

Ivy Slackers Multihop Routing



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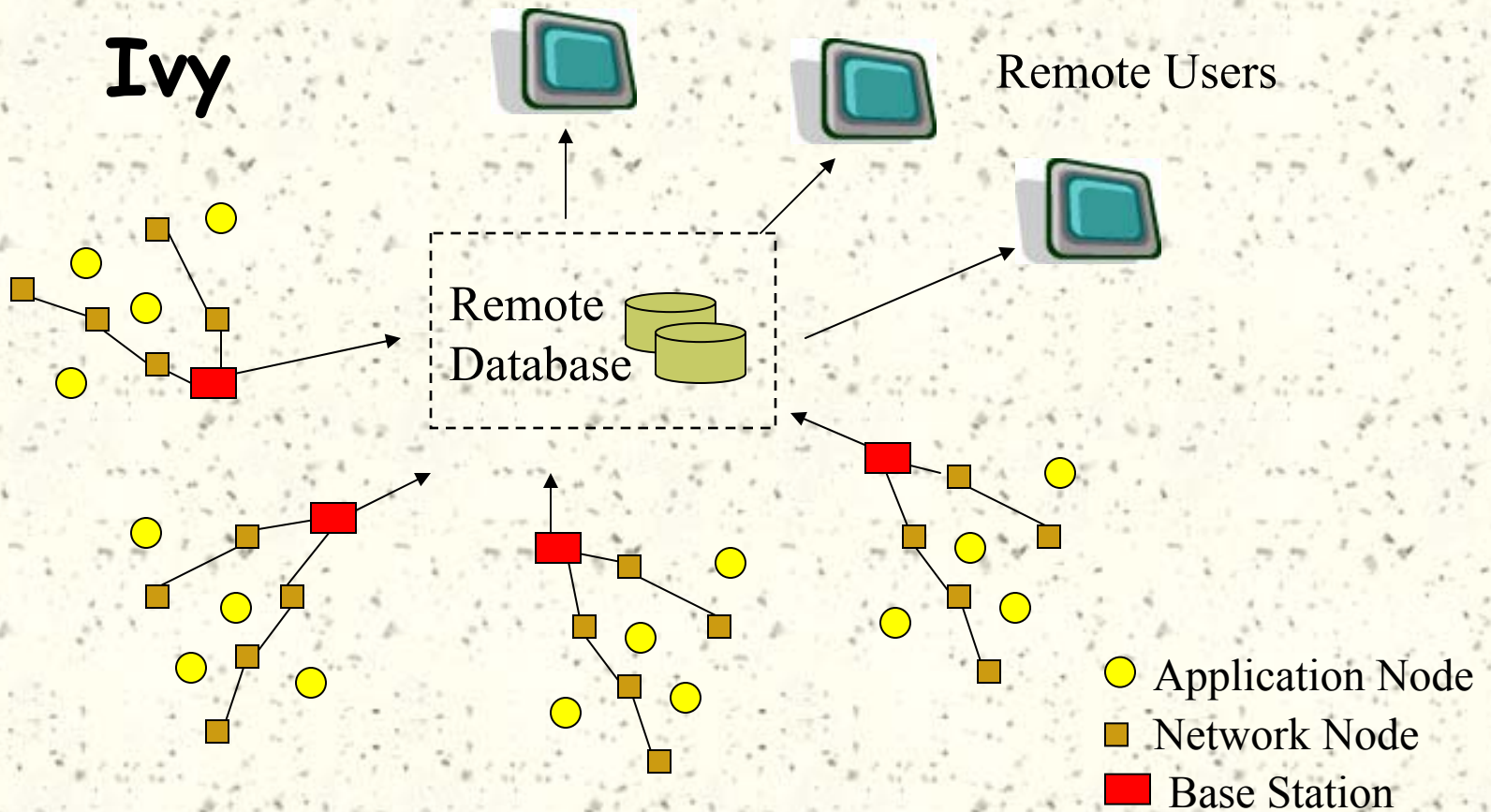
What is Slackers ?

- # Power scheduling multihop routing algorithm for Ivy networks
- # Primary goal is significant reduction of duty cycle per node
- # Network nodes are sparsely positioned
- # Slowly varying periodic data demands

The Algorithm

1. Init - listen 1 cycle for parent
2. For current cycle, pick an advertisement slot and a reservation slot randomly from idle slots
3. Loop through slots in cycle
 1. Receive message from downstream
 2. Transmit message upstream
 3. Broadcast an Advertisement
 4. Listen for a reservation request
 5. Send reservation request
 6. Idle - power down
4. Repeat 2 - 4

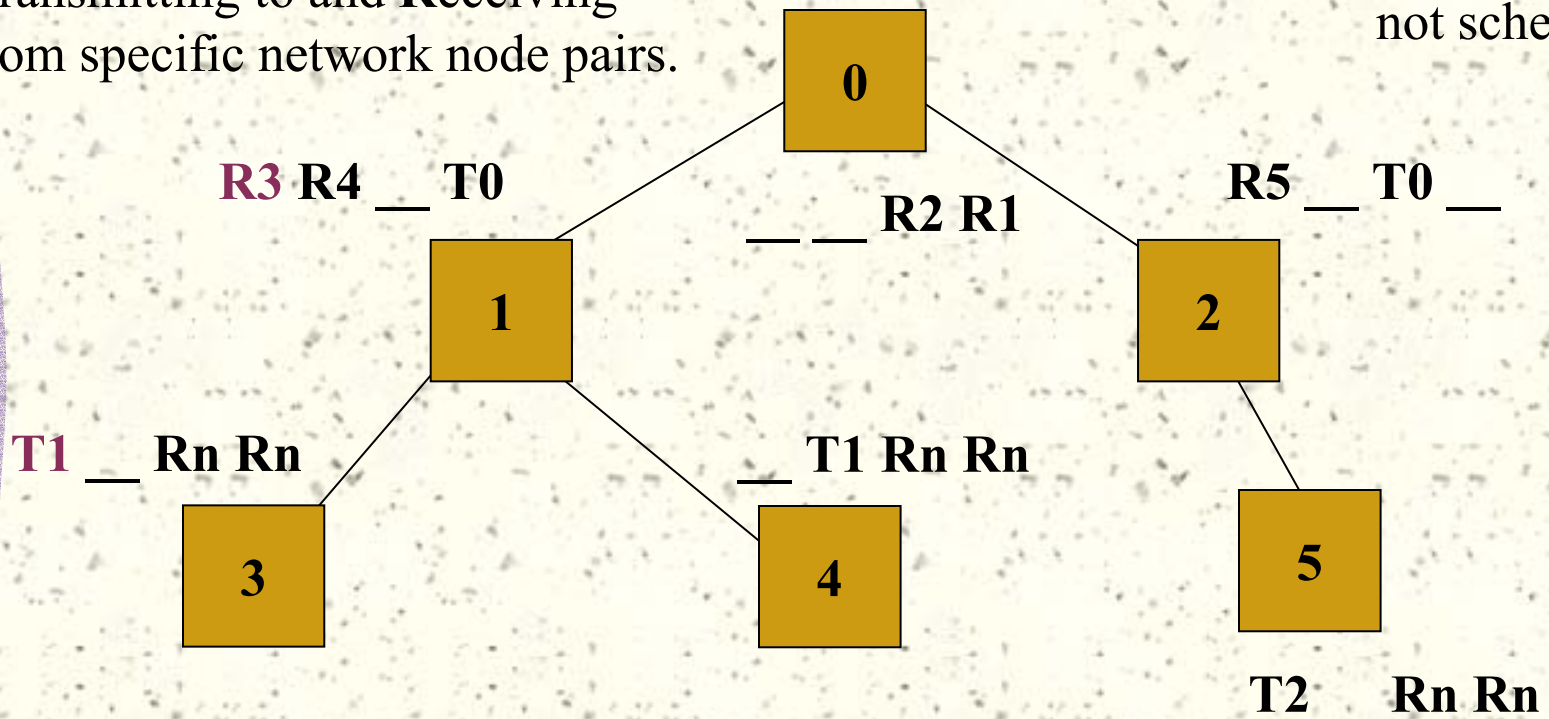
<http://www-bsac.eecs.berkeley.edu/projects/ivy>



Power Scheduling

Each time slot is reserved for **Transmitting** to and **Receiving** from specific network node pairs.

Sensor nodes can power down during the time slots that are not scheduled.



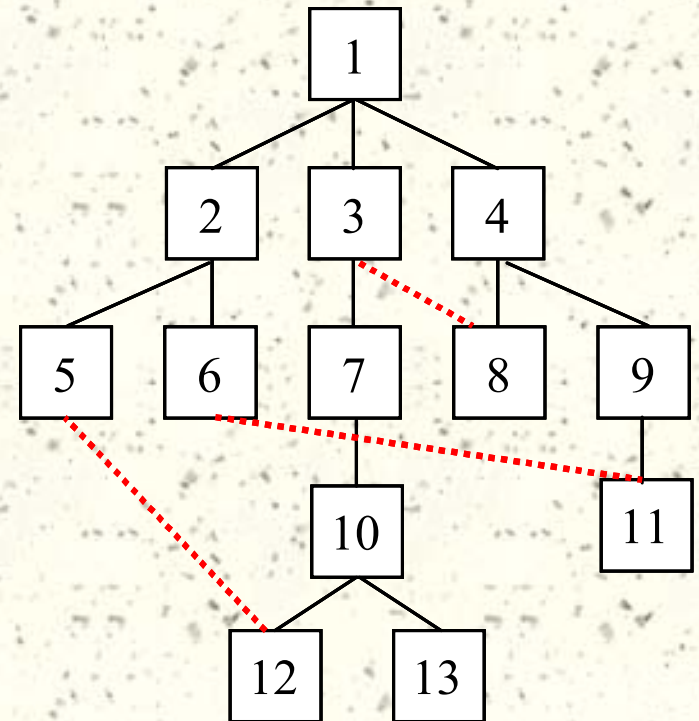
0	R	R	T	RP	R	RP	T	R	T	T	T	R	A	T	I
1	T	I	R	I	T	I	I	I	RP	RP	A	T	R	TP	I
2	A	T	RP	I	I	I	RP	T	R	I	I	I	I	I	I
3	I	I	RP	I	A	I	I	I	T	I	I	RP	I	I	I
4	I	I	T	RP	I	I	A	I	I	I	I	RP	I	I	I
5	I	RP	I	I	I	A	I	I	I	I	I	RP	T	I	I

Experiment: Sample schedules from a **6 sensor node** network with a demand of 1. The number of **slots per cycle is 15**.

Transmit
 Receive
 Advertise
 Transmit Pending
 Receive Pending
 Idle

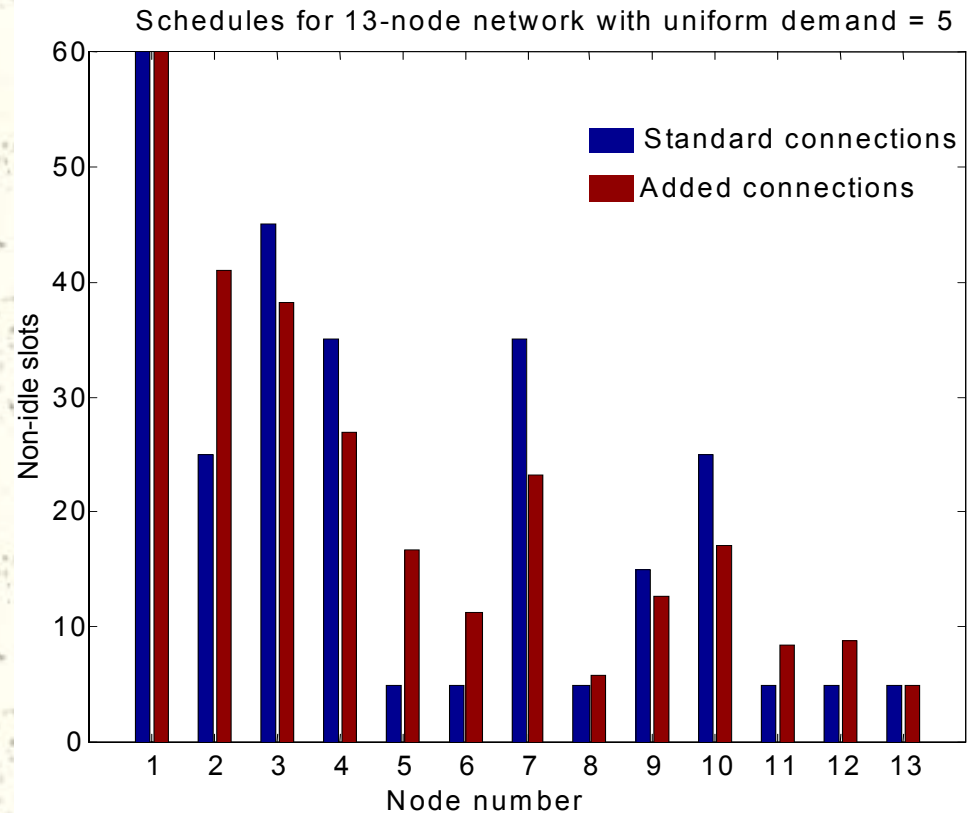
More realistic networks

Connectivity of a **13-node** network with. Solid lines represent the standard connection set while the dotted lines are added for the augmented connection set. Each network node has several **application nodes** (not shown) communicating to each of the network nodes.



Duty Cycle

A bar chart showing the number of slots occupied by either transmission or reception following completion of the schedule of the 13-node network with a demand of 5 at each node. The number of slots per cycle is 125 and $pAS = 0.5$. The results are averaged over a set of 100 trials.



Slackers Architecture

- MultiHopRoute receives messages
- MultiHopSend forwards messages
- PowerScheduler sends/receives advertisements

