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Chapitre 1

Deploying a DIET platform

Deployment is the process of launching a DIET platform including agents and servers. For DIET, this process includes writing configuration files for each element and launching the elements in the correct hierarchical order. There are three primary ways to deploy DIET.

Launching **by hand** is a reasonable way to deploy DIET for small-scale testing and verification. This chapter explains the necessary services, how to write DIET configuration files, and in what order DIET elements should be launched. See Section ?? for details.

Using GoDIET, a Java-based tool for automatic DIET deployment that manages the creation of configuration file, the staging of files, the launch of elements, the monitoring and reporting upon successful launch, and the cleanup process when the DIET deployment is no longer needed. See Section 1.1 for details.

Writing your own scripts is a surprisingly popular approach. This approach often looks easy initially, but can sometimes take much, much longer than expected, as there are many complexities to manage. Learn how to use GoDIET– it will save you time!

1.1 GoDIET introduction

GoDIET is a cross-platform tool that helps you automate ad-hoc deployment and management procedures for a DIET platform. It manages the creation of configuration files, the staging of files, the launch of software components, the monitoring and the reporting. GoDIET is extremely useful for large deployments on a complex physical infrastructure. The main features are :

- Complete running application customization. Infrastructure agnostic approach ;
- command-line interface ;
- distributed command execution via SSH ;
- real-time monitoring of applications' states ;
- handling of complex physical infrastructure, with firewalls and multiple local- and wide-area networks.

1.1.1 GoDIET installation

TODO 1 (Check avec Philippe).

Donner les infos pour la récupération et la compilation de GoDIET.

1.1.2 GoDIET requirement

The following operating systems are known to support GoDIET :

- Linux : the most recent distributions are likely to work ;

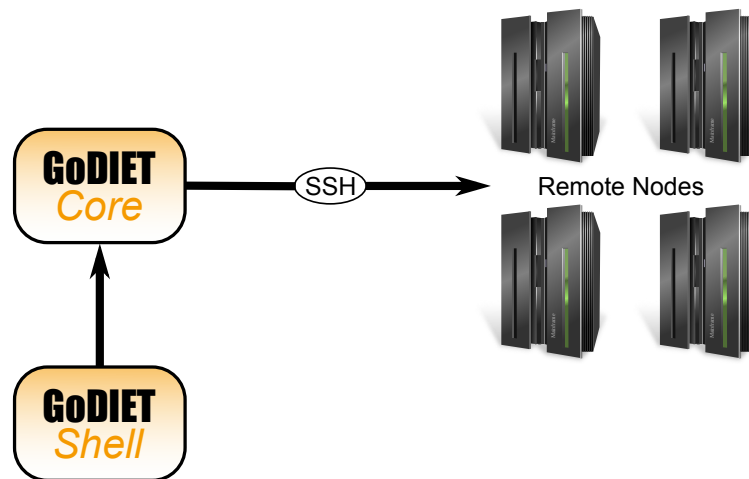


FIGURE 1.1 – GoDIET design.

- Mac OS X 10.4 or later.

You need to have Sun Java 6 or OpenJDK6 installed. Download GoDIET core and shell on the project's website¹. Check that the run.sh script works : it should display something similar to figure 1.3.

1.2 GoDIET Quickstart

Dans cette partie nous allons lancer une hiérarchie DIET très simple avec GoDIET. Pour simplifier encore les choses, DIET et GoDIET seront exécuter sur la même machine. Les pré-requis pour réaliser ce scénario sont d'avoir installé DIET, OmniNames ainsi que le serveur et le client GoDIET.

1.2.1 Création des fichiers de configuration

Remarque 1 (Configuration files).

Les fichiers décrits par la suite se situent dans le répertoire `examples/localhost` de l'archive GoDIET client.

TODO 2 (Check avec Philippe).

sauf que non... le fichier Infrastructure description est ici :
`project/target/test-classes/infrastructure/localhost-infrastructure.xml` ?

Infrastructure description La première étape est de créer le fichier de description de l'infrastructure physique. Dans ce cas, un domaine, nommé DomainLocalhost contient votre machine nommée my-node. La seule contrainte de nommage est qu'il faut que l'identifiant soit unique.

1. <http://graal.ens-lyon.fr/DIET/godiet.html>

```
<?xml version="1.0" encoding="UTF-8"?>
<godiet:infrastructure ...">
  <domain id="DomainLocalhost"/>
  <node id="mynode">
    <ssh id="lo" domain="DomainLocalhost" login="mylogin" server="127.0.0.1"/>
    <env>
      <var name="PATH"
        value="/omniNamesInstallPath/bin:/dietInstallPath/bin:$PATH"/>
      <var name="LD_LIBRARY_PATH"
        value="/omniNamesInstallPath/lib:/dietInstallPath/lib:"/>
    </env>
    <scratch dir="/tmp/scratch"/>
  </node>
</godiet:infrastructure>
```

File : project/target/test-classes/infrastructure/localhost-infrastructure.xml

Remplacer mylogin par votre login et les valeurs des variables PATH et LD_LIBRARY_PATH par celles correspondant aux répertoire d'installation sur votre machine.

Platform description Le fichier ci-après décrit la plate-forme minimale pour exposer un service. Il est composé d'un omniNames et d'un master Agent et un Sed fournissant un service de calcul matriciel. You can use the following file without any modification

```
<?xml version="1.0" encoding="UTF-8"?>
<godiet:dietPlatform xmlns:godiet="http://www.sysfera.com"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.sysfera.com ../Diet.xsd">

  <services>
    <omniNames id="omniNames" domain="DomainLocalhost">
      <config server="mynode" />
    </omniNames>
  </services>

  <hierarchy>
    <masterAgent id="MA1">
      <config server="mynode" />

      <sed id="matrix_service">
        <config server="mynode" />
        <file id="sed_config">
          <template name="sed_template.config" />
        </file>
        <binary name="dmat_manips_server">
          <commandLine>
            <parameter string="T" />
          </commandLine>
        </binary>
      </sed>

    </masterAgent>
  </hierarchy>
</godiet:dietPlatform>
```

File : project/target/test-classes/diet/localhost-diet.xml

1.2.2 Démarrer le serveur

Deux fichiers pour l'instant server.properties et configuration.xml

Vous devez créer le fichier de configuration associé au serveur. Il décrit le chemin où se trouvent les clés ssh privées, le nom du noeud sur lequel il est démarré. You need to create a GoDIET server configuration file. It contains information for remote connection like your ssh keys path. The server will look this file in \${HOME}/.godiet/configuration.xml directory.

```
<?xml version="1.0" encoding="UTF-8"?>
<godiet:configuration xmlns:godiet="http://www.sysfera.com"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.sysfera.com ../Configuration.xsd"
  localNode="mynode">
  <localscratch dir="/tmp/sc_godiet" />
  <user>
    <ssh>
      <key path="myPrivateKeyPath" encrypted="false"/>
    </ssh>
  </user>
</godiet:configuration>
```

File : project/target/classes/configuration/configuration-local.xml

TODO 3 (Check avec Philippe).

Le fichier en question a en fait des /home/phi en hard coded.

Remplacer myPrivateKeyPath par le chemin associé à votre clef privée **ssh**. Pour démarrer le serveur, lancer le script run-server.sh

1.2.3 Démarrer le client

GoDIET Server

Distribution Le serveur se présente sous la forme d'une archive tar ou zip.

- Répertoire doc : contient la documentation associé au serveur au format PDF et HTML ;
- Répertoire lib : contient les librairies (.jar) utiles au fonctionnement du serveur ;
- Fichier server.properties.sample : exemple de fichier de configuration du serveur ;
- Scripts run-server.* : script de lancement du serveur.

Configuration Ce fichier regroupe les informations indispensables pour que le serveur puisse se connecter et executer les applications sur les machines distantes. This file aggregates information about the local node from where GoDIET was launched. It also contains information about user authentication. By default, GoDIET looks in the `${HOME}/.godiet/configuration.xml` directory.

The mains elements are :

- **localNode** : the name of the node on which GoDIET was launched. This name must be present in the infrastructure description file ;
- **localScratch** : the working directory where GoDIET stores its temporary files ;
- **keys** : the paths of your private ssh keys, which are loaded at GoDIET's startup. You can give the public key's path, too. GoDIET tries to load a file with the same name as the private key and ending with **.pub**. See the **ssh initkeys** command [1.2.6](#) to initialize passwords if your keys are encrypted (i.e. need a passphrase).

General layout of the configuration description (some parts are omitted) :


```
<godiet:configuration localNode="local" schema="Configuration.xsd">

  <localscratch dir="/tmp/scratch_godiet" />
  <user>
    <ssh>
      <key path="/home/.ssh/id_dsa"/>
      <key path="/home/.ssh/admin_cluster2"/>
    </ssh>
  </user>
</godiet:configuration>
```

GODIET client setup

distribution.layout RMI configuration run-client.sh

1.2.4 Running Diet

Before using GODIET, you need to create three files : one to describe GODIET's configuration, one to describe your infrastructure and one that contains your DIET platform's description. These files use an XML-format and conform to the Configuration.xsd, Infrastructure.xsd and Diet.xsd grammar files (provided with GODIET), respectively. Sample files are provided in the **examples** directory.

Infrastructure.xml

GODIET needs to have the description of the infrastructure on which DIET will be running.

You can find the full list of options in the **Infrastructure.xsd** grammar file. You can also look in the **examples** directory.

The fields are :

Domain : aggregates a set of infrastructure elements (nodes, gateways, storage) which are able to communicate with DIET's exchange protocol (i.e., CORBA). Typically, elements separated by a firewall and/or a router must be described in separate domains ;

Node : describe a computing node where agents or SeDs will be running. It could be either a physical or virtual machine ;

Link : defines a directional link par lequel les communications SSH sont possibles. Il existe deux types de liens

- Entre un domaine et une machine : typiquement des machines derrière un nat (en violet sur la figure).
- Entre deux machines : la source est un routeur.

General layout of the infrastructure description (details are omitted) :

```
<godiet:infrastructure schema="Infrastructure.xsd">
  <domain id="idDomain1"/>
  <domain id="idDomain2"/>
  ..
  <node id="idNode">
    <ssh id="idInterface" domain="idDomainRef" login="login"
      server="ip/hostname" port="2022" />
    <scratch dir="/tmp/scratch_runtime/" />
    <ssh id="idInterface" domain="idDomainRef" login="login"
      server="ip/hostname" />
    <scratch dir="/tmp/scratch_runtime/" />
  </node>
  ..
  <link fromDomain="DomainSysferaLB" to="graal" accessref="graalinterface1"/>
  <link from="graal" to="testbedVM" accessref="testbedVMinterface1" />
  ..
</godiet:infrastructure>
```

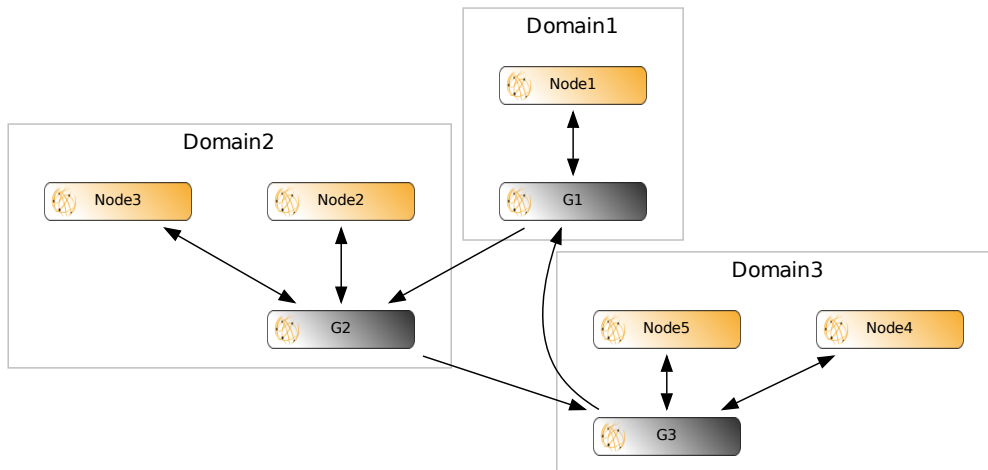


FIGURE 1.2 – Example of the representation of a three-domain infrastructure.

1.2.5 Platform.xml

A GoDIET user can describe the desired deployment in an XML file including all the external services needed (*e.g.*, omniNames and LogService). The desired hierarchical organization of agents and servers is expressed directly using the hierarchical organization of XML.

Services

Hierarchy

Sed description Explication : ligne de commande,

The most important fields are :

- **dietServices** : lists your DIET services, such as omniNames and LogCentral ;
- **dietArchitecture** : lists your DIET hierarchy, with all your agents and SeDs.

General layout of the DIET platform description (details are omitted) :

```
<godiet:dietPlatform schema="Diet.xsd">
  <services>

    <omniNames id="omniNames1" domain="DomainId1">
<config server="refIdNode"/>
    </omniNames>
    <omniNames id="omniNames1" domain="DomainId2">
<config server="refIdNode"/>
    </omniNames>
    <!-- Inter-connect Domain1 and Domain2 -->
    <forwarders>
      <client id="client1" type="CLIENT">
        <config server="refIdNode" />
      </client>
      <server id="server1" type="SERVER">
        <config server="refIdNode" />
      </server>
    </services>

    <hierarchy>
      <ma id="ma1">
        <config server="refIdNode"/>
        <la id="la1" server="refIdNode">
          <config server="refIdNode"/>
          ..
          <sed id="sed1">
            <config server="refIdNode"/>
            <file id="sed1_config">
              <template name="sed_template.config" />
            </file>
            <binary name="dmat_manips_server">
              <commandLine>
                <parameter string="${this.configurationFiles.sed1_config.absolutePath}" />
                <parameter string="T" />
              </commandLine>
            </binary>
          </sed>
          ..
          </la>
          ...
        </ma>
        <ma id="ma2" server="refIdNode3">..</ma>
      </hierarchy>

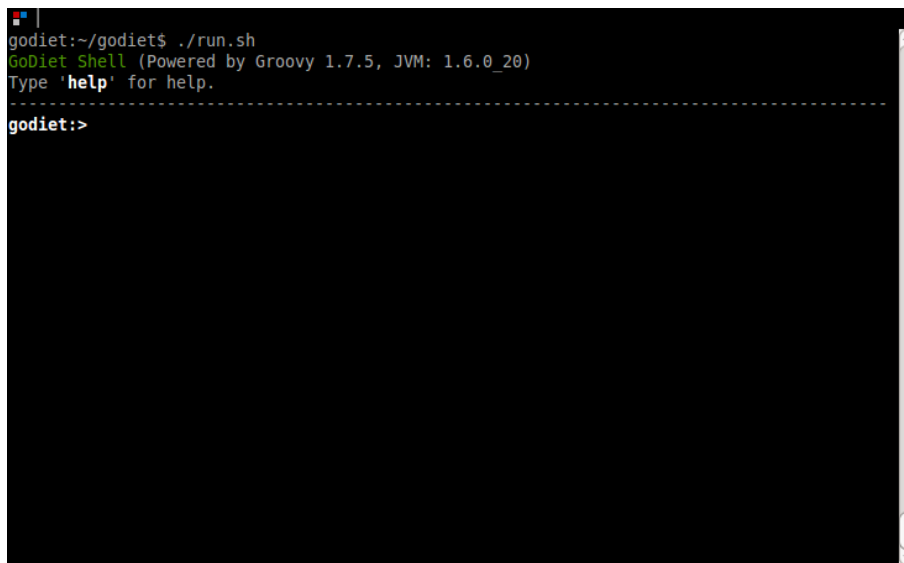
</godiet:dietPlatform>
```

1.2.6 Godiet shell

GoDIET shell is the interface to manage and monitor your DIET platform. It includes features such as syntax highlighting, command completion and command history. To use it, simply execute the script `run.sh`. You will obtain a prompt like in figure 1.3

TODO 4 (Il est où?).

Aucune trace de `run.sh` ?

A terminal window showing the GoDiet shell prompt. The prompt is 'godiet:~/godiet\$./run.sh'. The output shows 'GoDiet Shell (Powered by Groovy 1.7.5, JVM: 1.6.0_20)' and 'Type 'help' for help.' followed by a dashed line and the prompt 'godiet:>'.

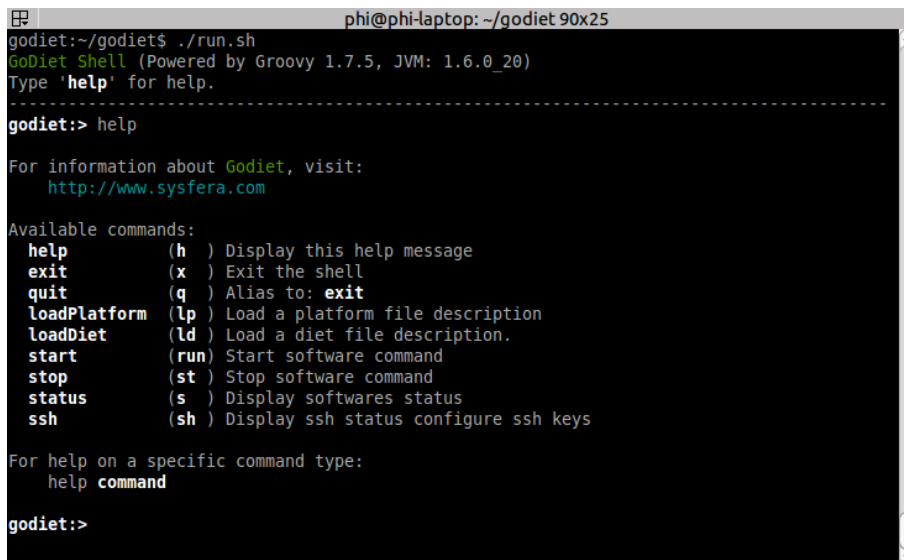
```
godiet:~/godiet$ ./run.sh
GoDiet Shell (Powered by Groovy 1.7.5, JVM: 1.6.0_20)
Type 'help' for help.
-----
godiet:>
```

FIGURE 1.3 – GoDIET shell prompt.

The help command

Displays the help message. By default, lists all the commands and short information about them. It gives contextual help when followed by a command name.

- **command** : gives help on the command.

A terminal window showing the output of the 'help' command. The prompt is 'godiet:> help'. The output includes information about Godiet, a list of available commands with their shortcuts, and instructions on how to get help for a specific command. The prompt 'godiet:>' is shown at the bottom.

```
phi@phi-laptop: ~/godiet 90x25
godiet:~/godiet$ ./run.sh
GoDiet Shell (Powered by Groovy 1.7.5, JVM: 1.6.0_20)
Type 'help' for help.
-----
godiet:> help

For information about Godiet, visit:
  http://www.sysfera.com

Available commands:
help      (h ) Display this help message
exit      (x ) Exit the shell
quit      (q ) Alias to: exit
loadPlatform (lp) Load a platform file description
loadDiet   (ld) Load a diet file description.
start      (run) Start software command
stop       (st) Stop software command
status     (s ) Display softwares status
ssh        (sh) Display ssh status configure ssh keys

For help on a specific command type:
  help command

godiet:>
```

FIGURE 1.4 – The help command.

The ssh command

The **ssh** command takes the following arguments :

- **initpasswords** : to initialize the SSH key's passphrase loaded from the configuration file ;
- **addkey** : to register a new key ;

- **modifykey n** : to modify a key that has already been registered ;
- **status** : to display the key's status. Could be PASSWORDNOTSET, PRIVATEKEYERROR, PUBKEYERROR or LOADED.

The loadInfrastructure command

Loads an infrastructure description file [1.2.4](#).

- **filename** : loads an infrastructure from the specified XML file.

The loadDiet command

Loads the DIET platform description [1.2.5](#). When the loading is complete, GoDIET automatically computes and creates all the DIET forwarders needed. These DIET forwarders are mandatory when your platform is deployed on several domains. For more details, please refer to the DIET documentation.

- **filename** : loads a DIET platform from the specified XML file.

The start & stop commands

The **start** and **stop** commands both take the same arguments :

- **software name** : starts/stops software *name*.
- **services** : starts/stops all services ;
- **agents** : starts/stops all agents ;
- **seeds** : starts/stops all seeds ;
- **all** : starts/stops all software components ;

The status command

The command displays the status of the DIET platform's software components. It takes the following arguments :

- **ma** : displays the status of the master agents ;
- **la** : displays the status of the local agents ;
- **seeds** : displays the status of the server daemons ;
- **all** : displays the status of all the managed software components.

The **status** command displays the software components managed by GoDIET as a table. Figure [1.5](#) shows an output exemple of this command's execution. The information is :

- **Label** : the name of the component, as described in the DIET platform description ;
- **Status** : the status of the component ;
- **Since** : the date since when the component has been in this status ;
- **Plugged** : the infrastructure resource it is or will be running on (depending on its state) ;
- **Cause** : an information message, in case of error.

The possible states of a component are :

- **Incubate** : the component is correctly loaded in GoDIET ;
- **Ready** : the configuration files are created in the local scratch directory and the component is ready to start ;
- **Up** : the component is running. Its state is periodically checked ;
- **Down** : the component is down. Typically, if the GoDIET user has used the **stop** command on this component ;
- **Error** : appears when the component is not running (unable to launch or crashed) or if it is unreachable. The cause is displayed in the Cause row of the information table.

```

OmniNames Status (3) :

```

Label	Status	Since	Plugged	Cause
omniNames1	ERROR	2011-05-06 12:07:46	Node1	null
omniNames2	UP	2011-05-06 12:07:53	Node2	-
omniNames3	UP	2011-05-06 12:08:01	Node4	-

```

Forwarders Status (6) :

```

Label	Status	Since	Plugged	Cause
DietForwarder-G1-CLIENT	INCUBATE	2011-05-06 12:07:25	G1	-
DietForwarder-G2-SERVER	INCUBATE	2011-05-06 12:07:25	G2	-
DietForwarder-G2-CLIENT	INCUBATE	2011-05-06 12:07:25	G2	-
DietForwarder-G3-SERVER	INCUBATE	2011-05-06 12:07:25	G3	-
DietForwarder-G3-CLIENT	INCUBATE	2011-05-06 12:07:25	G3	-
DietForwarder-G1-SERVER	INCUBATE	2011-05-06 12:07:25	G1	-

```

Master agents Status (1) :

```

Label	Status	Since	Plugged	Cause
MA1	INCUBATE	2011-05-06 12:07:25	Node1	-

```

No Local agents

Seds Status (3) :

```

FIGURE 1.5 – The status command.

1.2.7 Un exemple plus complexe

Déploiement sur une plate-forme réelle