

ResCom 2014 : Setting up a testbed with USRP N210

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Setting up a testbed with USRP N210

Introduction

Context

IRIS

Testbed

Results

References

- Software Defined Radios
 - Components implemented by means of software
 - J.Mitola : « 80% of [digital radio] functionality is provided in software »
- Context
 - Wireless networks
 - Cognitive radios
- Setting up a testbed
 - Network architectures
 - MAC Layer implementations
 - USRP N210 radios



- ✓ Low-cost high-quality SDR
- ✓ SBX daughterboard : 400-4400 MHz
- ✓ MIMO & Synchro capable

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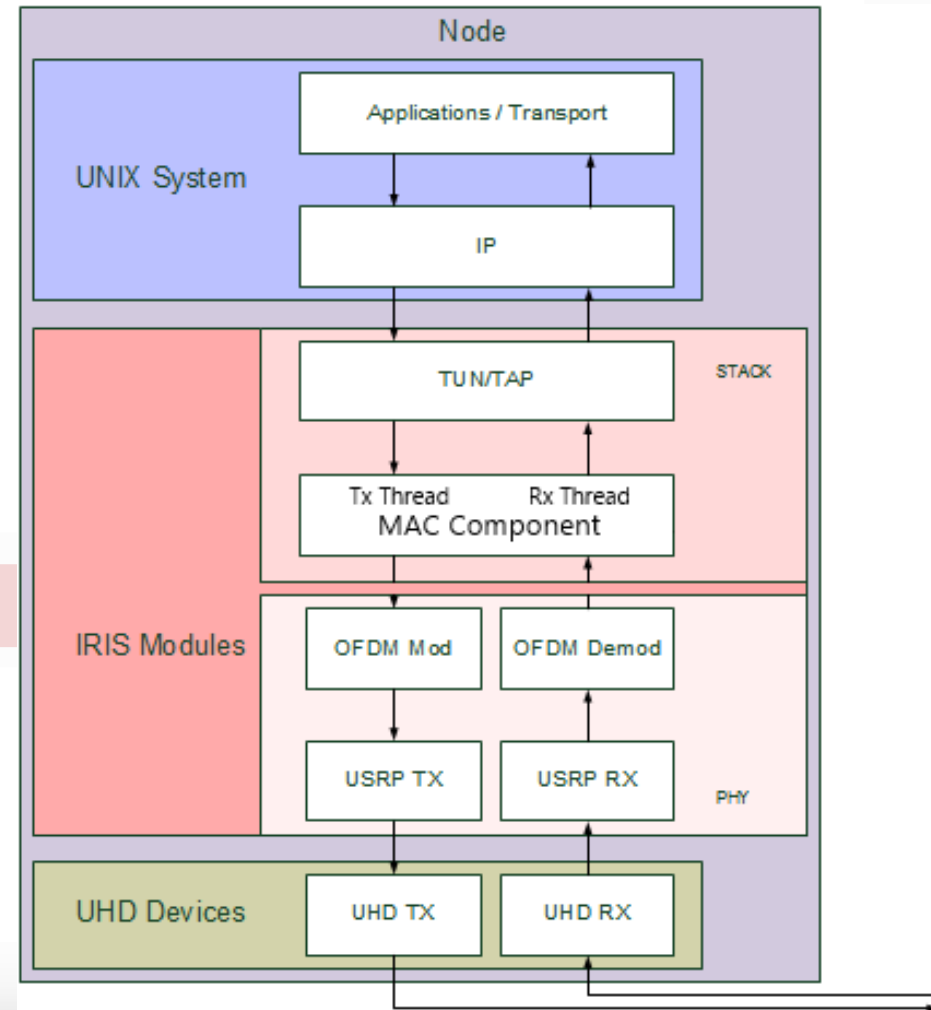
Results

References

- Open source SDR development tools
 - GNU Radio : reference tool
 - IRIS : released in 2013
- IRIS
 - OSI model compliant
 - Component based architecture
 - A radio is composed of engines
 - Common functionalities embedded

➤ **Issue: need other specific functions ?**

- Develop a new IRIS component
 - Collect data from each port
 - Implement TX and RX threads



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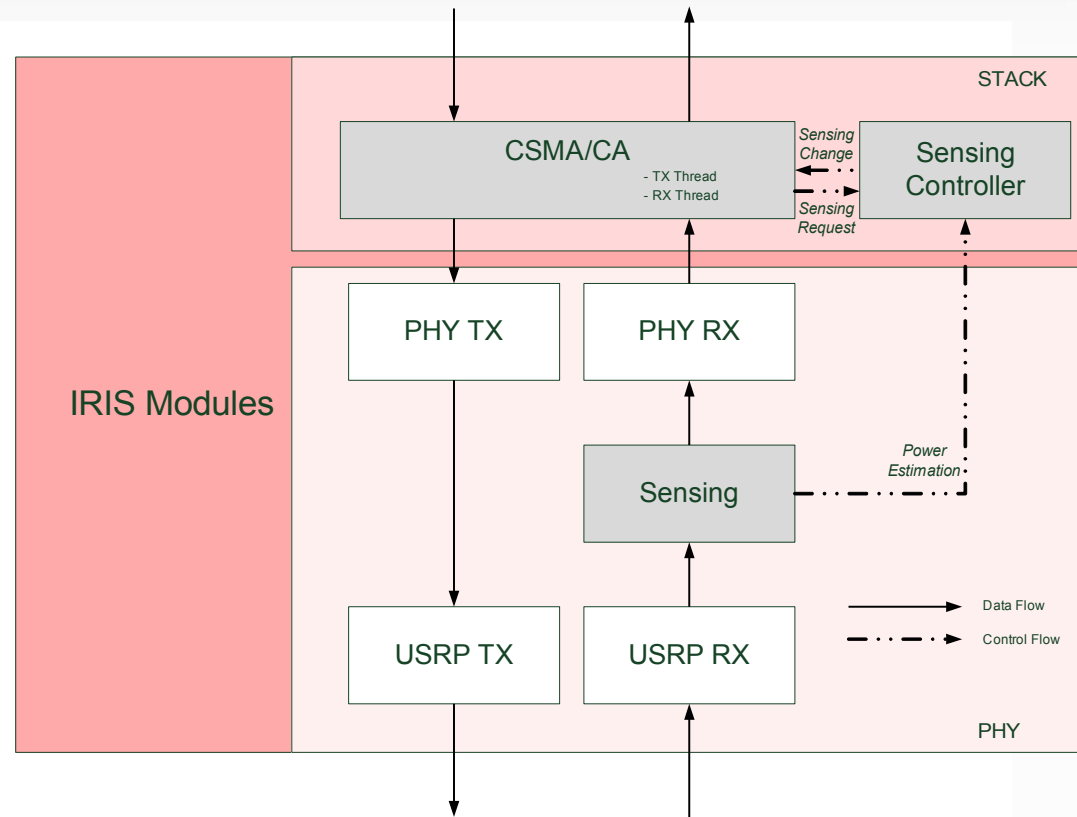
References

- Components developed

- Sensing components
- CSMA/CA
- USRP Synchronisation
- TDMA (with GPS sync)
- Fragmentation & Reassembly

- Testbed

- Multihop real networks
- Many Physical and Stack layers
- Every IP-application can work on top of the testbed
- Real-time reconfiguration



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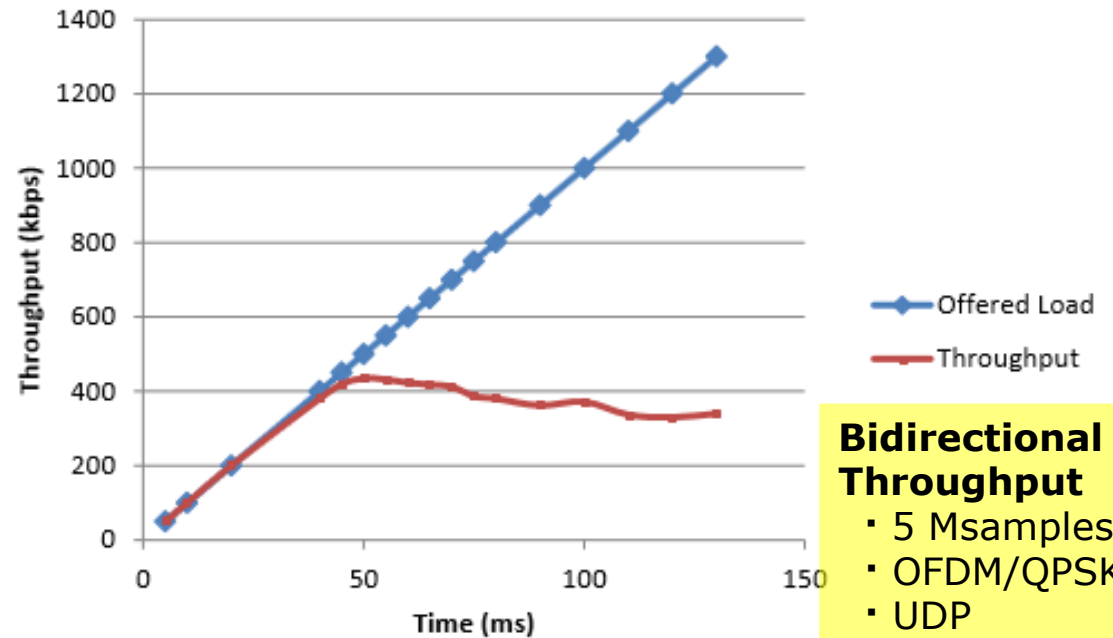
References

- Performance

- Outperforming up-to-date testbed implementations
- SDR-PC delay

- Cognitive Radio

- Channel assignment
- Channel switching
- QoS routing (OLSR)
- New collected metrics



Bidirectional Throughput

- 5 Msamples/s
- OFDM/QPSK
- UDP
- CSMA/CA
- Send & Wait

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- Thank you for your attention !
- Questions ?
- References
 - IRIS : <http://softwareradiosystems.com>
 - GNU RADIO : <http://gnuradio.org/redmine/projects/gnuradio/wiki>
 - USRP2 – Ettus research : <http://www.ettus.com>

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