Basic Management Interface
User Manual

March 9, 2007

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1 Introduction

The Basic Management Interface (BMI) is an interface included in the OpenTC project which provides facilities for the configuration and management of individual software components called *Protection Domains*. The communications between the Protection Domains are subjected to security policies managed by the BMI.

The BMI is supposed to address three requirements:

- **Common Management View**
  The BMI should hide the details on the actual virtualization approach used in the system, which may be L4 or Xen.
- **Dynamic manipulation of the Protection Domains**
  The management functionalities of the BMI must allow dynamic creation and reconfiguration of the Protection Domains hosted by the Hypervisor.
- **Integrity Control**
  The BMI should provide primitives to link the integrity information of the trusted virtualization layer with the integrity measurements of the Protection Domains.

The components eventually manipulated by the BMI Server are the Protection Domains to which belong a set of virtual CPUs and some allocated virtual memory. A BMI client does not interact directly with a Protection Domain but uses a controller interface that provides the methods for its management and configuration. The core functionalities are defined at the level of the BMI Server, with which the client may interact.

In the L4 version presented here, the BMI is implemented as a server and a client-side library which provides a set of front-end classes. These classes contain the methods which allow to configure and manage Protection Domains, where each Protection Domain corresponds to a L4 task.

2 Usage

In this implementation of the BMI, four operations on Protection Domains are supported:

1. **start**: Start a new Protection Domain, where the Protection Domain can be either a L4Linux-2.6 task (command `--start-linux`) or any other L4 task (command `--start`). The Protection Domain is assigned a unique identifier by the BMI Server.
2. **shutdown** n: Instruct the Protection Domain with identifier n to perform a clean shutdown.
3. **destroy** n: Kill the Protection Domain with identifier n and clear all the resource allocated by it.
4. **listpds** k: Display a list (labelled with k) of all the Protection Domains currently available at the BMI Server.

The specific sequence of operations a BMI client wants to perform can be written in form of *L4 Loader configuration files* or executed directly in a L4Linux-2.6 console. In the former case, the usual syntax, described in [2], was extended to support interaction with the BMI Server. In these files, every new operation should be written on a new line and match one of the following patterns:

`task ‘‘bmi_cmd_l4’’ ‘‘--start-linux` *image_name memory_size* `’’`

`task ‘‘bmi_cmd_l4’’ ‘‘--start` *image_name* `[` *argument_list* `] ’’`

`task ‘‘bmi_cmd_l4’’ ‘‘--shutdown` *pd_id*`’’`

`task ‘‘bmi_cmd_l4’’ ‘‘--destroy` *pd_id*`’’`

`task ‘‘bmi_cmd_l4’’ ‘‘--listpds [` *label_number* `] ’’`

The user may define some parameters:

- *image_name*: the name of the binary file executed in order to start the Protection Domain. You can use `$BMIBASE/cfgdir/vmlinux` with `--start-linux` or `$BMIBASE/cfgdir/cbhinew` with `--start`.
- *pd_id*: identifier of the Protection Domain concerned by this operation.
- *memory_size*: the size (in MB) of the memory assigned to the Protection Domain. The default value is 32.
- *label_number*: an arbitrary integer displayed with the list in order to identify it. The default value is -1.
- *argument_list*: an arbitrary list of additional parameters passed when the Protection Domain is created.

These Loader configuration files must be saved in the directory `$BMIBASE/cfgdir`. Then, executing the script `$BMIBASE/cfgdir/bmi_start` with the name of one of these Loader configuration files as parameter (e.g. the file `$BMIBASE/cfgdir/bmitest.cfg`) leads the BMI Server to start and perform the required operations. The direct management in L4Linux-2.6 is achieved by executing `/bin/bmi_cmd` followed by the aforementioned commands.

References

[1] D4.1 Basic Management Interface, OpenTC Report, WP4, June 2006.

[2] L4 Loader Manual, http://os.inf.tu-dresden.de/ fm3/doc/loader/p_hello_page.html.