RPL

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RPL

- RPL stands for Routing Protocol for Low-power and Lossy Networks
- Layer 3 routing protocol.
- The root creates the RPL DAG.
- #include “net/rpl/rpl.h”

Contiki RPL

- Set a global address:

```
uip_ipaddr_t ipaddr;
uip_ip6addr(&ipaddr,0xaaaa,0,0,0,0,0,0,0);
uip_ds6_set_addr_iid(&ipaddr,&uip_lladdr);
uip_ds6_addr_add(&ipaddr,0,ADDR_AUTOCONF);
```

Contiki RPL (2)

- Create DAG:

```
uip_ipaddr_t prefix;
rpl_dag_t *dag;
rpl_set_root(RPL_DEFAULT_INSTANCE,&ipaddr);
dag=rpl_get_any_dag();
uip_ip6addr(&prefix,0xaaaa,0,0,0,0,0,0,0);
rpl_set_prefix(dag, &prefix, 64);
```

Exercise 1

- Modify the SimpleUDP program in order to have IP addresses with global scope.

NOTE: Only the receiver must create the DAG.

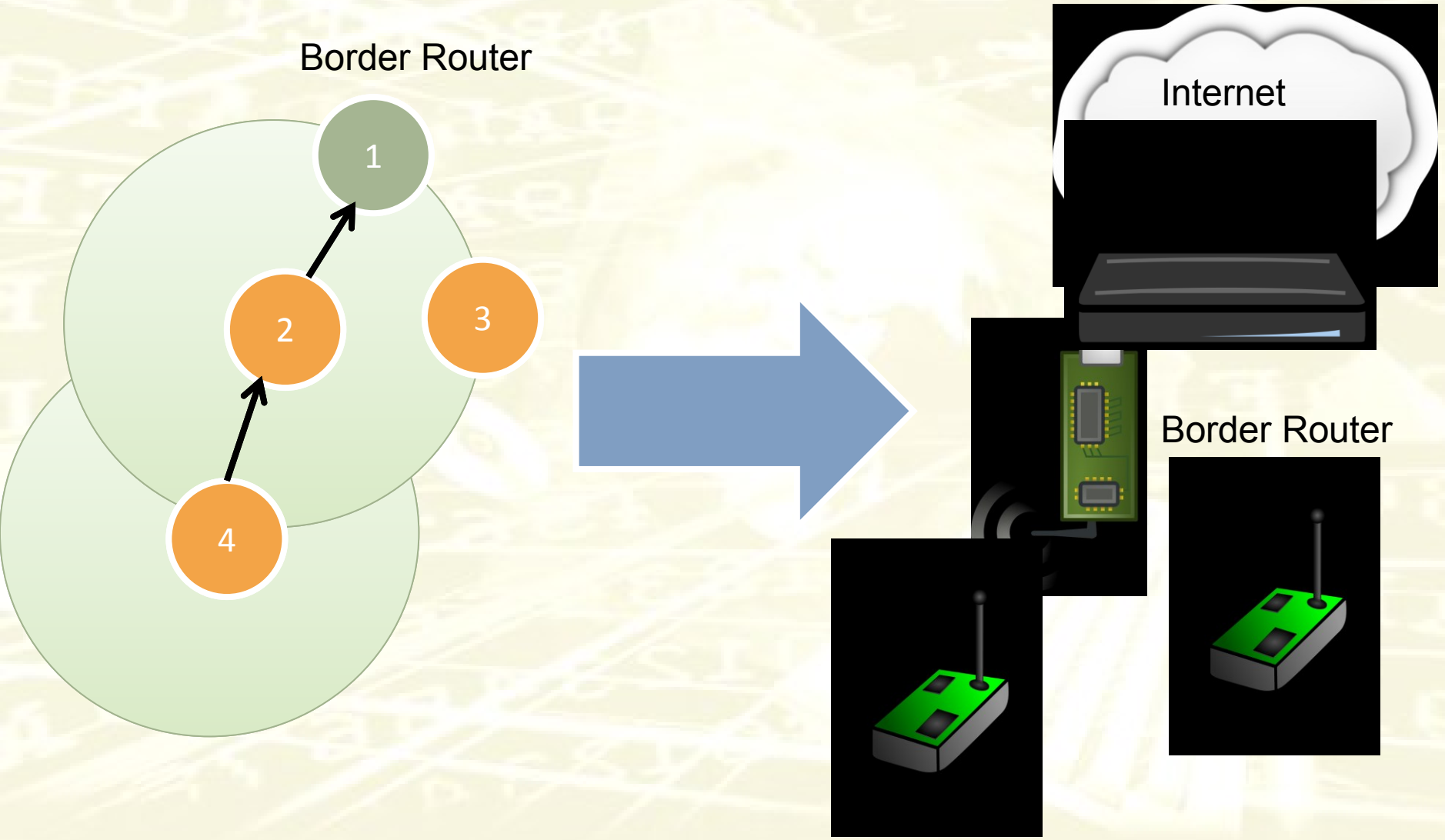
Exercise 2

- Modify the receiver of the previous example in order to manage two type of requests:
  - Reading: A client sends a message asking the value of a server's variable.
  - Writing: A client sends a message with the new value for the server's variable.
- Write a client that sends a periodic Reading request and a Writing request only when a button is pressed.

RPL Border Router

- An RPL border router is used to:
  - Set the IPv6 global scope address of all motes.
  - Route messages from leafs to the root.
  - Interconnect a WSN to the rest of Internet.

Typical scenario



tunslip6

- The tunslip6 will create a virtual interface (called tun0) which is bridged to the border router.
- The interface will have an IPv6 address (aaaa::1).
- The border router will use the prefix (aaaa) as the global IPv6 prefix. This will be forwarder and installed in the overall WSN.

Set up in cooja

- Deploy a border router
  - examples/ipv6/rpl-border-router/border-router.c
- Add the socket on the border router
  - Tools -> Serial Socket (SERVER) -> sky 1
- Deploy motes which will get the global IPv6 from the border router
- Use the tunslip6:
  - cd examples/ipv6/rpl-border-router/
  - make connect-router-cooja

Set up on real motes

- Deploy a border router
  - examples/ipv6/rpl-border-router/border-router.c
- Use the tunslip6:
  - cd examples/ipv6/rpl-border-router/
  - Connect the mote to USB
  - make TARGET=z1 border-router.upload
  - make connect-router

Exercise 3

- Set up a WSN with a border-router, an UDP Receiver and some UDP Sender. Use Simple-UDP.

- Try to ping all the motes.