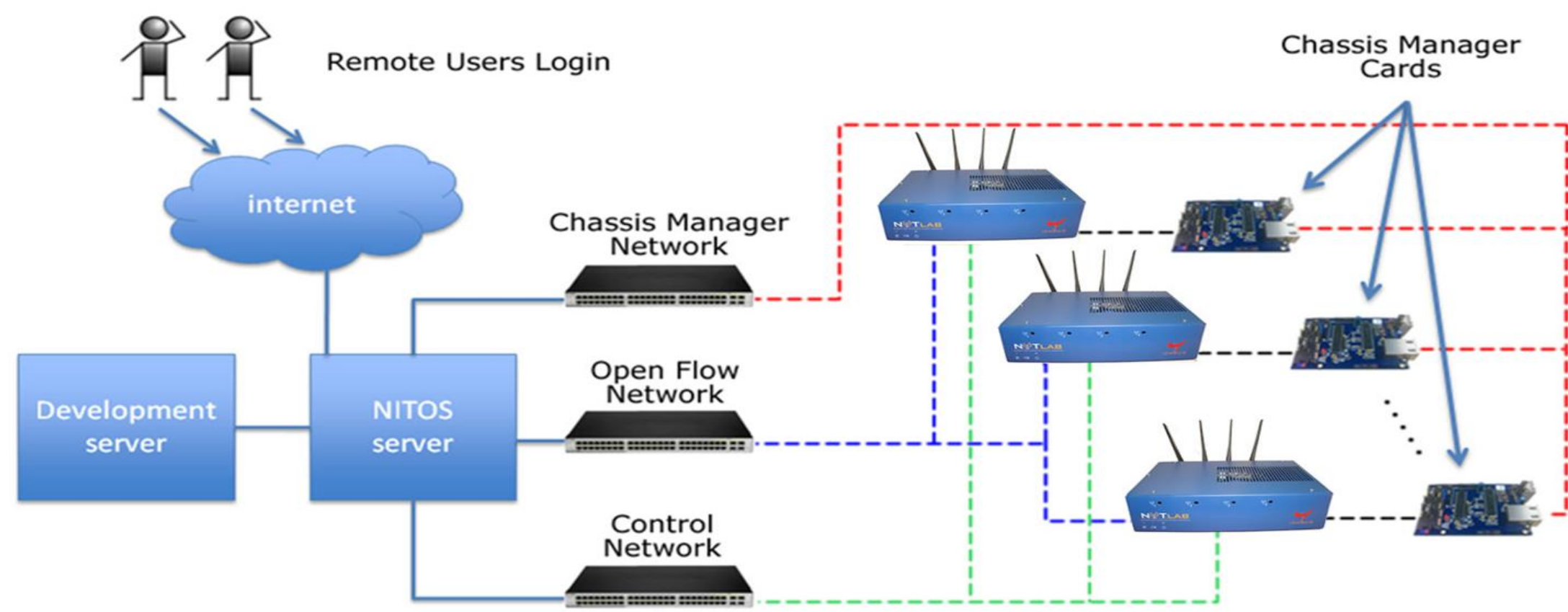
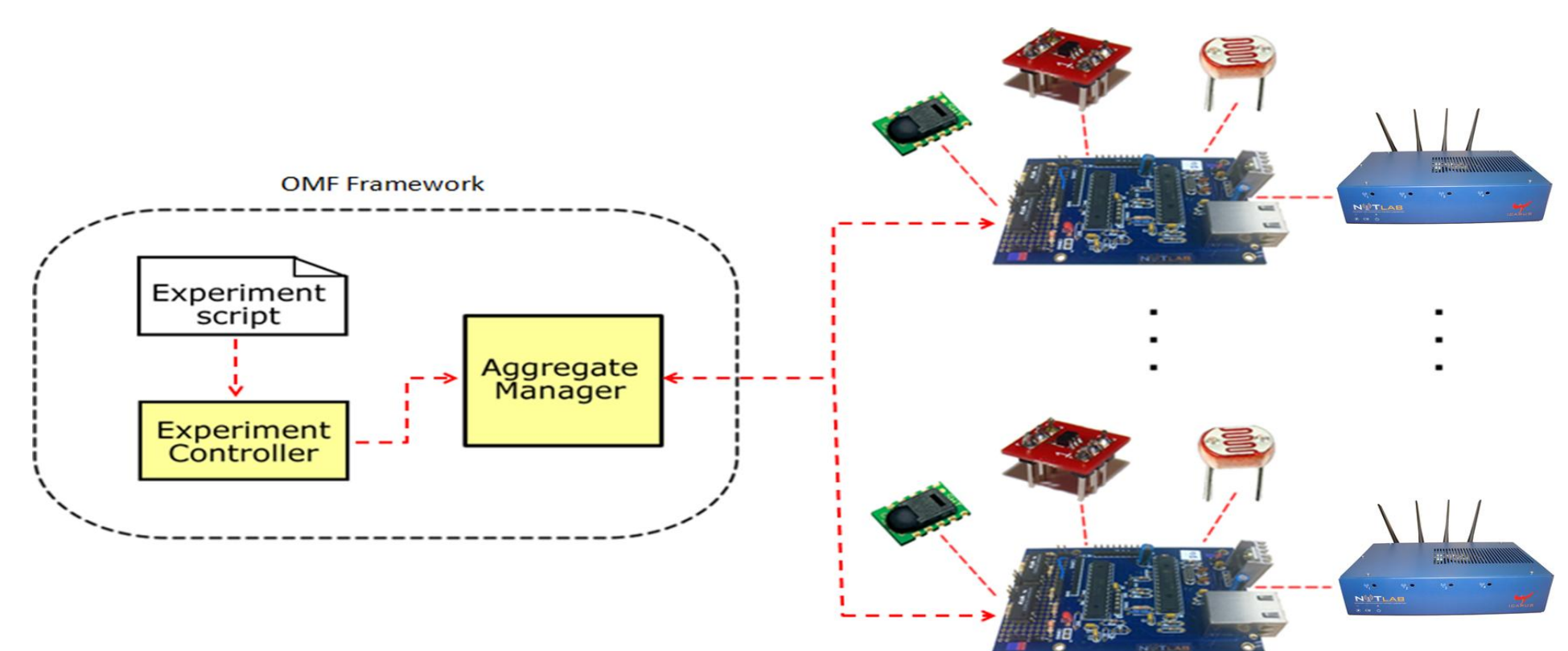


# Integrating sensor measurements through CM cards as an OMF service

## NITOS ARCHITECTURE



## PROVISION OF MEASUREMENT OMF SERVICE THROUGH CM CARDS



## OMF MEASURE COMMAND

```

root@nitlab:~# omf-5.4 help measure
Returns the value of a node's measurement (temperature, humidity, light, power consumption, current node's state)
Usage:
omf-5.4 measure -m SENSOR-MEASUREMENT [-h] [-t TOPOLOGY] [-c AGGREGATE]

With:
-h, --help           print this help message

-m, --measure SENSOR-MEASUREMENT specifies which measurement is requested from
the CM card attached to the nodes in the TOPOLOGY argument
MEASURE:
temp                returns the temperature of the node
humidity            returns the humidity measurement of the node
light               returns the light measurement of the node
power               returns the power consumption of the node
state               returns the present state (ON/OFF) of the node
all                 returns all the measurements and the present state (ON/OFF) of the node

-c, --config AGGREGATE use testbed AGGREGATE
-t, --topology TOPOLOGY a valid topology file or description (defaults to 'system:topo:all')

Some Examples:
omf-5.4 measure -m temp
omf-5.4 measure -m humidity -t omf.nitos.node019,omf.nitos.node020
omf-5.4 measure -m light -t omf.nitos.node019
    
```

### Microcontroller board features:

- an Ethernet interface
- a tiny webserver which allows programming of web services
- various types of sensors (temperature, humidity, etc.)

### Advantage of using CM cards:

Sensor measurements are decoupled from the function of the main testbed nodes, allowing for savings in power consumption and increased node availability

## OMF MEASURE SCENARIOS

```
vamaglog@nitlab:~/test$ omf-5.4 measure -m temp -t omf.nitos.node019
```

```

Domain: nitlab.inf.uth.gr - Command: temperature
Node: omf.nitos.node019   Reply: 28.6
    
```

```
vamaglog@nitlab:~/test$ omf-5.4 measure -m humidity -t omf.nitos.node019
```

```

Domain: nitlab.inf.uth.gr - Command: humidity
Node: omf.nitos.node019   Reply: 43
    
```

```
vamaglog@nitlab:~/test$ omf-5.4 measure -m light -t omf.nitos.node019
```

```

Domain: nitlab.inf.uth.gr - Command: light
Node: omf.nitos.node019   Reply: 99
    
```

```
vamaglog@nitlab:~/test$ omf-5.4 measure -m state -t omf.nitos.node019
```

```

Domain: nitlab.inf.uth.gr - Command: state
Node: omf.nitos.node019   Reply: on
    
```

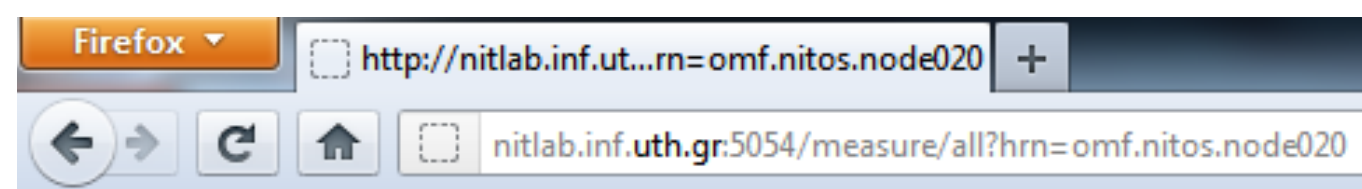
```
vamaglog@nitlab:~$ omf-5.4 measure -m all -t omf.nitos.node019
```

```

Domain: nitlab.inf.uth.gr - Command: all
Node: omf.nitos.node019   Reply: temperature
Node: omf.nitos.node019   Reply: <value>34.0</value>
Node: omf.nitos.node019   Reply: humidity
Node: omf.nitos.node019   Reply: <value>37</value>
Node: omf.nitos.node019   Reply: light
Node: omf.nitos.node019   Reply: <value>99</value>
Node: omf.nitos.node019   Reply: power
Node: omf.nitos.node019   Reply: <value>0</value>
Node: omf.nitos.node019   Reply: state
Node: omf.nitos.node019   Reply: <value>on</value>
    
```

## OTHER WAYS TO CALL THE SERVICE

Besides the "omf measure" command, the CM sensor measurement service can be requested through the testbed's Aggregate Manager through http (see figure below) or XMPP



```

<Measurement>
temperature
<value>37.2</value>
humidity
<value>32</value>
light
<value>99</value>
power
<value>0</value>
state
<value>on</value>
</Measurement>
    
```

## MORE PRACTICAL USAGE

- Testbed users can schedule specific measurements on the testbed's CM-card-mounted sensors.
  - The results are stored in SQL databases via the OML measurement framework.
- Users can then view the results graphically at the NITOS website (currently, average values, variances and correlation across nodes are computed).



```

vamaglog@nitlab:~/test$ ruby demo.rb -l 3 -s humidity -t omf.nitos.node017,omf.nitos.node019,omf.nitos.node020,omf.nitos.node021,omf.nitos.node022 --om
l-expid='measure_1' --oml-appid='measure' --oml-server='localhost' --oml-port='3083' --oml-nodeid='1'
OML4R: OML enabled.
vamaglog
Finished sensor_set.py 1
Talking to the measure service, please wait....Last ID 321
Last ID 321
Last ID 321
Last ID 321
Talking to the measure service, please wait....Last ID 321
Last ID 321
Last ID 321
Last ID 321
Talking to the measure service, please wait....Last ID 321
Last ID 321
Last ID 321
Last ID 321
    
```

Set ID	efkerani	2011-06-29 11:44:04	30	10	10
150	efkerani	2010-12-08 19:17:02	180	10	20
149	efkerani	2010-12-08 14:57:48	60	10	20
75	efkerani	2010-12-03 19:42:45	300	10	14
74	efkerani	2010-12-03 19:42:31	5	5	5
73	efkerani	2010-12-03 19:29:53	5	4	5

Select a specific Set\_ID to get a graphical representation of its measurements:  Submit

