grs documentation

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CHAPTER

ONE

INTRODUCTION

This document describes the use of the *grs* (GMT Runtime System) tool.

CHAPTER

TWO

THE GRS COMMAND LINE TOOL

The grs utility allows interacting and communicating with remote component instances. The utility has several commands that are explained in the following sections. The `send` and `listen` commands are mostly used for debugging purposes, while the `get`, `set` and `inspect` commands are intended to interact with a remote component during operation. The `compile` command process the configuration file of a given component so it's ready to be consumed during the start up of a component. This removes the need for sending the configuration of a component to the configuration port after starting the component.

The `grs` common options are described at the end of this document. The `grs` help command provides a brief description of the utility:

```
$ grs --help
grs [command]

Commands:
grs send [instance]             Send a message to the port of the␣
↪instance[aliases: push]
grs listen [instance]           Listen to messages from the port of the␣
↪instance
grs compile [module]            Compiles the configuration of a module or␣
↪compile the
                                 input file passed as argument
grs info <instance>             displays configuration information for a␣
↪given instance
grs get <instance>              Obtains the value of a feature of a remote␣
↪Component
                                 instance
grs set <instance>              Sets the value of a feature in a remote␣
↪Component
                                 instance
grs db <operation> <instance>   Database operations when the instance␣
↪implements a
                                 database server
grs inspect <instance>          scans the values of all the features of a␣
↪remote
                                 Component instance

Options:
--version    Show version number                                              ␣
↪  [boolean]
--name       name of the configurable entity              [string] [default:
↪"grs_7074"]
--scope      scope to load the configuration file                 [string]␣
↪[default: ""]
--config     name of the component configuration to be applied
```

```
                                                                [string]␣
↪[default: "default"]
--auto_conf  load the configuration from file if it exists     [boolean]␣
↪[default: true]
--logging    logging level                                     [string]␣
↪[default: "info"]
--help       Show help                                                 ␣
↪  [boolean]

Examples:
grs send -i x_ctrl -p position_goal -m 1
grs send -i x_ctrl -p position_goal -m 1 2.4 3 -d 100
grs listen --url 'tcp://127.0.0.1:14103'
grs listen tele_server --port 'pub_port'
grs compile <instance_name>
grs compile --input <absolute_file_path> --output <file_path>
grs get x_ctrl -f state_vars
grs get x_ctrl -f state_vars/position
grs get x_ctrl -f state_vars/position/goal
grs set x_ctrl -f state_vars/position/goal -v 1.5
grs db query  alarm_srv -e '{src: "alarm_srv"}'
grs db query  alarm_srv -e '{src: {$regex: /alarm_srv/}' --limit 10
grs db insert alarm_srv -r '{src: "test_client"}'
grs db update alarm_srv -e '{src: {$regex: /alarm_srv/}' -u '{ $set:
↪{counter: 1} }'
grs db delete alarm_srv -e '{state: "ON" }'
grs inspect alarm_server
grs inspect alarm_server -f properties
grs inspect alarm_server -f state_vars -s goal

For more information, find our manual at https://gmto.github.io/gmt_docs/
```

2.1 grs send

Description

The `send` command sends messages to a running component instance. The receiver endpoint can be specified in two ways:

- Using the instance, the port and the configuration (this last one is optional).
- Using the url of the receiver port.

The help options displays an overview of the send command:

```
$ grs send --help

 grs send [instance]

 Send a message to the port of the instance

 Options:
 --instance, -i  name of the instance                            ␣
↪    [string]
 --delay, -d     Delay between messages                    [number]␣
↪[default: 1]
 --port, -p      name of the port                                ␣
↪    [string]
```

```
 --url, -u       url of the port                                                 ␣
↪    [string]
 --msg, -m       message(s) to be send                                           ␣
↪     [array]
 --file, -f      Name of the file to send                                        ␣
↪    [string]
 --repeats, -r   Number of times the message is send                [number]␣
↪[default: 1]
 --conf, -c      name of the configuration                  [string]␣
↪[default: "default"]
```

Options

`--instance, -i` the name of the receiver component instance.

`--delay, -d` the delay between messages in milliseconds if case more than one message is sent (see option –repeats)

`--port, -p` the name of the receiver component port

`--url, -u` the url of the receiver port

`--msg, -m` the message(s) to be send. The messages are separated by an space.

```
$ grs send -i test_cmp -p position_goal -m 1 2 3 -d 100

# will send 3 messages (1 -> a), (2 -> b), (3 -> c) with a delay of 100 ms␣
↪between them
```

The following data types are supported:

- string: 'message content'
- array: '[1, 2, 3, [4, 5]]'
- struct: '{one: 1, two: "two", three: [1, 2, 3]}'
- number: 10

`--file, -f` name of the file to be send

`--repeats, -r` Number of times that the message(s) is send.

`--conf, -c` the name of the configuration of the receiver component

Examples

2.2 grs listen

Description

The `listen` command listens to messages from a running component instance Like in the `send` command is possible to address a remote endpoint by giving the instance, port and configuration or by using directly the url of the remote port

```
$ grs listen --help

 grs listen [instance]
```

```
Listen to messages from the port of the instance

Options:
--instance, -i  name of the instance                                    ␣
↪    [string]
--port, -p      name of the port                        [string] [default:
↪"sd_rep_out"]
--url, -u       url of the port                                         ␣
↪    [string]
--conf, -c      name of the configuration                  [string]␣
↪[default: "default"]
```

Options

`--instance, -i` the name of the remote component instance.

`--port, -p` the name of the remote component port

`--url, -u` the url of the remote port

`--conf, -c` the name of the configuration of the remote component

2.3 grs compile

Description

The `compile` commands process the configuration file of a given component so it's ready to be consumed during the start up of a component. This removes the need for sending the configuration of a component to the configuration port after starting the component. The compiled configuration is saved in the same location as the configuration file (e.g: $GMT_LOCAL/etc/conf/<subsystem>) with the extension .cfg

```
$ grs compile --help

grs compile [instance]

Compile the configuration of an instance. Compiled files are saved in $GMT_
↪LOCAL/etc/conf/subsystem/

Options:
--instance, -i  name of the instance                                    ␣
↪    [string]
--conf, -c      name of the configuration                  [string]␣
↪[default: "default"]
```

Options

`--instance, -i` the name of the component instance.

`--conf, -c` the name of the configuration of the component intance

2.4 grs info

Description

The `info` command displays the configuration information of a component instance, showing what features are defined. This information can be used in the `get`, `set` commands.

```
$ grs info --help

 grs info [instance]

 displays configuration information for a given instance

 Options:
 --instance, -i  name of the instance                                    [
↪    [string]
 --conf, -c      name of the configuration                  [string]
↪[default: "default"]
```

Options

`--instance, -i` the name of the remote component instance.

`--conf, -c` the name of the configuration of the remote component

Examples

```
$ grs info -i x_ctrl

 Configuration: default
 { properties:
 { host:
     { name: 'host',
         default_value: '127.0.0.1',
         type: 'string',
         desc: '' },
     port:
     { name: 'port', default_value: 12200, type: 'integer', desc: '' },
     scan_rate:
     { name: 'scan_rate', default_value: 1, type: 'integer', desc: '' } },
 state_vars:
 { position:
     { name: 'position',
         default_value: 1.1,
         min: -100,
         max: 100,
         type: 'float',
         blocking_mode: 'sync',
         desc: 'Axis position' } },
 inputs:
 { encoder:
     { name: 'encoder',
         default_value: 1.1,
         min: -100,
         max: 100,
         type: 'float',
         blocking_mode: 'sync',
         desc: 'Axis encoder input' } },
 outputs:
 { motor:
     { name: 'motor',
         default_value: 1.1,
         min: -100,
         max: 100,
         type: 'float',
         blocking_mode: 'sync',
```

```
        desc: 'Axis motor demand' } },
faults:
{ motor_over_heat:
    { name: 'motor_over_heat',
        default_value: 'NOT_ACTIVE',
        kind: 'primary',
        level: 'CRITICAL',
        detection_latency: 1,
        type: 'string',
        parent: 'axis_fault',
        desc: 'Motor Overheat' },
    encoder_fault:
    { name: 'encoder_fault',
        default_value: 'NOT_ACTIVE',
        kind: 'primary',
        level: 'CRITICAL',
        detection_latency: 1,
        type: 'string',
        parent: 'axis_fault',
        desc: 'Encoder not responding' },
    motor_fault:
    { name: 'motor_fault',
        default_value: 'NOT_ACTIVE',
        kind: 'primary',
        level: 'CRITICAL',
        detection_latency: 1,
        type: 'string',
        parent: 'axis_fault',
        desc: 'Motor not responding' },
    axis_fault:
    { name: 'axis_fault',
        default_value: 'NOT_ACTIVE',
        kind: 'or',
        level: 'CRITICAL',
        detection_latency: 1,
        type: 'string',
        parent: null,
        desc: 'Axis fault' } },
alarms:
{ axis_malfunction_alarm:
    { name: 'axis_malfunction_alarm',
        default_value: 'NORM',
        type: 'string',
        desc: 'The X Axis is not operational' } },
connectors: []
Proxy ports:
{ sd_req_in: 'tcp://127.0.0.1:12204',
sd_rep_out: 'tcp://127.0.0.1:12203',
sd_req_out: 'tcp://127.0.0.1:12201',
sd_rep_in: 'tcp://127.0.0.1:12202' }
```

2.5 grs get

Description

The `get` command retrieves information about the state of a component. If not feature is specified it will display all

the features of the component.

```
$ grs get --help

 grs get [instance]

 displays the value of a feature of a remote Component instance

 Options:
 --instance, -i  name of the instance                                    ␣
↪    [string]
 --conf, -c      name of the configuration                  [string]␣
↪[default: "default"]
 --feature, -f   name of the feature                                     ␣
↪    [string]
 --slice, -s     name of the attribute to slice the collection           ␣
↪    [string]
```

Options

`--instance, -i` the name of the remote component instance.

`--conf, -c` the name of the configuration of the remote component

`--feature, -f` the name of the feature to be get from the remote component. The feature is specified by defining its path: <feature_set>/<feature_name>/<feature_attribute>, where

- feature_set: the category of the component feature, eg.: state_vars, inputs
- feature_name: the name of the feature, e.g: op_state
- feature_atrribute: the name of the attribute of the feature e.g: value, goal, desc

`--slice, -s` the name of the slice

Examples

```
$ grs get -i x_ctrl

 # will display all the features of the x_ctrl component

$ grs get -i x_ctrl -f state_vars

 # will display all the values of all the state variables of x_ctrl

$ grs get -i x_ctrl -f state_vars -s desc

 # will display all the descriptions of all the state variables of x_ctrl

$ grs get -i x_ctrl -f state_vars/position

 # will display all the attributes of the x_ctrl position state variable

$ grs get -i x_ctrl -f state_vars/position/goal

 # will display the goal of the x_ctrl position state variable
```

2.6 grs set

Description

The `set` command sets the value of a feature in a remote component

```
$ grs set --help

 grs set [instance]

 Sets the value of a feature in a remote Component instance

 Options:
 --instance, -i  name of the instance
↪    [string]
 --conf, -c      name of the configuration                  [string]
↪[default: "default"]
 --feature, -f   name of the feature
↪    [string]
 --value, -v     New value
↪     [array]
```

Options

`--instance, -i` the name of the remote component instance.

`--conf, -c` the name of the configuration of the remote component

`--feature, -f` the name of the feature to be set in the remote component

`--value, -v` the new value to be set in the remote component feature

```
$ grs set -i x_ctrl -f state_vars/position/goal -v 1.5

# will set the goal of the remote component position state variable to 1.5
```

The following data types are supported:

- string: 'value content'
- array: '[1, 2, 3, [4, 5]]'
- struct: '{one: 1, two: "two", three: [1, 2, 3]}'
- number: 10

2.7 grs inspect

Description

The `inspect` continuously retrieve the values of all the features of a remote component instance

```
$ grs inspect --help

 grs inspect [instance]

 retrieves the values of all the features of a remote Component instance

 Options:
```

```
 --instance, -i  name of the instance                                          ␣
↪    [string]
 --feature, -f   name of the feature                                           ␣
↪    [string]
 --rate, -r      Scan rate, 0 = 1 shot                                  [number]␣
↪[default: 10]
 --conf, -c      name of the configuration                          [string]␣
↪[default: "default"]
```

Options

`--instance, -i` the name of the remote component instance.

`--feature, -f` the name of the feature to retrieve from the remote component. If this parameter is passed `grs inspect` will update only the value of the specified feature

`--rate, -r` the rate at which `grs inspect` will retrieve and display the remote information

`--conf, -c` the name of the configuration of the remote component

The following example shows the ouput of the inspect command for a component implemented in nodeJS:

```
$ grs inspect cartesian_ctrl

 Timestamp:  Mon Jul 01 2019 17:37:21 GMT-0700 (Pacific Daylight Time) hb
↪#:[0]
 { properties:
 { name: 'cartesian_ctrl',
     scope: '',
     config: 'default',
     auto_conf: true,
     uri: '',
     host: '127.0.0.1',
     port: 12500,
     scan_rate: 1,
     auto_start: false,
     auto_init: false,
     auto_halt: true,
     auto_shutdown: true },
 state_vars: { op_state: 'RUNNING', position: 0.01 },
 inputs:
 { x_position_in: 18.499999999999996,
     y_position_in: 1.1,
     z_position_in: 18.499999999999996 },
 outputs:
 { x_position_out: 17.69999999999998,
     y_position_out: 17.69999999999998,
     z_position_out: 17.69999999999998 },
 faults:
 { x_axis_fault: 'NOT_ACTIVE',
     y_axis_fault: 'NOT_ACTIVE',
     z_axis_fault: 'NOT_ACTIVE',
     stage_fault: 'NOT_ACTIVE' },
 alarms: {},
 connectors: { },
 proxies: { x_ctrl: null, y_ctrl: null, z_ctrl: null } }
 Enter <CTRL-C> to exit
```

2.8 grs db

Description

The db allows to interact with a Component that implements the ServerProxy API.

```
$ grs db --help
grs db <operation> <instance>

Database operations when the instance implements a database server

Options:
--instance     name of the instance                                          ␣
↪   [string]
--conf, -c     name of the configuration                    [string]␣
↪[default: "default"]
--operation    name of the database operation
                              [string] [choices: "query", "insert", "update
↪", "delete"]
--output, -o   output format of the database result operation
[string] [choices: "raw", "payload", "console", "json", "json_raw"]␣
↪[default: "console"]
--expr, -e     the expresion of the query in MongoDB format       [string]␣
↪[default: ""]
--record, -r   the record to insert in the database              [string]␣
↪[default: ""]
--update, -u   update to apply to the query record               [string]␣
↪[default: ""]
--limit, -l    the maximum number of records to return from the query
                                                                   [number]␣
↪[default: 40]
--timeout, -t  timeout for the get command                      [number]␣
↪[default: 400]
```

Options

`--operation` the name of the database operation. The choices are:

- `query`: Sends a query to the service server and returns the result. The query must be writen using the mongodb query syntax [https://docs.mongodb.com/manual/tutorial/query-documents/]
- `insert`: Inserts a new record in the database
- `update`: Updates the record(s) defined by the –expr option with the update expresion. The –update and –expr options follow the MongoDB syntax
- `delete`: Deletes the record(s) defined by the –expr option.

`--instance` the name of the remote component instance.

`--conf, -c` the name of the configuration of the remote component

`--output, -o` the ouput format of the database result operation. The possible choices are:

- `raw`: Writes to the standard output the query result as generated by the MongoDB database. It includes additional information related to the database organization
- `payload`: Writes to the standard output the data part of the query result.
- `console`: Similar with payload but with console formatting.
- `json`: Creates a file in the current directory with the data part of the query result.

- `json_raw`: Creates a file in the current directory with the query result as generated by the MongoDB database.

`--expr, -e` the query expresion used for the query, update and delete operations. The query expression follows the MongoDB systax

`--record, -r` the record to be inserted in the database

`--update, -u` the update expresion for the update operation. The update expression follows the MongoDB syntax

`--limit, -l` the maximum number of records returned by the database query operation

The following examples show different db commands

```
$ grs db query  alarm_srv -e '{src: "alarm_srv"}'
$ grs db query  alarm_srv -e '{src: {$regex: /alarm_srv/}' --limit 10
$ grs db insert alarm_srv -r '{src: "test_client"}'
$ grs db update alarm_srv -e '{src: {$regex: /alarm_srv/}' -u '{ $set:
↪{counter: 1} }'
$ grs db delete alarm_srv -e '{state: "ON" }'
```

2.9 grs options

The following options can be used in combination with the previous commands

`-V, --version` The `grs` command will print the version number

`-l, --logging <level>` Activates <level> logging. The following table describes the different values available for the `logging` option

<level>	Abbr	Description
fatal	FTL	fatal - errors which make the application unusable
error	ERR	error - errors that preclude to achive an specific request
warning	WRN	warning - problems that may caused that the result achieved may not be the expected
info	INF	info - information about the general execution of the application
debug	DBG	debug - information to provide an understanding of the internal of the application
trace	TRC	trace - information that may server to identify a potential problem
metric	MET	metric - information to record performance metrics relative to the execution of the application

`auto_conf` Loads and applies the `grs` application configuration file if it exists.

`config` Name of the `grs` application configuration file

`scope` Scope used to load the `grs` configuration file

`-h, --help` output usage information