Recording of web-Sessions using the SPECTO web recorder

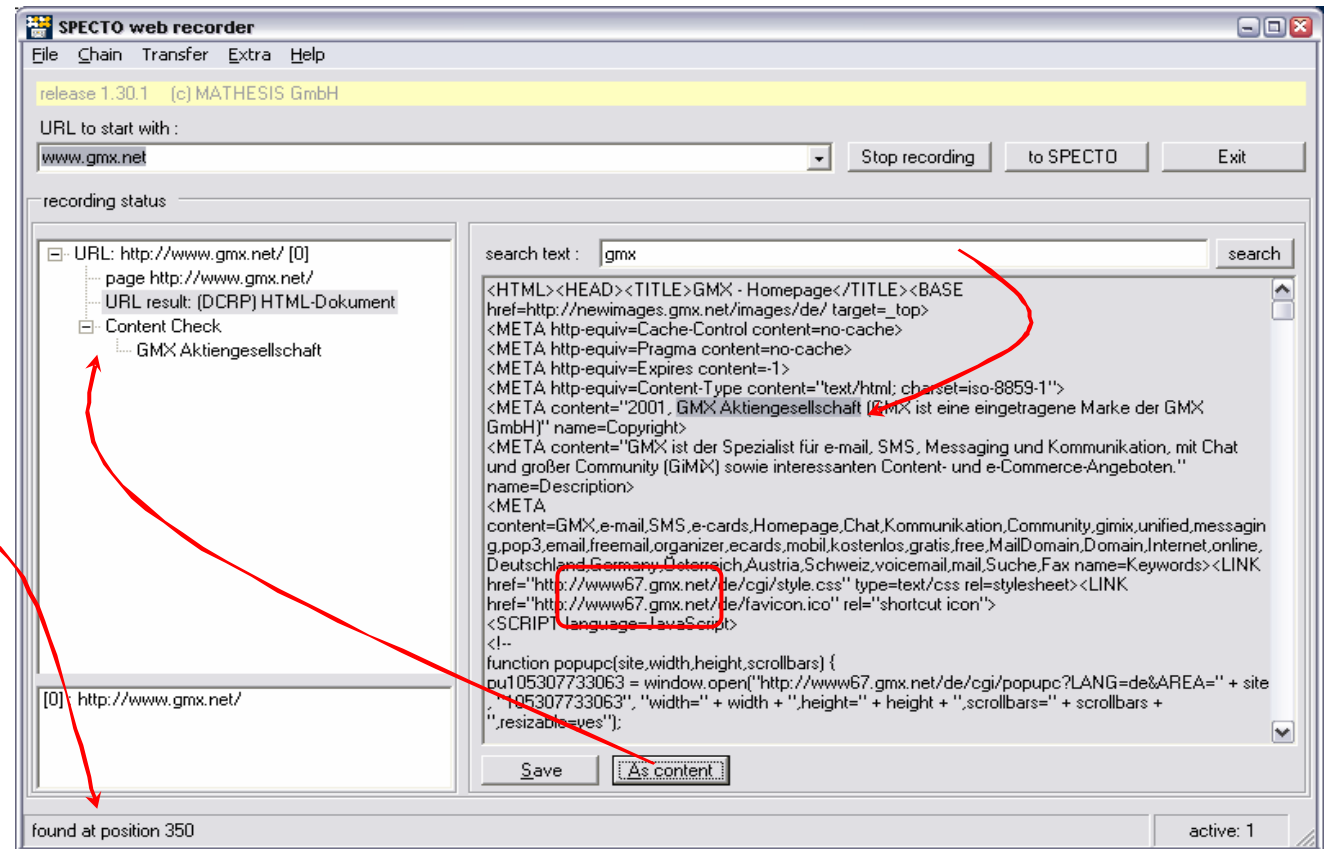
Adding content checks :

Now you may select tokens whose appearance in the web page shall later be checked by the SPECTO engine. To do this, just mark the token and press the 'As content' button (or 'drag & drop' using the right mouse button); a new sub node 'Content Check' will appear in the web recorders list window.

Adding of content check entries may be done for an unlimited number of tokens.

Tags may be searched for using the search box and 'search' button; the found token is highlighted and its exact position is displayed in the main window's status line. Searching may be repeated by pressing the 'search' button again; the frame will be adjusted so that found tags are always visible.

Also note the definition of the dynamic GMX host (here 'www67.gmx.net') in the page source : we will need this information later!



# Recording of web-Sessions using the SPECTO web recorder

Now log in to GMX using account 'specto@gmx.net' and password 'secret' and pressing the 'login' button (You may, and this is to be preferred, use your own free GMX account).

GMX will display the greeting screen ('Hallo Specto, herzlich willkommen' – in GMX' german version) you may use this as a content check.

Note the URL generated by GMX it's something like :

```
http://www67.gmx.net/de/cgi/startpage/1052388320?CUSTOMERNO=19137646&lALIAS=Specto&lDOMAIN=gmx.net&lLASTLOGIN=2003%2D05%2D08+11%3A45%3A06&t=de148539703.1052388320&
```

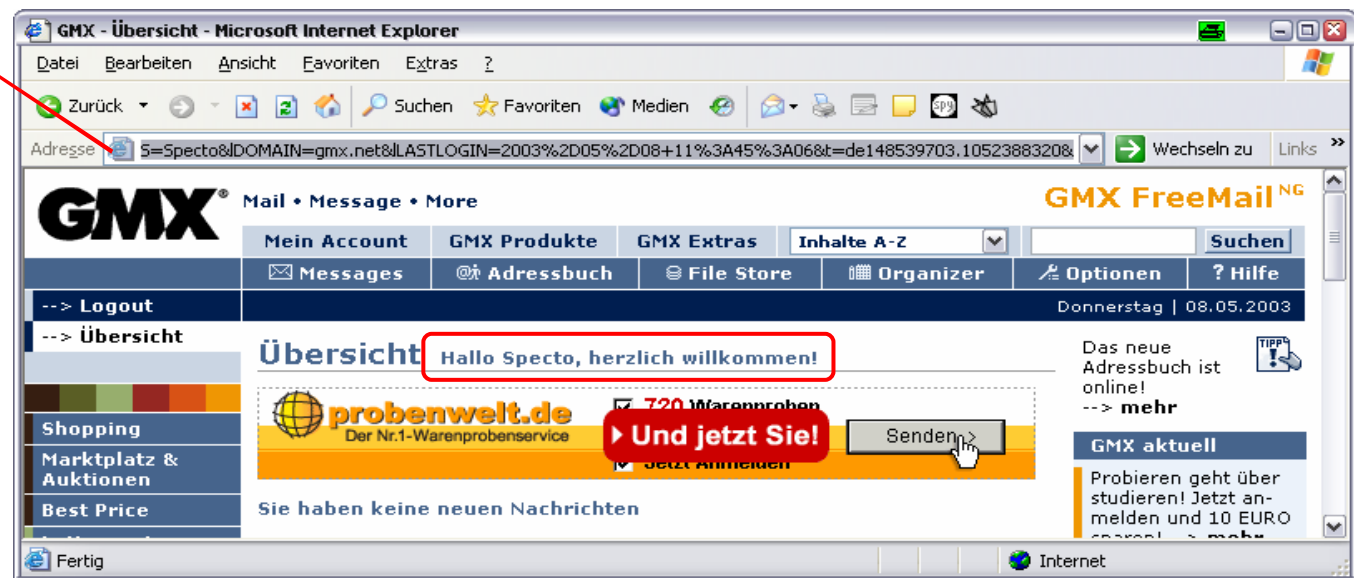
(yours will be different).

Important here are :

**www67** a variable part within the URL's host (before the '?'), GMX uses this for 'load balancing'

**customerno=191376** the session id, an URL parameter (because it's after the '?')

**t=de148539703.1052388320** another identifier parameter.



# Recording of web-Sessions using the SPECTO web recorder

During the last action the web recorder has recorded the new page and has extracted the different parameters used (e.g. you'll find your login information in parameters 'id' and 'p'). (You'll have to expand the node and its sub nodes to see the parameters).

Also, in the result page, (you may have noted the two result pages 'NC' and 'DC'; in most situations the 'DC' type result page is to be preferred) add a content check for the page. You may use the 'search' function in the result window to check for appropriate content tags (see also previous slide).

Note, the URL node '...flashbanner', it's a new browser window (new because of the [1] instead of the [0] denoting our main browser window, you also see the second browser as a new entry in the session frame) opened by GMX and containing advertisement. You may just close the browser window (the entry in the session frame will disappear) and delete the corresponding node using 'right mouse click' and 'delete node'.

The screenshot shows the SPECTO web recorder interface. The main window displays the recording status and a tree view of the recorded session. The tree view shows the following structure:

- URL: http://www.gmx.net/ [0]
- URL: http://www67.gmx.net/de/cgi/login [redirected to http://www67.gmx.net/de/cgi/login]
- page http://www67.gmx.net/de/cgi/login
- POST parameters
  - PARAM AREA=1
  - PARAM EXT=
  - PARAM EXT2=
  - PARAM id=Specto@gmx.net
  - PARAM p=secret
  - PARAM submit.x=61
  - PARAM submit.y=10
- URL result: (NC) HTML-Dokument
- URL result: (DC) HTML-Dokument
- Content Check
  - Hallo Specto, herzlich willkommen!
- URL: http://www67.gmx.net/de/cgi/flashbanner [1]
- [0]: http://www67.gmx.net/de/cgi/startpage/1053083834?CUSTOMERNO=19137646
- [1]: http://www67.gmx.net/de/cgi/flashbanner?JSFUNC=conrad20030502&ADIP=213:

The right pane shows the HTML content of the selected node, with a search function. The search text is 'hallo' and the search results show the following HTML snippet:

```
<TD vAlign=baseline nowrap><FONT color=#46648c><B>Hallo Specto, herzlich willkommen!</B></FONT></TD></TR>
```

The bottom right corner of the screenshot shows a small advertisement for Conrad, featuring a DVD-R disc and the text '39.95' and 'Großer Vorrat, kleiner Preis! DVD-R 4,7GB / 25er Spindel'.

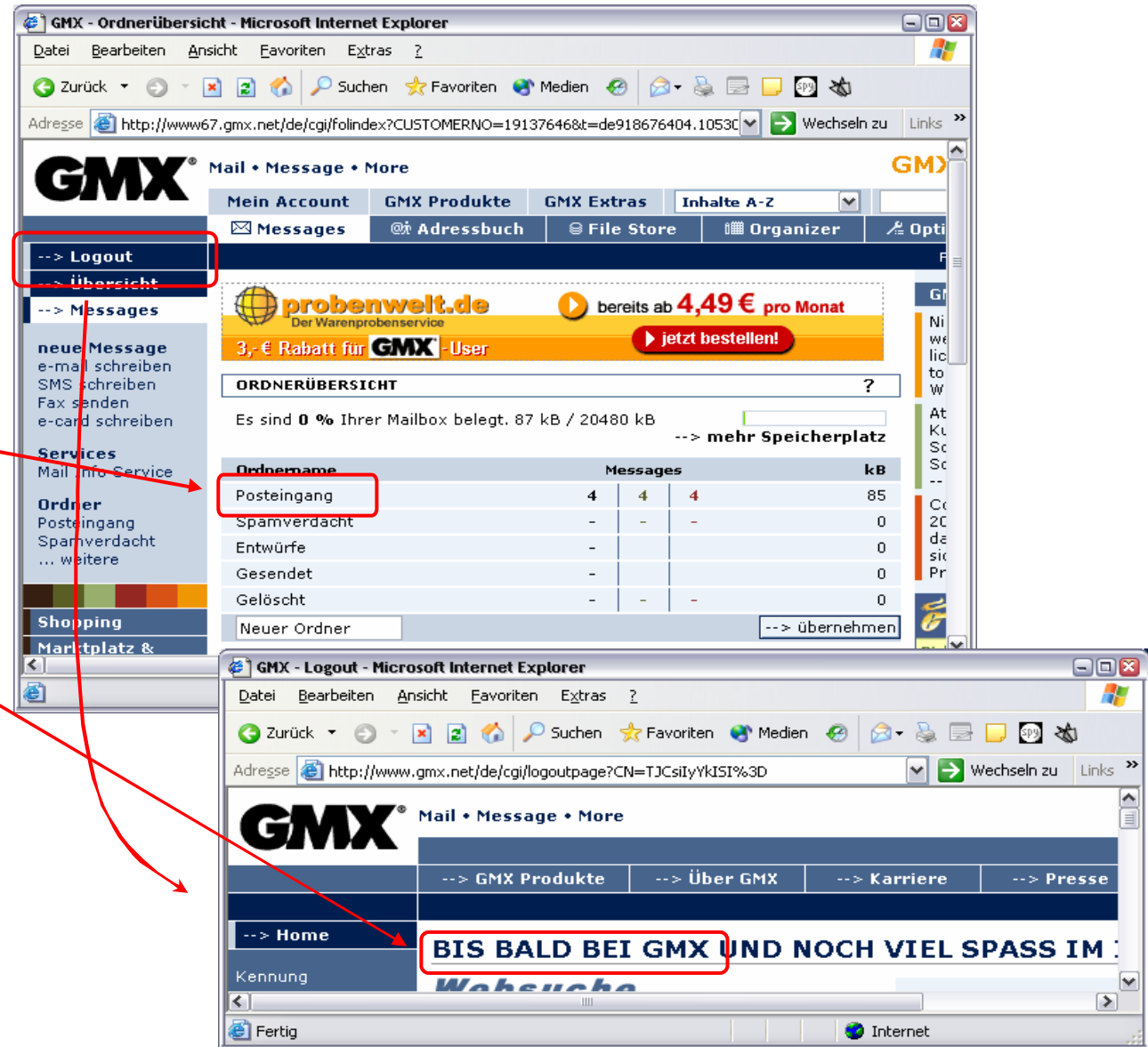
# Recording of web-Sessions using the SPECTO web recorder

Continuing the web session:

Next we select in GMX (see screen two pages before) the 'Messages' link, resulting in the 'email overview' ('Ordnerübersicht') page.

And then, with the 'Logout' link we will terminate our GMX session.

For both pages we may add appropriate content check entries; e.g. 'Posteingang' on the email folder overview page, and 'BIS BALD BEI GMX' on the 'logout' page.





# Recording of web-Sessions using the SPECTO web recorder

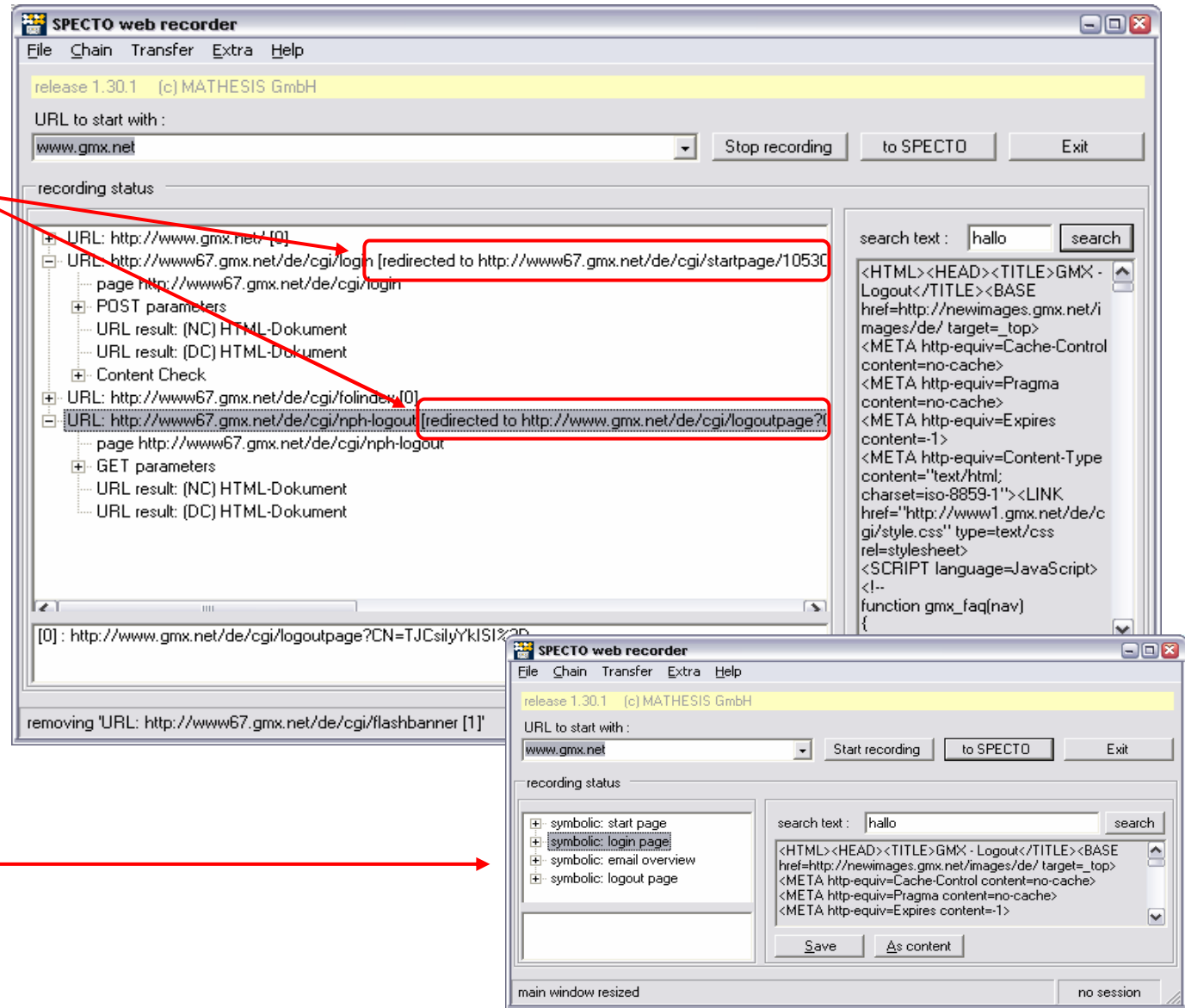
Back in the web recorder :

Looking at the recorded results, you may notice the two URL entries with the 'redirected' marker : in these cases the pages were redirected (using HTTP 30x codes) to new locations. Such methods are frequent in complex e-business applications and often require separate handling.

It is also visible that, during logout, GMX is switching back to the non-load-balancer page ('www.gmx.net').

Cause we're finished with the recording we can stop it using the 'Stop recording' button. Web recorder will automatically close the associated web browser and remove the entry in the session frame.

To make our work a little bit more transparent it is a good idea to give the base nodes more obvious names (limited to a maximum of 40 characters). That can be done by double-clicking them, also optional documentation (e.g. the 'redirect' information) may be added by 'right mouse button click', selecting the menu entry 'edit documentation'.





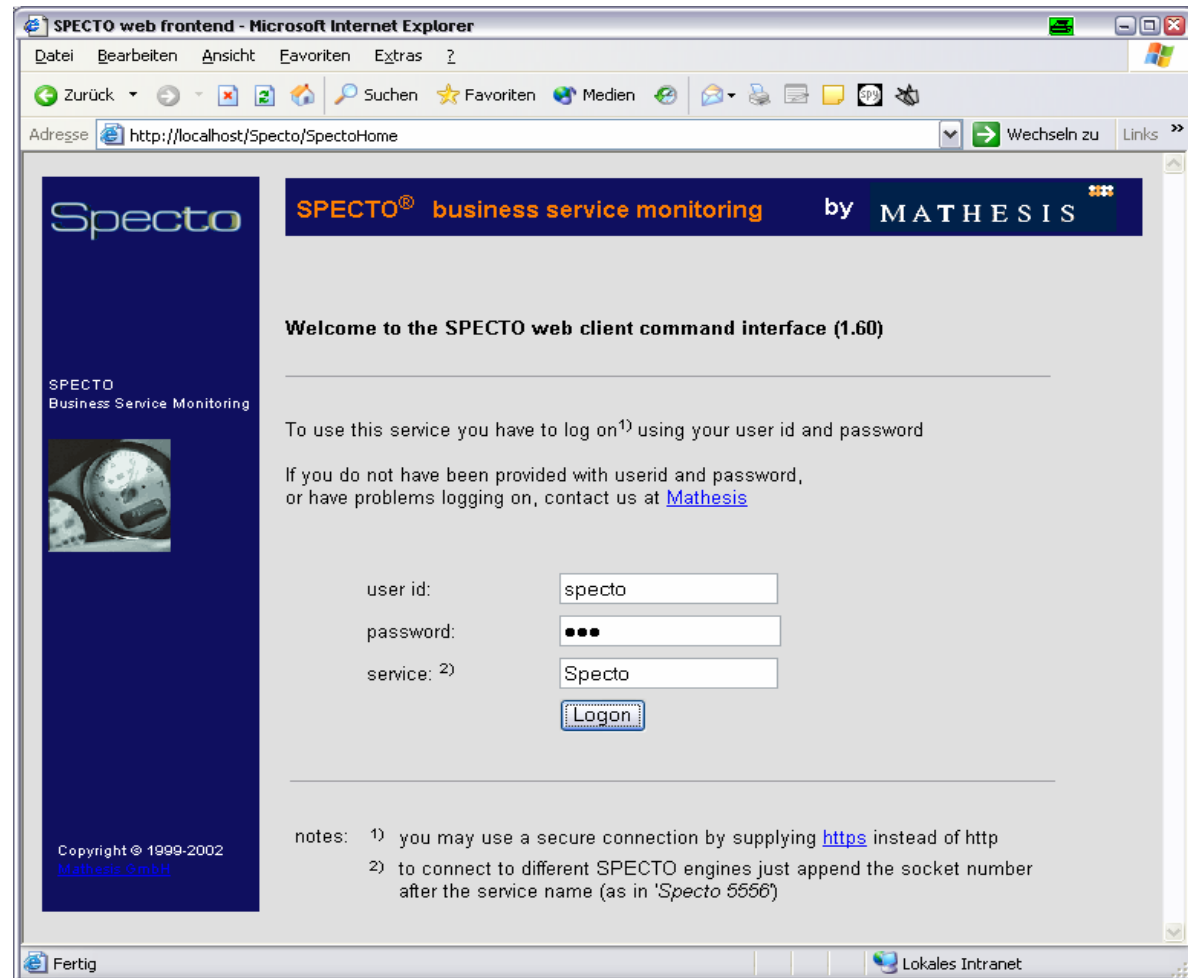
# Transfer recording to the SPECTO engine : Login to the SPECTO

Preparing the SPECTO engine :

Log on to SPECTO using your account.

You will use your web browser to work with the SPECTO engine – no software needs to be installed on your workstation.

Your SPECTO administrator will supply you with the logon URL (something like 'http://your-company/Specto/SpectoHome') an userid and the matching password. Also a service (usually 'Specto') and optionally an engine number (if multiple SPECTO engines are running on the SPECTO host) must be specified.



# Defining a new chain in the SPECTO engine

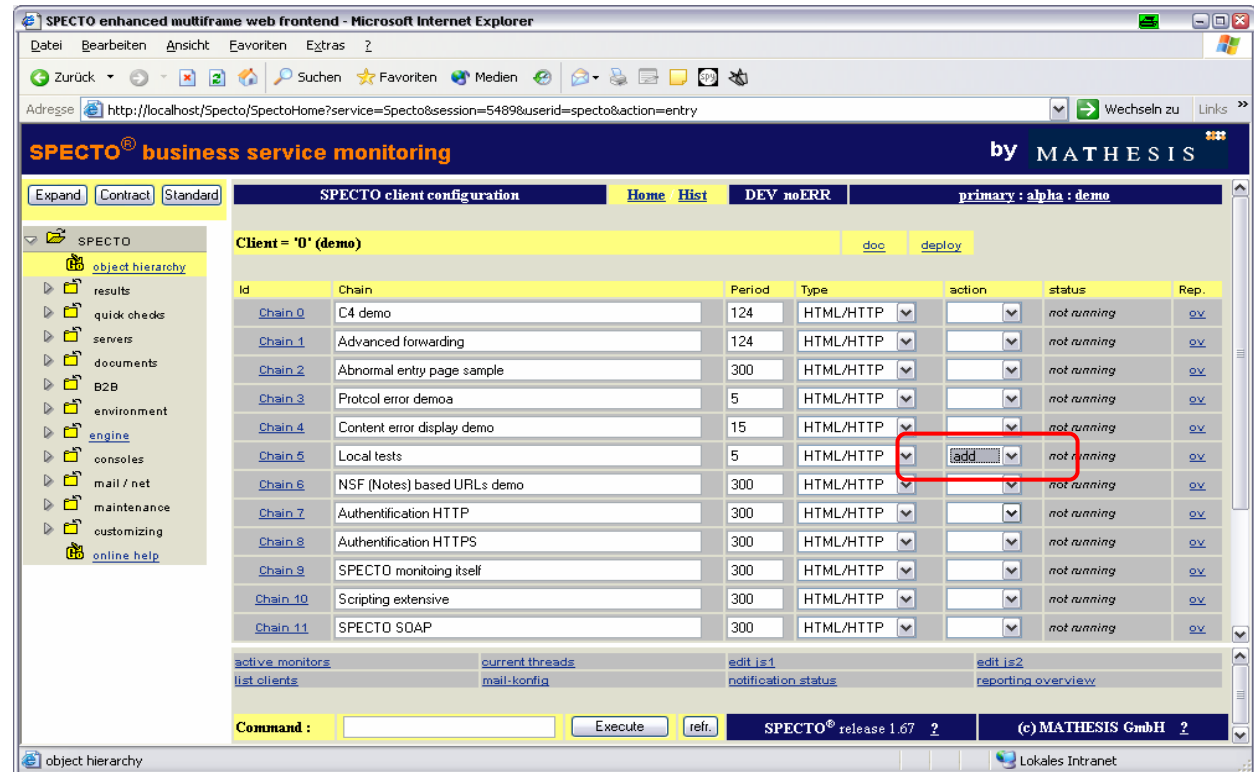
After log in you are automatically routed to your client (SPECTO features multiple-clients) and a list of all already defined chains is displayed.

Now, add a new chain by selecting the 'add' method in the chain after which the new chain shall be added and push the 'execute' button (on the bottom of the chain list frame, not the 'execute' right of the Command entry field).

A new chain entry with the name '\* new \*' is added.

Change the name to something more appropriate (e.g. 'GMX email check') and press 'execute' again.

Then return to the SPECTO web recorder.



Two tables are shown, illustrating the change in Chain 6. Red arrows point from the first table to the second, indicating the update.

Chain 5	Local tests	5	HTML/
Chain 6	* new *	300	HTML/
Chain 7	NSF (Notes) based URLs demo	300	HTML/

Chain 5	Local tests	5	HTML/
Chain 6	GMX email check	300	HTML/
Chain 7	NSF (Notes) based URLs demo	300	HTML/

# Transferring from the SPECTO web recorder to the SPECTO engine

The next step is the transfer to SPECTO:

Back in the web recorder open the transfer window using the 'to SPECTO' button; opening the 'Transfer to SPECTO' window.

Here enter the chain id and the chain name which you have just added in the SPECTO engine into the appropriate fields.

You have to take care to enter the exact chain name because for security reasons, the pair id / name entered here is checked against the name defined in the SPECTO engine.

Then select 'Gen. and Transfer' button. The ongoing actions are displayed in the status line; if you have selected the 'Session visible' box you'll also see the life session used for transferring the data.

After the transfer is finished, a dialog box informs about the success.

Transfers are repeated as often as necessary. You may store (and inspect) the generated file (here '\generated.xml') it contains the previous recording work in an xml format.



FormTransferSPECTO

SPECTO URL: http://localhost/Specto/SpectoHome

SPECTO Port: 5555

User Id: SPECTO

Password: ####

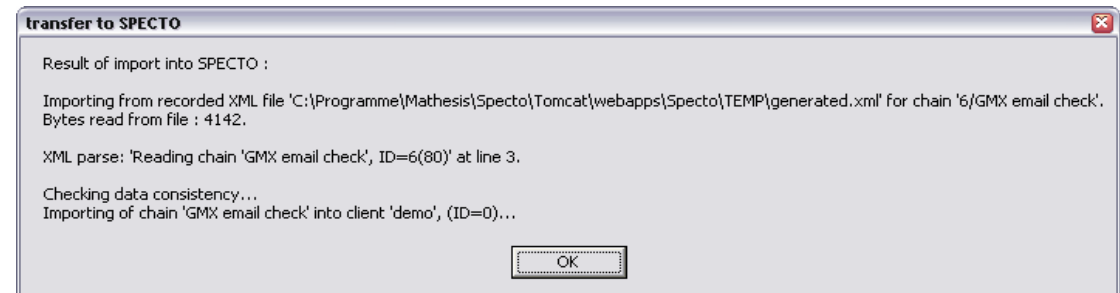
Session visible:

Filename: \generated.xml

Chain Id / name: 6 GMX email

no transfers yet

Generate Gen. and Transfer Back



transfer to SPECTO

Result of import into SPECTO :

Importing from recorded XML file 'C:\Programme\Mathesis\Specto\Tomcat\webapps\Specto\TEMP\generated.xml' for chain '6/GMX email check'. Bytes read from file : 4142.

XML parse: 'Reading chain 'GMX email check', ID=6(80)' at line 3.

Checking data consistency...

Importing of chain 'GMX email check' into client 'demo', (ID=0)...

OK

# Inspecting the new chain in the SPECTO engine :

Back in your browser session of the SPECTO engine you may inspect the transferred recording by opening the new chain

You'll see the list of URLs recorded in your web recorder session. You may use the symbolic links to inspect the single URL definitions.

Please note that we already have found out that GMX is using a load balancer and therefore 'rewrites' the host part (here the 'www67') so that we have to make this part dynamic and dependent of 'something' happening in the first URL.

To do this we replace this dynamic part with a SPECTO variable (here '@clusterid.')

(For the following it is useful to look at the content of the web recorders result page of the first URL).

Chain	Name	Timeout	Type
Chain 5	Local tests	5	HTML/
Chain 6	GMX email check	300	HTML/
Chain 7	NSF (Notes) based URLs demo	300	HTML/

Id	URL	timeout	2long	type	session	action
start_page	http://www.gmx.net/	3500	2000	HTML/HTTP		
login_page	http://www67.gmx.net/de/cgi/login	3500	2000	HTML/HTTP		
email_overview	http://www67.gmx.net/de/cgi/foindex	3500	2000	HTML/HTTP		
logout_page	http://www67.gmx.net/de/cgi/nph-logout	3500	2000	HTML/HTTP		

Id	URL	timeout
start_page	http://www.gmx.net/	3500
login_page	http://www@clusterid@.gmx.net/de/cgi/login	3500
email_overview	http://www@clusterid@.gmx.net/de/cgi/foindex	3500
logout_page	http://www@clusterid@.gmx.net/de/cgi/nph-logout	3500

# Extracting parameters : the 'load balancer' string

Within the URL configuration page of the first URL you may spot the content check entry 'GMX Aktiengesellschaft' which was also transferred from the web recording.

Here we have to include another entry (using 'add' in the 'action' field and 'execute') to compute the 'load balancing' variable we included in the step before : 'clusterid://www:.gmx.net' and we've to set the new entry's type to 'var. betw.'.

That does this do : it does set the variable which names is before the first colon ('clusterid') to the value which is extracted from the web pages HTML content between the tags '//www' and '.gmx.net' (separated by another colon).

The reachability of the URL may be checked using the 'page test' button, it will reveal a status page similar to the own show; note the 'page's content is okay' signaling that the check against the specified content check tag has succeeded.

There's nothing else to be done on the first URL, proceed to the second URL using the 'nextURL' button.

Id	content	type	parent	level	next	action
0	GMX Aktiengesellschaft	value	-1	0	next	
1	clusterid://www:.gmx.net	var. betw.	-1	0	next	

excerpt of recorded HTML source :

```
<META content=GMX,e-mail,SMS,e-cards,Homepage,Chat,Kommunikation,Community,gimix,unified,messaging,pop3,email,fr  
eemail,organizer,ecards,mobil,kostenlos,gratis,free,MailDomain,Domain,Internet,online,De  
utschland,Germany,Österreich,Austria,Schwe  
iz,voicemail,mail,Sucpe,Fax  
name=Keywords><LINK  
href="http://www67.gmx.net/de/cgi/style.css"  
type=text/css rel=stylesheet>
```

# The 'login' page

This is the login page. The correct parameters ('AREA' to 'submit.x') have already been filled in by the recording, as is the first content check ('Hallo...').

With the same logic as in the previous page we have to extract two more values and put them into variables :

- customerno

- t

Don't forget to set the type to 'var betw.!'!

And, remember the hint during recording, because this is a redirected page we have to set the two flags 'No (auto) redir.' and 'Dyn. redir.'.

There's nothing else to be done on the first URL, proceed to the third URL using the 'nextURL' button.

Client = '0' (demo) doc

Chain = 'B' (GMX\_email\_check) doc

URL = '1' (http://www@clusterid@gmx.net/de/cgi/login) doc

Post  No redir.  dyn. redir.  Cache  binary cont.  Loc lang  From  Referer

Force 1.0  Force 1.1  Force 1.2  Authent  Trace  par order  use PBU  use PAU

Delay to next URL (ms): 1000 Symbolic name: login page

Id	parameter	value	type	action
0	AREA	1	direct	
1	EXT		direct	
2	EXT2		direct	
3	id	Specto@gmx.net	direct	
4	p	secret	direct	
5	submit.x	61	direct	
6	submit.y	10	direct	

Id	content	type	parent	level	next	action
0	Hallo Specto, herzlich willkommen!	value	-1	0	next	
1	customerno:CUSTOMERNO=&	var betw.	-1	0	next	
2	t:t=de:%AREA	var betw.	-1	0	next	

Execute page analysis page test one run single step prev. URL next URL

# The 'check email' page

This is the page where we check the email folders. The correct parameter names ('CUSTOMERNO' and 't') have already been filled in by the recording, but their values are the constant values from the recorded session; we have to replace them with the variables we have defined in the step before.

Here, we have to set the parameters type to 'variable' because the value entered is the name of a SPECTO variable. In case we have to mix constant text with variable(s), the variable(s) have to be enclosed in double percentage characters ('%%').

There's nothing else to be done on the first URL, proceed to the last URL using the 'nextURL' button.

The screenshot shows the SPECTO configuration interface for a step named 'email overview'. The client is '0' (demo) and the chain is '6' (GMX\_email\_check). The URL is '2' (http://www@clusterid@gmx.net/de/cgi/fo/index). The interface includes various checkboxes for options like Post, No redir, dyn. redir, Cache, binary cont., Loc lang, From, Referer, Force 1.0, Force 1.1, Force 1.2, Authent, Trace, par order, use PBU, and use PAU. The delay to next URL is set to 1000 ms. The symbolic name is 'email overview'. There are two tables for parameter and content configuration. The parameter table has two rows: one for 'CUSTOMERNO' with value 'customerno' and type 'variable', and one for 't' with value 'de%%t%%' and type 'variable'. The content table has one row for 'Posteingang' with type 'value', parent '-1', level '0', and next 'next'. At the bottom, there are buttons for 'Execute', 'page analysis', 'page test', 'one run', 'single step', 'prev. URL', and 'next URL'.

Id	parameter	value	type	action
0	CUSTOMERNO	customerno	variable	
1	t	de%%t%%	variable	

Id	content	type	parent	level	next	action
0	Posteingang	value	-1	0	next	



# The 'logout' page

This is the page where we log out from GMX. We have to made same adjustments to the parameters as in the page before.

SPECTO URL configuration    Home Hist    DEV noERR    primary : alpha : demo

Client = '0' (demo)    doc

Chain = '6' (GMX email check)    doc

URL = '3' (http://www@clusterid@gmx.net/de/cgi/nph-logout)    doc

Post     No redir.     dyn. redir     Cache     binary cont.     Loc lang     From     Referer

Force 1.0     Force 1.1     Force 1.2     Authent     Trace     par order     use PBU     use PAU

Delay to next URL (ms): 1000    Symbolic name: logout page

id	parameter	value	type	action
0	CUSTOMERNO	customerno	variable	
1	t	de%%t%%	variable	

id	content	type	parent	level	next	action
0	BIS BALD BEI GMX	value	-1	0	next	

Execute    page analysis    page test    one run    single step    prev. URL    up next



# Testing the chain using 'one run'

Now we're ready with our new chain and can begin testing it.

Testing is done with SPECTO's 'one run' functionality; it may be selected on chain or URL level and always goes through the complete chain.

During 'one run' execution, the web browser is updated automatically every two seconds.

After finishing the result should look similar to this :

Through the appropriate links you may want to inspect the messages created during the URL's execution, the assigned variables, the source code or the page as it would have looked like in a browser.

This information blocks are displayed in separate windows; they should be closed after inspection.

Note the 'timeout' message which differs from the other entries 'okay' messages; it results from the access to this page being longer than specified in the URL definition; we will look for that in the next step.

Continue with the link to the chain definition.

	chain	URL	symbolic name	status	response	start time	delay				
terminated	6	1	[start page] http://www.gmx.net/	okay / K	872 ms	15:46:27	1000	msg	var	src	disp
<a href="#">check for termination</a>	6	1	[login page] .../www@clusterid@gmx.net/de/cgi/login	okay / K	1813 ms	15:46:29	1000	msg	var	src	disp
<a href="#">stop run</a>	6	2	[email overview] ...lusterid@gmx.net/de/cgi/fo/index	okay / K	1663 ms	15:46:34	1000	msg	var	src	disp
<a href="#">results index</a>	6	3	[logout page] ...clusterid@gmx.net/de/cgi/nph-logout	timeout / K	4467 ms	15:46:37	1000	msg	var	src	disp

(if defined, the content of variable 'chainResult' would be reflected here)

Messages and output of last 'one run' - Microsoft Internet Explorer

Messages during processing of URL 'http://www@clusterid@gmx.net/de/cgi/nph-logout' (client 6 / URL3)

name	value	created in URL	last mod. in URL
Instance	'0'	0	-1
CurrChain	'0'	0	2
CurURL	'2'	0	2
CallStack	''	0	2
ResultPage	'!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional/EN...'	0	2
LastError	''	0	2
ResultSize	'35704'	0	2
ResultCode	'200'	0	2
ResponseTime	'1663'	-1	-1
clusterid	'7'	0	-1
ResponseTotalTime	'4348'	-1	-1
customerno	'19137646'	1	-1
t	'1658412051.1053092902.27bef781'	1	-1

# Final adjustment of the chain and URL definitions

On the chain level it makes sense to adjust the 'too long' and 'timeout' parameters to correct values.

Also, one might add notifications (email, fax, sms, ...) and specify periods during which no measurements should be done.

Back on the client level we can specify a time period (in seconds) between single executions of the chain.

Then we can start the continuous monitoring using the 'start' entry in the action field. The number of running instances of that chain is reflected in the status column.

Using the 'ov' link on the client level, or the 'results' link on the chain level, will navigate to the 'results overview' page from which it is possible to look at tabular and graphical representations of the measured data.

The screenshot displays the 'SPECTO chain configuration' interface. At the top, there are navigation links: 'Home', 'Hist', 'DEV noERR', and 'primary: alpha: demo'. Below this, the 'Client = '0' (demo)' and 'Chain = '6' (GMX email check)' are shown. There are several checkboxes for configuration options: 'persistent', 'use PBT', 'use PAT', 'use PBC', 'use PAC', and 'execute AT'. The main part of the interface consists of three tables. The first table lists chain steps with columns for 'id', 'URL', 'timeout', 'Zlong', 'type', 'session', and 'action'. The second table lists notifications with columns for 'id', 'notification', 'message', 'type', 'period', 'level', and 'action'. The third table lists exclusion periods with columns for 'Type', 'bday', 'eday', 'bhour', 'ehour', 'reason', and 'action'. At the bottom, there are buttons for 'Execute', 'one run', 'single step', 'prev. chain', and 'next chain'. A status bar at the very bottom shows 'Chain 6', 'GMX email check', a value of '300', 'HTML/HTTP', 'running (one)', and an 'ov' link.

id	URL	timeout	Zlong	type	session	action
start_page	http://www.gmx.net/	4000	2000	HTML/HTTP		
login_page	http://www@clusterid@gmx.net/de/cgi/login	5000	3000	HTML/HTTP		
email overview	http://www@clusterid@gmx.net/de/cgi/foindex	5000	3000	HTML/HTTP		
logout_page	http://www@clusterid@gmx.net/de/cgi/nph-logout	6000	4000	HTML/HTTP		

id	notification	message	type	period	level	action
id_0	specto@mathesis.de	GMX demo	email	-1	-1	
id_1	+491724711		sms	60	6	

Type	bday	eday	bhour	ehour	reason	action
not_during	daily	-1	-1	0	0	cause backup

Chain 6 | GMX email check | 300 | HTML/HTTP | running (one) | ov

Now we are through with the complete process of recording and establishing a complete SPECTO monitoring chain.

At this point it is advisable to add some documentation on chain and URL level, and then to save the configuration using SPECTO's export facility.

We thank you for being/staying interested and going with us through one of the more complex things which can be done using SPECTO.

In case you're stuck with this example – just export your recording and your current chain definition and mail us the .xml files – maybe we have an idea...