

This document presents the format of the XML configuration file that is used in the NXE software. The choice of the XML format is motivated by the fact that it provides a clear hierarchical description of the experiments we want to perform.

The following sections will present the topology, configuration and scenario description.

1 Topology

To describe the topology, we are currently using 3 main objects: the site, the frontal and the aggregator. At the end of the processing of the XML file, we have three lists *siteList*, *frontalList* and *aggregatorList* that contains a set of each of the adequate objects filled with the data obtained through the parsing of the XML file.

Site : this describes a site, *e.g.* a cluster or group of nodes that are located around the same area. Additional flags like *gnet* can be provided to configure special things like emulation of latency in this case.

Frontal : this part of the site description provides the way to connect to the site and how to reserve and deploy nodes by providing local scripts and parameters name. In the case where this kind of service are not available, you just need to return the list of nodes you want to use.

Aggregator : this allows to describe the way the different sites are inter-connected.

The more formal description of this part of the XML can be found in Table 1

Please note that it would be easy to change our topology description, which is ad-hoc for our needs, by a standardised format like GraphXML or RDF, just by modifying the `ITBParser.topology` class so that it is able to fill the internal object model with this input.

2 Configuration

The description of the configuration is a collection of keys and values that globally affect the behaviour of the NXE application. The complete list is given in the Table 2. At the end of the file processing, the variables' value corresponding to the keys have been changed to those inputed from the file.

Tag name	Nested in	Description	Type	Unit	Implemented
topology	file	Global tag to describe the topology	-	-	Y
site	topology	tag to describe a experimental site	-	-	Y
sitename	site	The real name of the experimental site, <i>e.g.</i> cluster name	String	-	Y
siteabstractname	site	An abstract name associated with the real name	String	-	Y
number	site	Number of nodes used on a given site	Integer	-	Y
nodelay	site	One way delay to the site associated aggregator	Integer	ms	I
nodecapacity	site	Expected network capacity of a node	Integer	Mbps	I
flag	site	Switches modifying the site behaviour	gnet	-	I
aggregname	site	Abstract name to the site point of aggregation	String	-	Y
frontal	site	Description of the resource management services available on the site	-	-	Y
frontalname	frontal	Name of the resource management services handler	String	-	Y
resatool	frontal	Script used to reserve nodes	String	-	Y
resaparam	frontal	Parameters to the script used to reserve nodes	String	-	Y
deploytool	frontal	Script used to deploy a kernel image on the nodes	String	-	Y
deployparam	frontal	Parameters to the script used to deploy images	String	-	Y
gnettool	frontal	Script to configure hardware emulator boxes	String	-	N
gnetparam	frontal	Parameters to the script used to configure hardware emulators	String	-	N
aggregator	topology	Inter-connexion point between sites	-	-	I
aggregid	aggregator	Abstract name of the aggregator	String	-	I
link	aggregator	Description of a link coming from a site	-	-	I
from	link	Origin site of the link	String	-	I
capacity	link	Maximum capacity of the link	Integer	Mbps	I
delay	link	One way delay of the link	Integer	ms	I

Table 1: XML Topology description

Tag name	Nested in	Description	
timeout	config	A timeout passed to the script to stop after the given time	BDTS, c
flag	config	Switches modifying the global behaviour of the software	
		BDTS: using a bandwidth profile manager	
		clean: removing all NXE temp files at the end of the execution	
		sync: syncing scripts used by nodes before the start of the experiment	
		law: using distribution laws to generate the parameters needed by the experiment (<i>e.g.</i> file sizes, interstart, . . .)	B
acces	config	Host from which all nodes are reachable	
user	config	Login name used to connect to every nodes	
keypath	config	Public key file used for the authentication	
password	config	Password associated with the user and the key	
archivepath	config	Path to the folder where to store the logs after the experiments	
BDTSprogram	config	Software used to apply bandwidth allocation	
spoof	config	Pid of a NXE previous instance to reuse already allocated resources	
timelinelog	config	Name of the file where the execution steps of the scenario are logged	
resadate	config	Date at which the nodes should be reserved from	
applicationtype	config	Type of application used in the scenario	
repeat	config	Number of repetitions/succesive transfers to be made	

Table 2: XML Configuration description

3 Scenario

In this section, we present the description of the XML format of the scenario corresponding to a networking experiment.

A networking experiment is described with a scenario skeleton defined as a succession of dates at which an event occurs. The events corresponds to the starting point of an action (*e.g.* the start of a new bulk data transfer, of a new web session) combined with the parameters relevant to this action (*e.g.* distribution law of file sizes, inter waits) between a set of end-hosts, whose size depends on the kind of application we are trying to model (*e.g.* 2 for data transfers, many for parallel applications).

Table 3 presents the format used. After the file has been parsed, the hashtable *nodeTable* contains the association between abstract nodenames and Node objects that are filled with the information retrieved from the file.

4 Profile

This section contains the description of the XML format used to describe the bandwidth profile used by the BDTS software.

Table 4 presents the XML format used to describe a bandwidth profile. After the xml file has been processed, we have access to a hashtable (*nodeTable*) that maintains an association between a node name and the bandwidth profile we want to use. The bandwidth profile is a string that can be directly send to the FLOC bandwidth limitation tool.

Tag name	Nested in	Description	Type
scenario	file	Global tag used to describe the scenario	-
node	scenario	Tag defining a node/set of nodes execution steps	-
id	node	Abstract name/real name of a node in the topology	String
type	node	Role of the node in the experiment	server, client, mpi
number	node	Number of nodes concerned by the execution steps (if a '*' is used in the id field)	Integer
target	node	Abstract name of a node that is targetted during the experiment (as in client/server relationship)	String
sizedistribname	node	Name of the distribution law to be used for the file sizes	String
sizealpha	node	First parameter of the size distribution law	Float
sizebeta	node	Second parameter of the size distribution law	Float
sizetab	node	String of numbers separated by hyphens to indicate which fixed transfer size should be used	String
interdistribname	node	Name of the distribution law to be used for the inter wait between successive transfers	String
interalpha	node	First parameter of the inter wait distribution law	Float
interbeta	node	Second parameter of the inter wait distribution law	Float
intertab	node	String of numbers separated by hyphens to indicate which fixed inter wait should be used	String
step	node	Tag describing an execution step	-
date	step	Relative date at which do the action corresponding to the current step	Integer
offset	step	Amount of time to wait between the execution of the step (if the step is applied on several nodes)	Integer
scriptname	step	Script to be executed at this step	String
scriptparam	step	Parameters of the script to be executed	String
label	step	A string to describe the step (stats generation purpose)	String

Table 3: XML scenario description

Tag name	Nested in	Description	Type	Unit	Implemented
profile	file	Tag starting the description of the bandwidth profile	-	-	Y
node	profile	Tag to describe the bandwidth profile of a node	-	-	Y
name	node	Name of the node considered	String	-	Y
key	node	The BDTS token associated with a transfer/sender	Integer	-	Y
step	node	Tag delimiting a step of a bandwidth limitation	-	-	Y
date	step	A relative date at which the rate limitation starts replacing the previous limitation	Integer	-	Y
rate	step	The rate at which the bandwidth should be limited	Integer	Mbps	Y

Table 4: XML bandwidth profile description