

# ANT BASICS

© 2017 by Castream Innovations Inc.

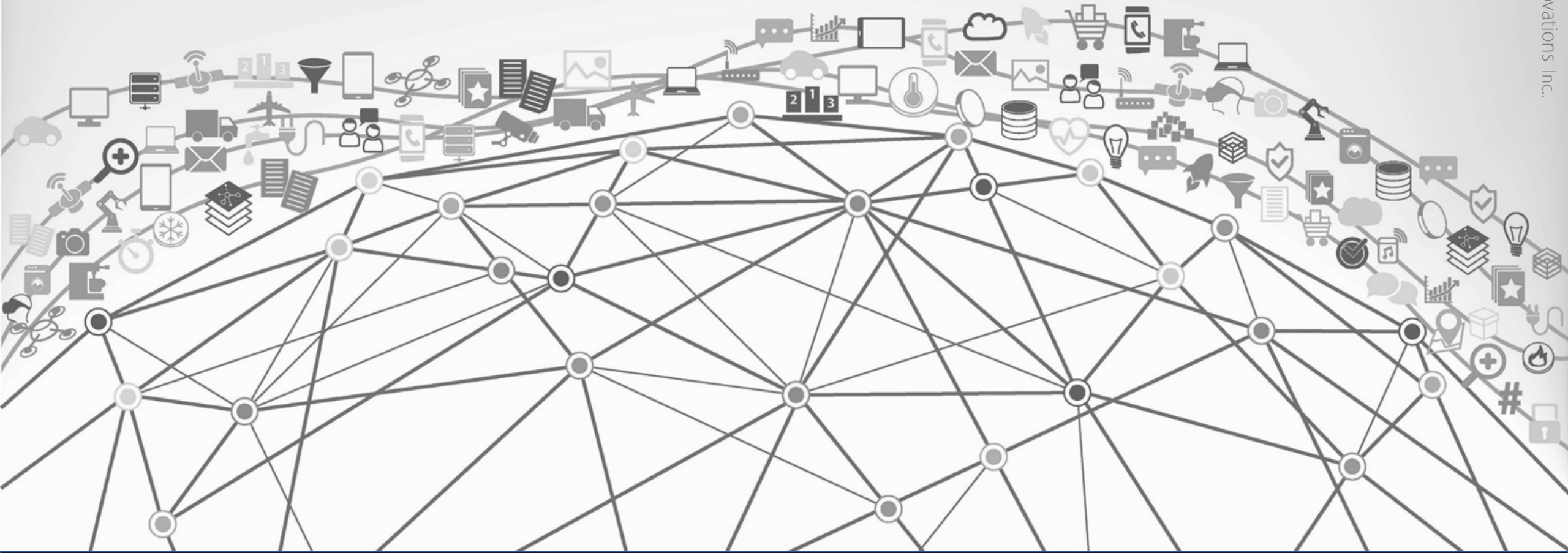
**MICHAEL HEIBER**

**Software Engineer (E.I.T.)**

**10<sup>th</sup> Annual ANT Wireless Symposium | Banff, Canada**

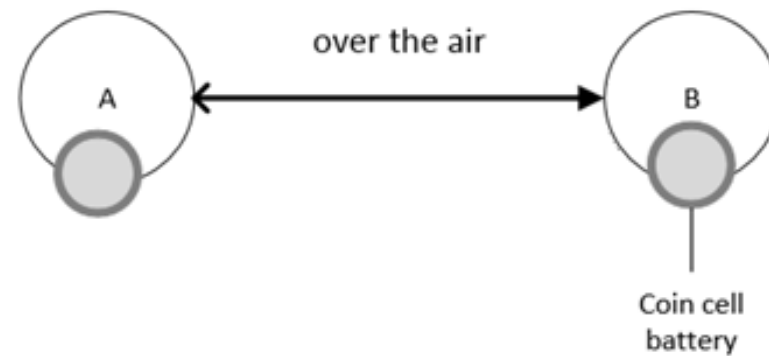


# WHAT IS ANT?



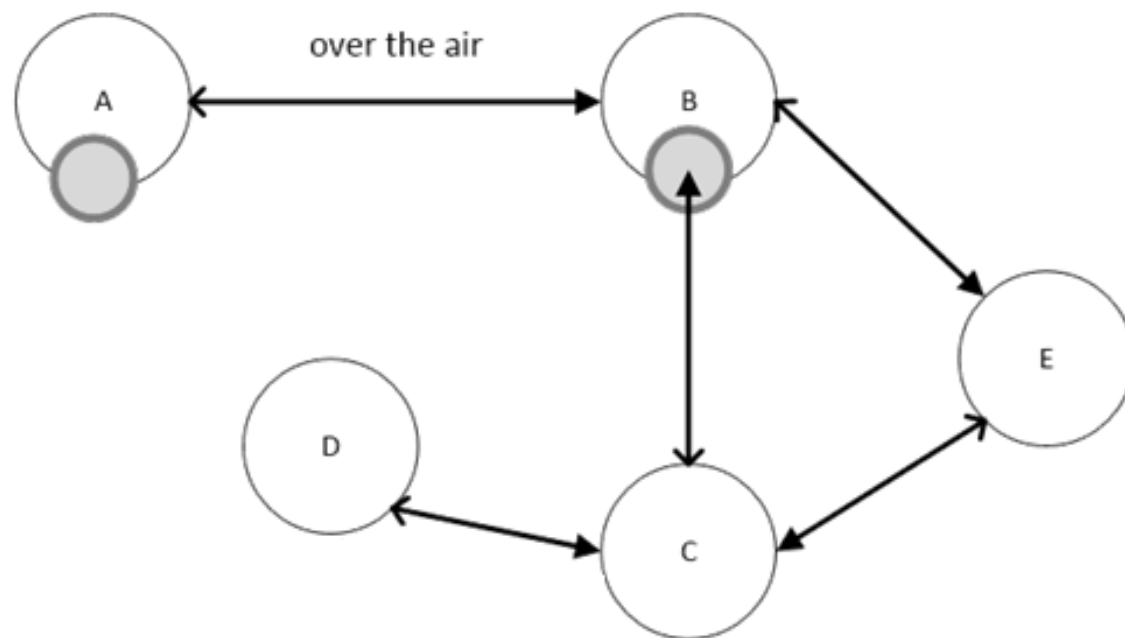
# ULTRA-LOW POWER WIRELESS PROTOCOL

- Reliable Communication



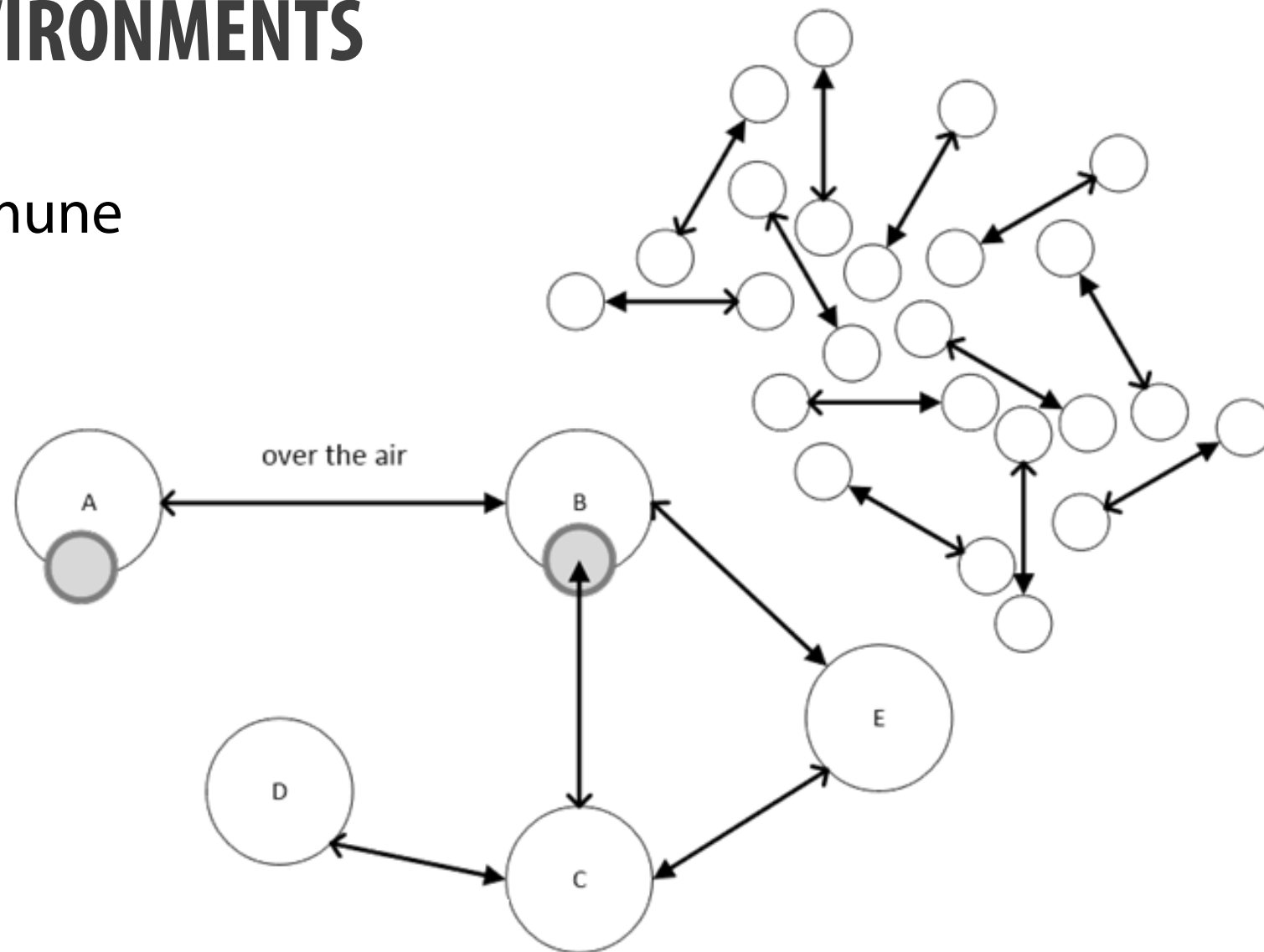
# COMPLEX NETWORKS

- No Network Masters



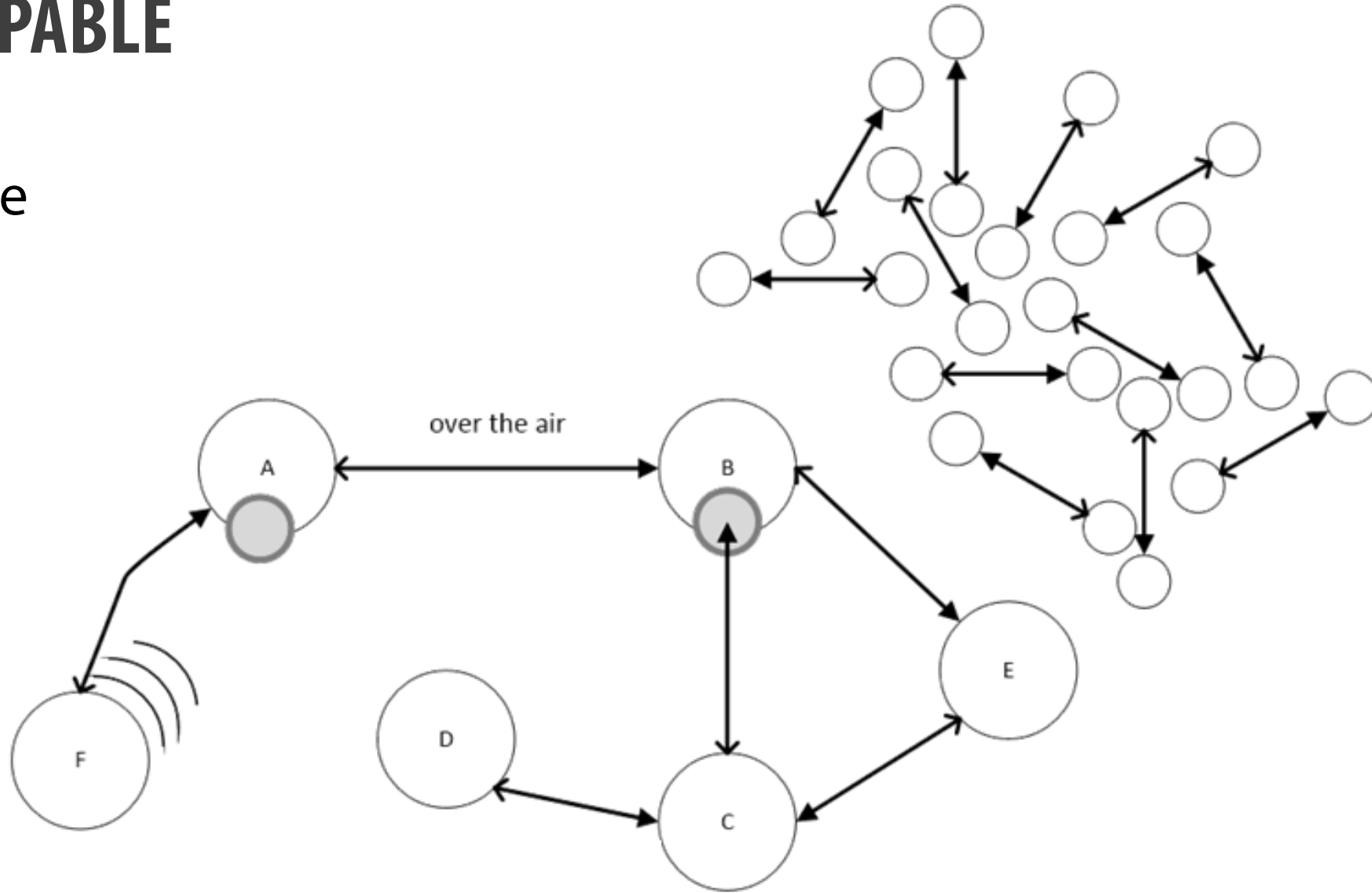
# CROWDED RF ENVIRONMENTS

- Cross-Talk Immune



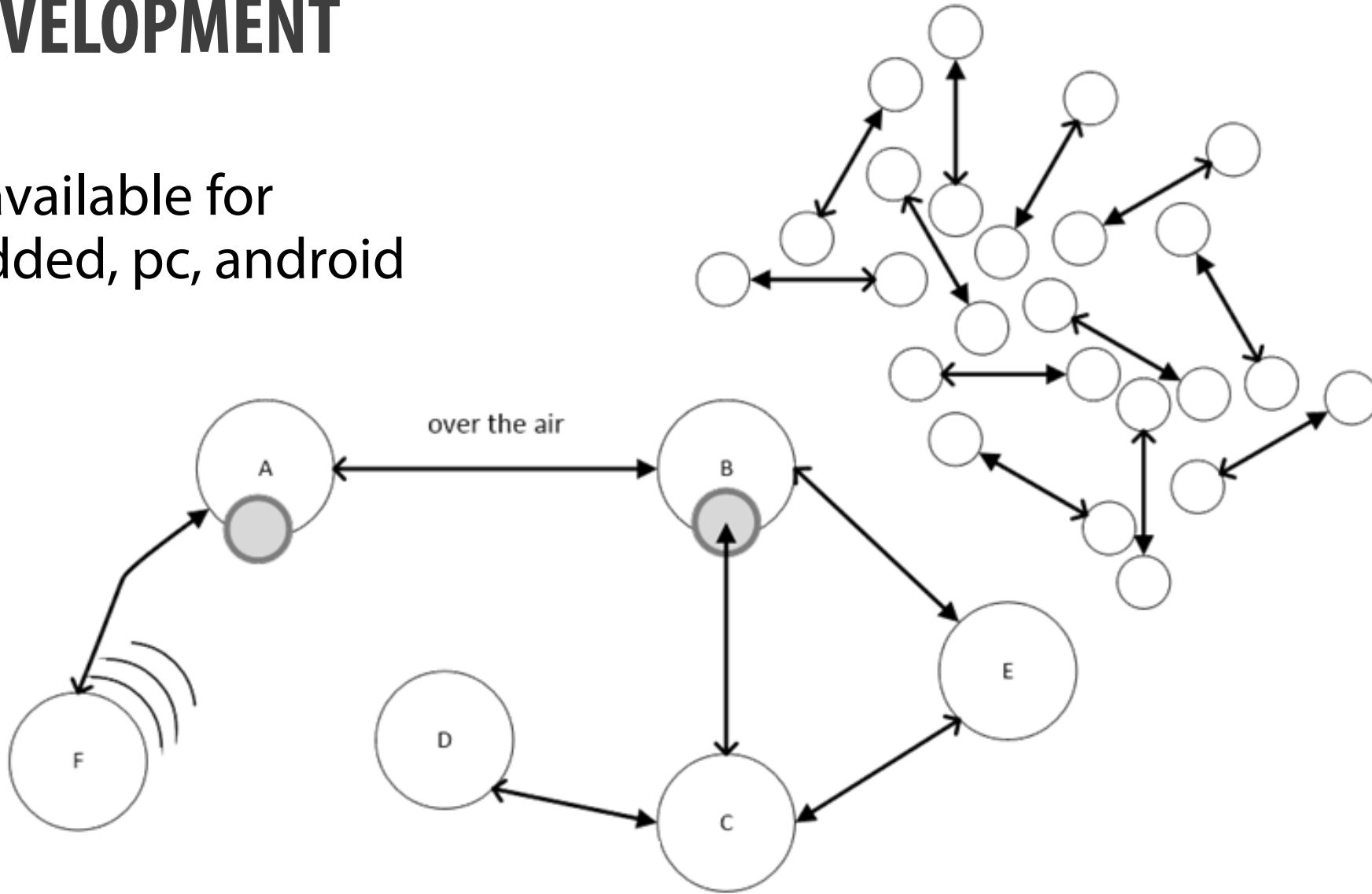
# AD-HOC CAPABLE

- Flexible



# EASE OF DEVELOPMENT

- Tools available for embedded, pc, android





# DEVELOPMENT RESOURCES

Welcome Guest, Register Now | Log In

ANT+ CONSUMER DIRECTORY BUSINESS DEVELOPER NEWS ABOUT US SUPPORT

Search [ ] Follow [ ] [ ] [ ] [ ] [ ]

## IT JUST WORKS!

Designed to simplify network development and optimize operational efficiency.

### SPOTLIGHT

**ANT WIRELESS ANNOUNCES ANT+ RUNNING DYNAMICS DEVICE PROFILES**  
Read More

RD HR-RD

### GETTING STARTED: With ANT+ | With ANT+ | Analysis

## ANT

### ANT BASICS

<< >>

### RESOURCES

- DEV FORUM »
- TECH FAQ »
- TECH SUPPORT »
- DOWNLOADS
- COMPONENTS

### UPDATES

#### Critical Bytes

30 August 2017  
Version 20.43.00 of the FIT SDK is now available on the [downloads](#) page. Includes profile updates as well as a fix for the CSVTool, full release notes are available [here](#).

16 August 2017  
Version 20.42.00 of the FIT SDK is now available on the [downloads](#) page. Includes profile updates as well as a new CSVTool flag, full release notes are available [here](#).

02 August 2017  
Version 20.41.00 of the FIT SDK is now available on the [downloads](#) page.

#### Tech Bulletin

Sep 20, 2017  
Latest Production release of S212 and S332 ANT Protocol Stacks v5.0.0 now available  
The latest production revisions of the ANT protocol stacks are now available for licensing and download at [www.thisisant.com](#) on the nRF52832 SoftDevices tab. ...

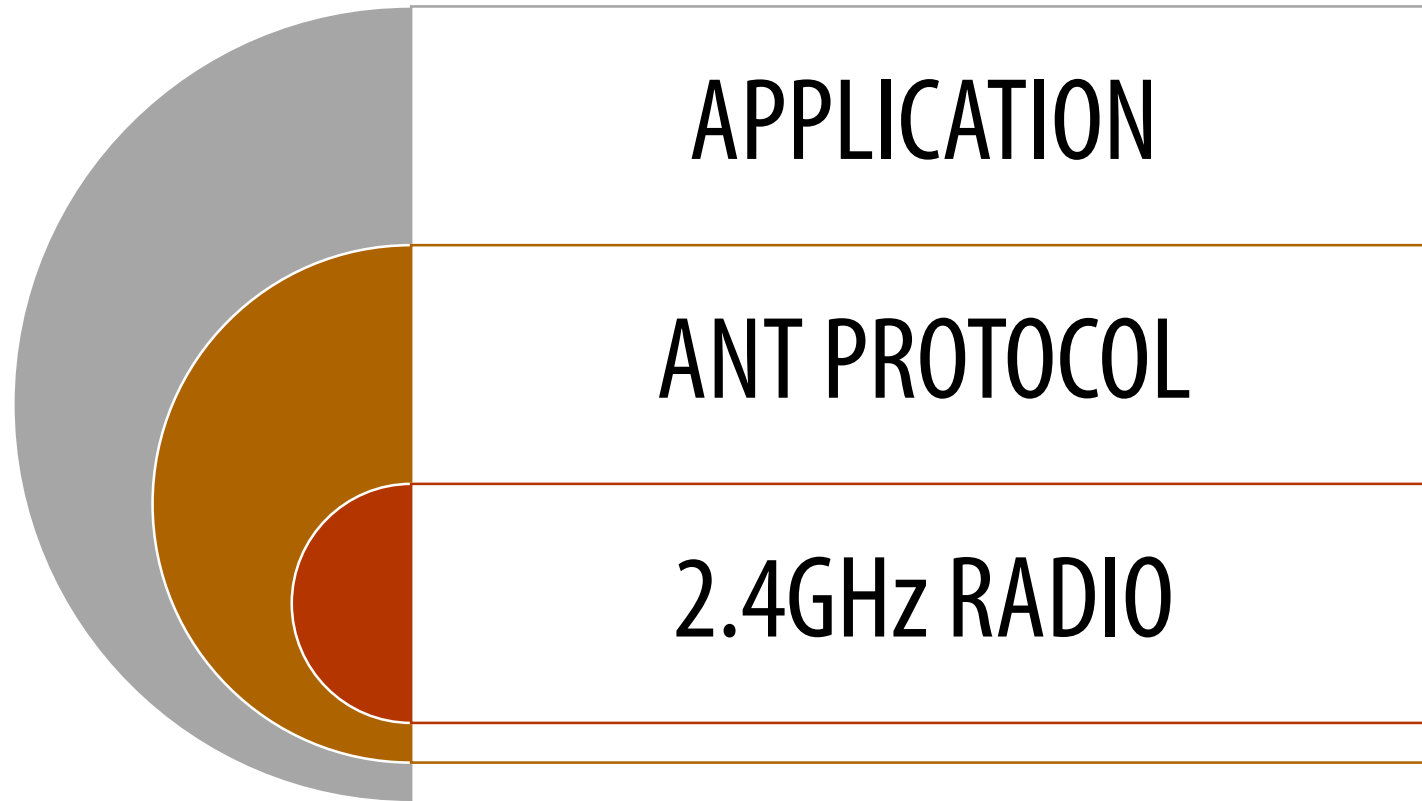
May 19, 2017  
Latest Production release of S212 and S332 ANT Protocol Stacks v4.0.2 now available  
The latest production revisions of the ANT capable protocol stacks are now available for licensing and download at



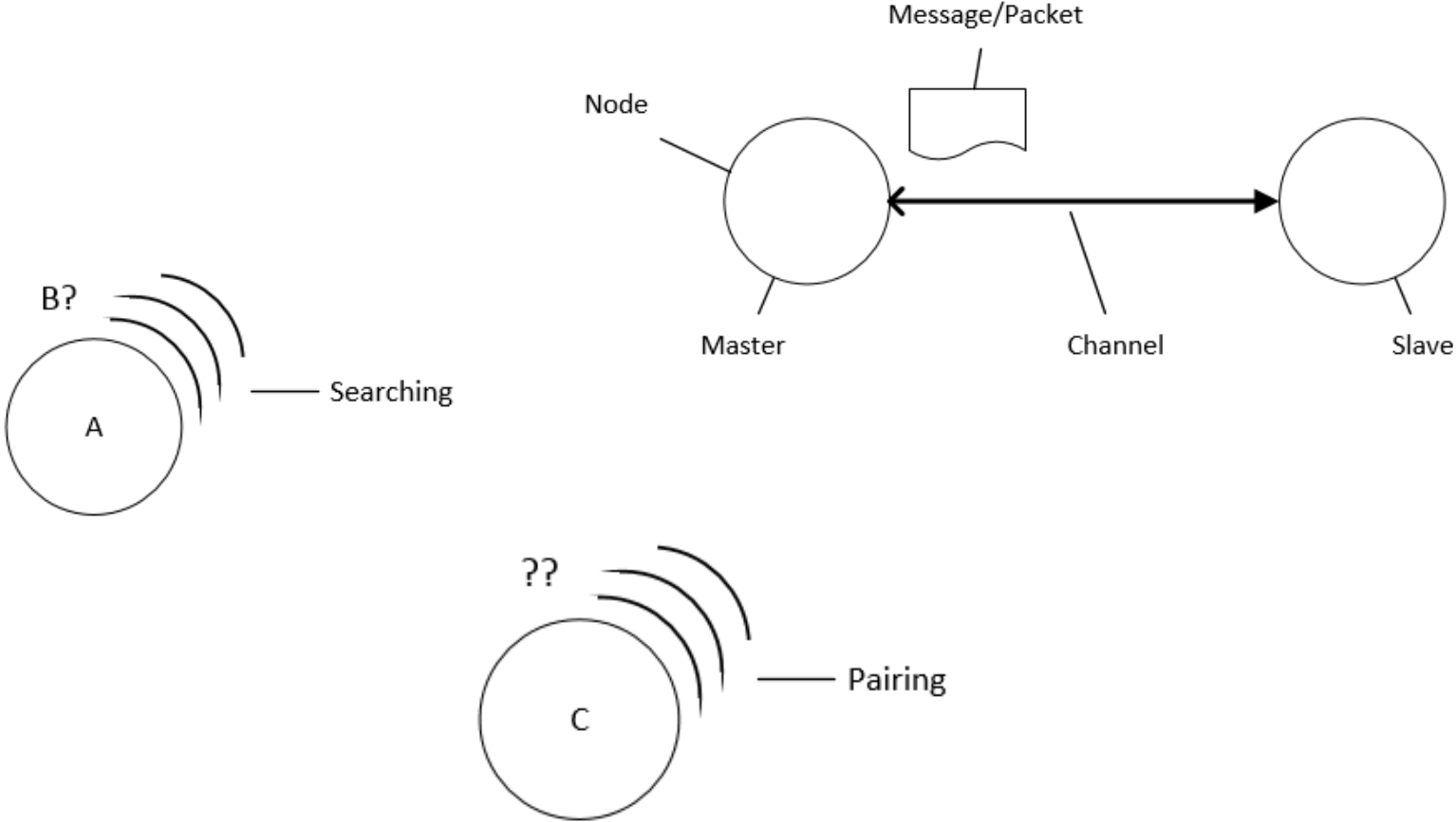
# HOW DOES IT WORK?



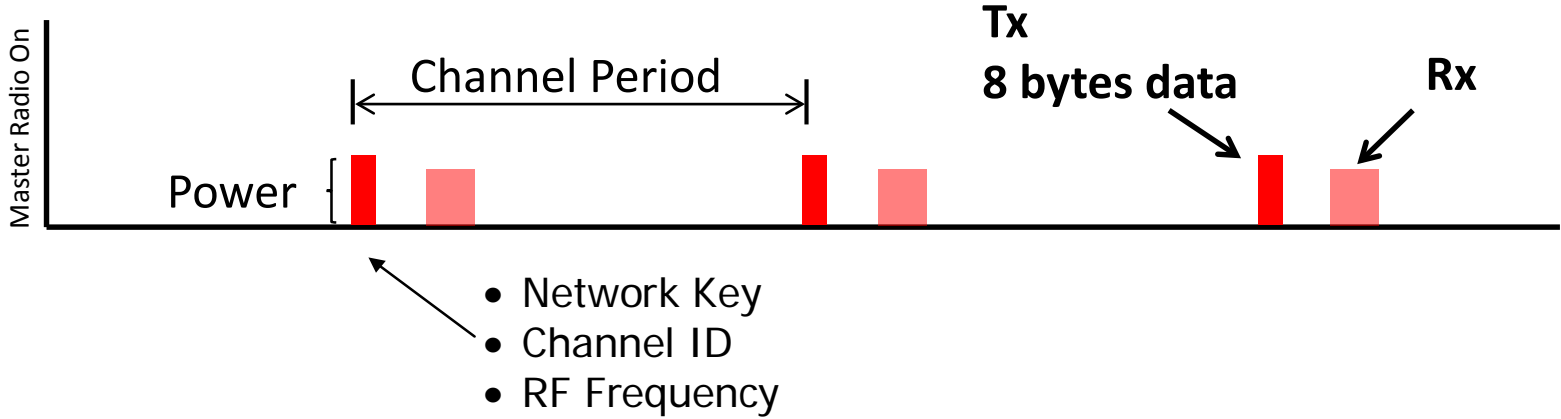
# ANT NODE



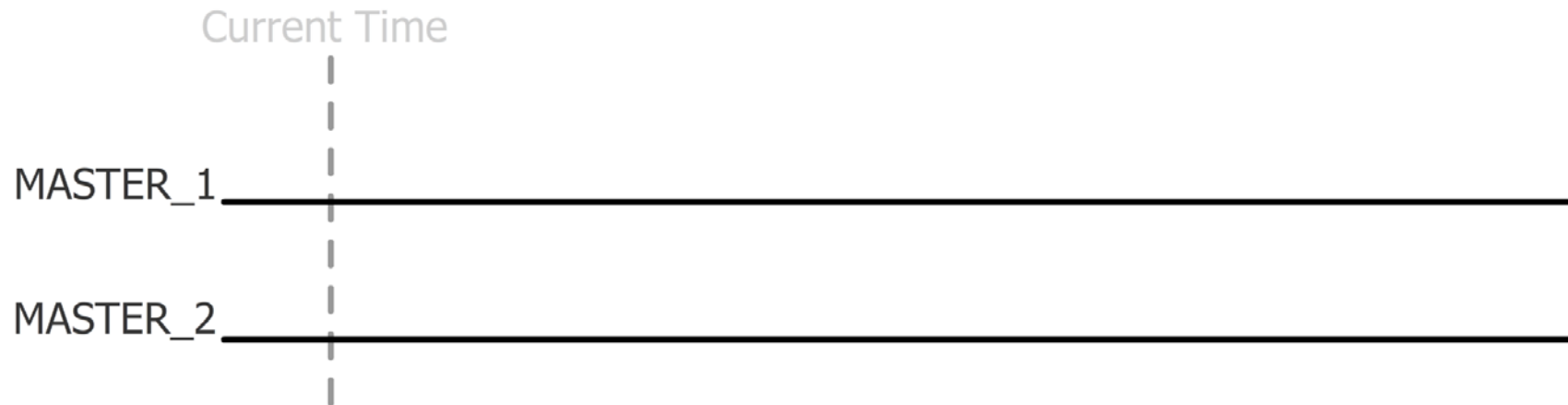
# BASIC DEFINITIONS



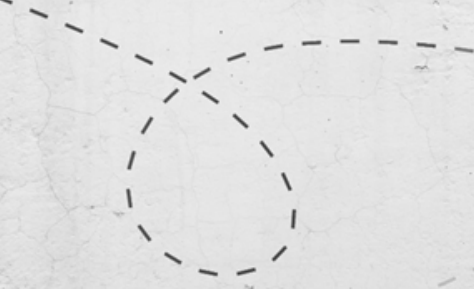
# MASTER



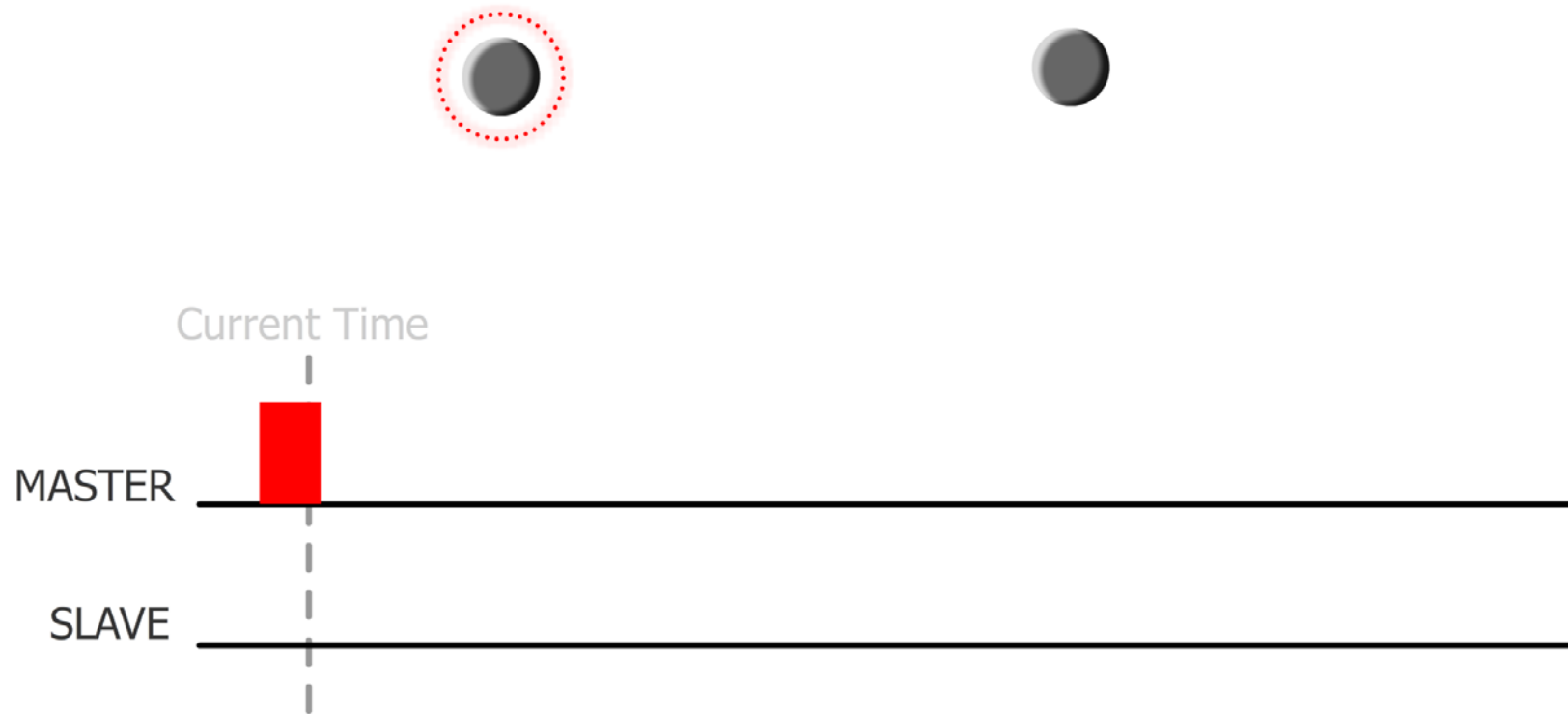
# COEXISTENCE MANAGEMENT



# SLAVE: SEARCH AND ACQUISITION



# SLAVE: SEARCH AND ACQUISITION





# PAIRING

## Channel Identification

- Channel Identified by:
  - Network key
  - RF Frequency
  - Channel period
- Channel ID
  - Device Type
  - Transmission Type
  - Device Number

## Techniques

- Wildcards + isolation
- Pairing bit
- Inclusion/Exclusion lists
- Proximity Search

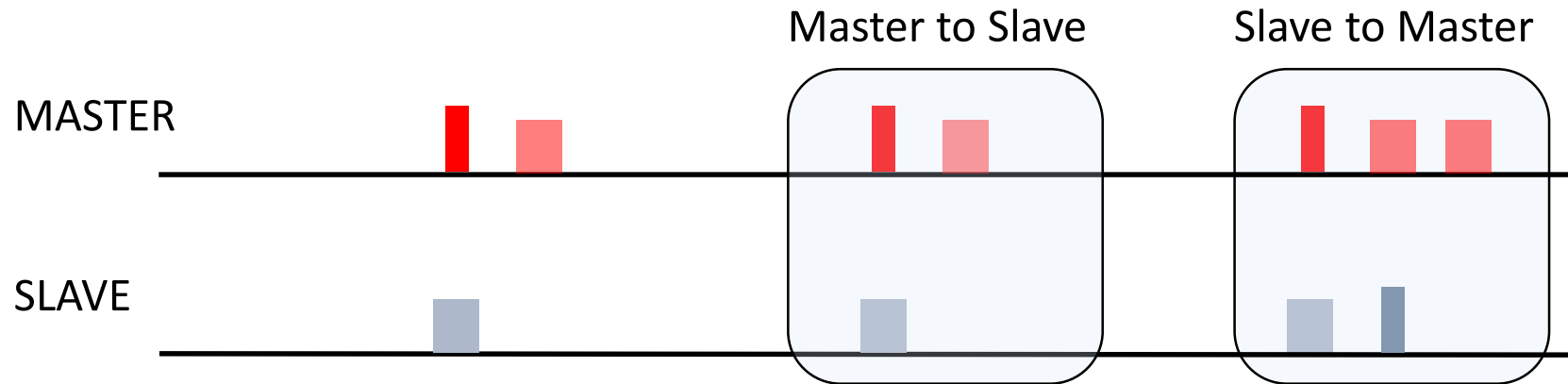
# MESSAGE TYPES



© 2017 Dynasream Innovations, Inc.

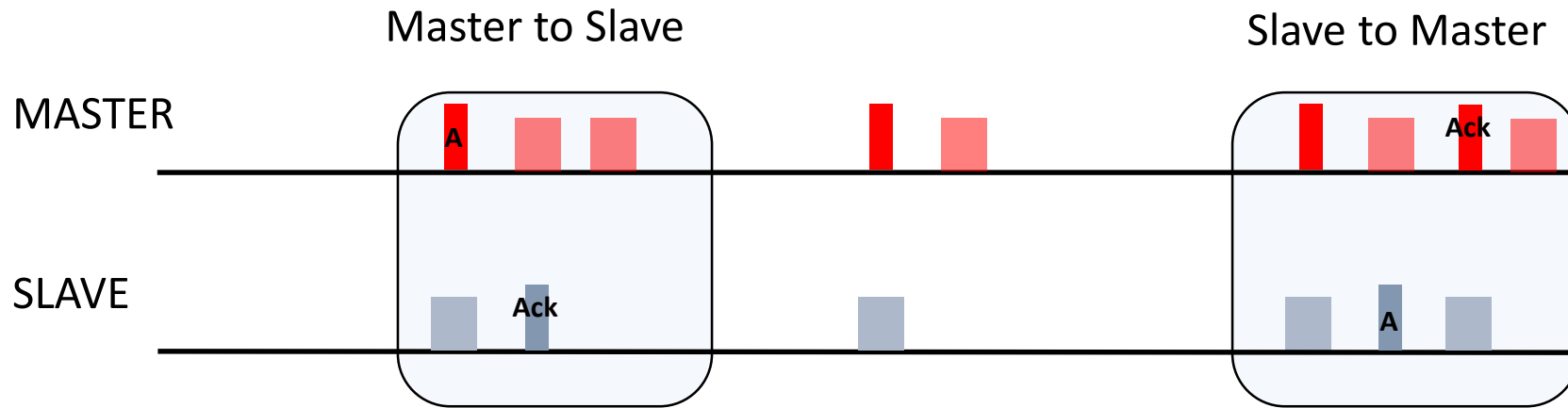
# BROADCAST DATA

- Default data type for Master endpoint
- 8 bytes of data per message period
- Suited to sensor applications where data loss is not critical



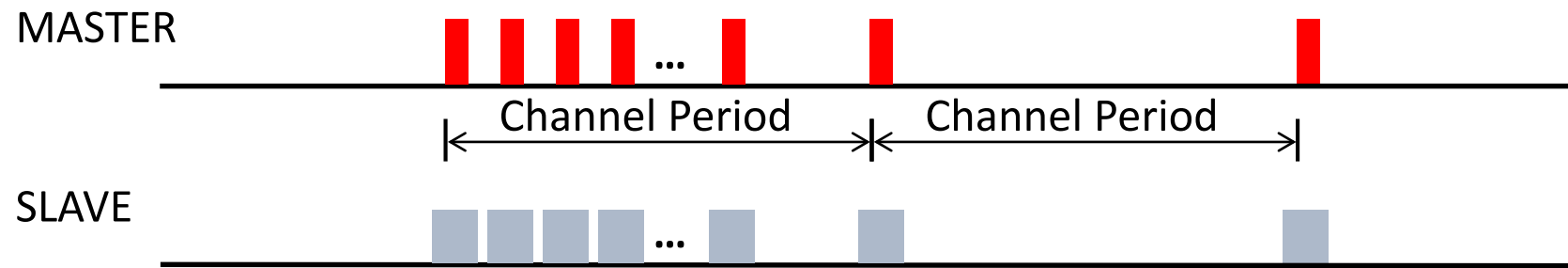
# ACKNOWLEDGED DATA

- 8 bytes of data per message period
- Suited to control applications where sender must know if data was received

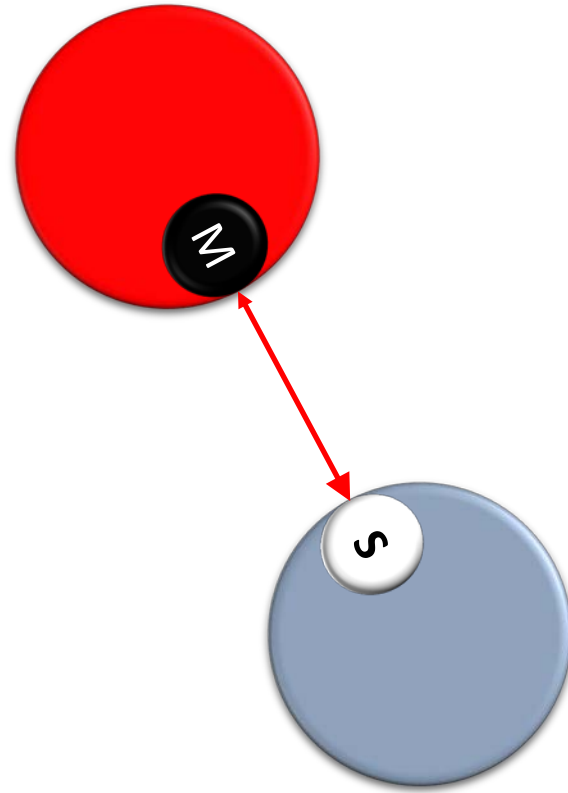


# BURST DATA

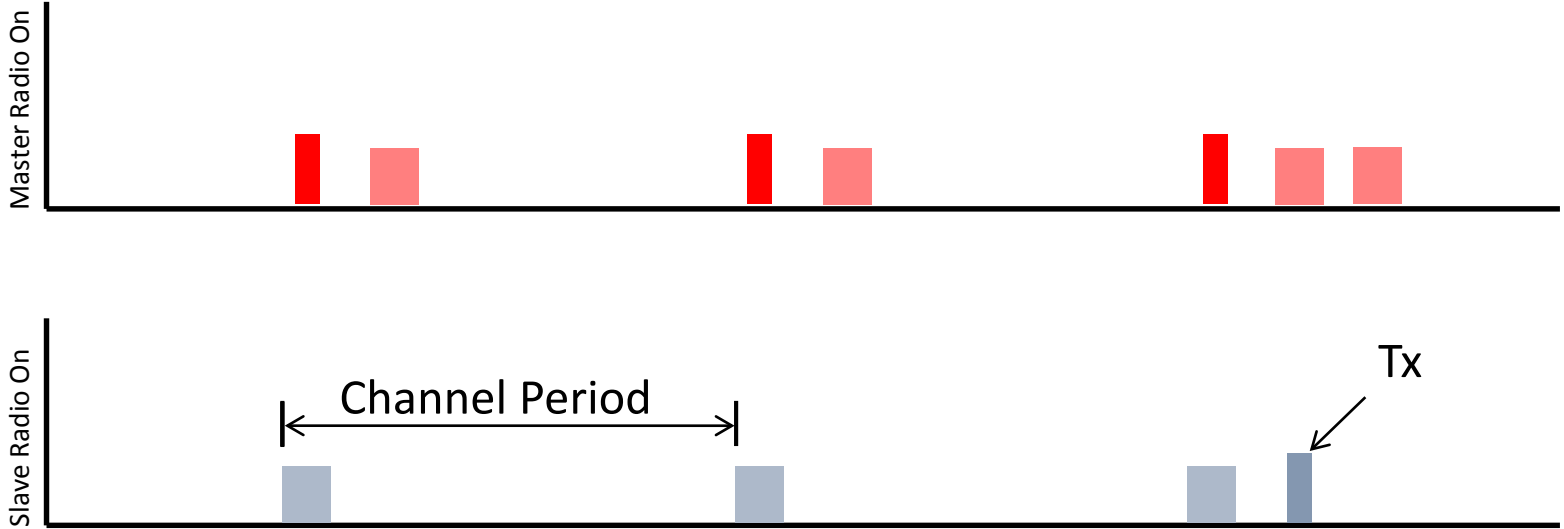
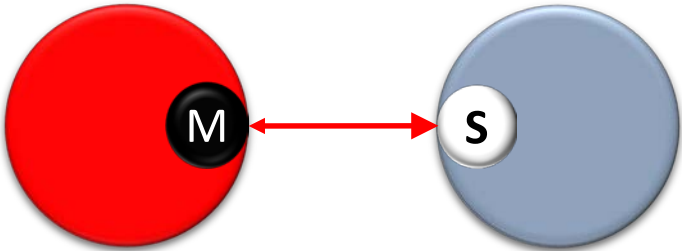
- Optimized to send bulk data (20 – 60kbps)
- Transmission slots synchronized relative to each other
- Application is notified of a successful or failed transfer



# CHANNEL TYPES



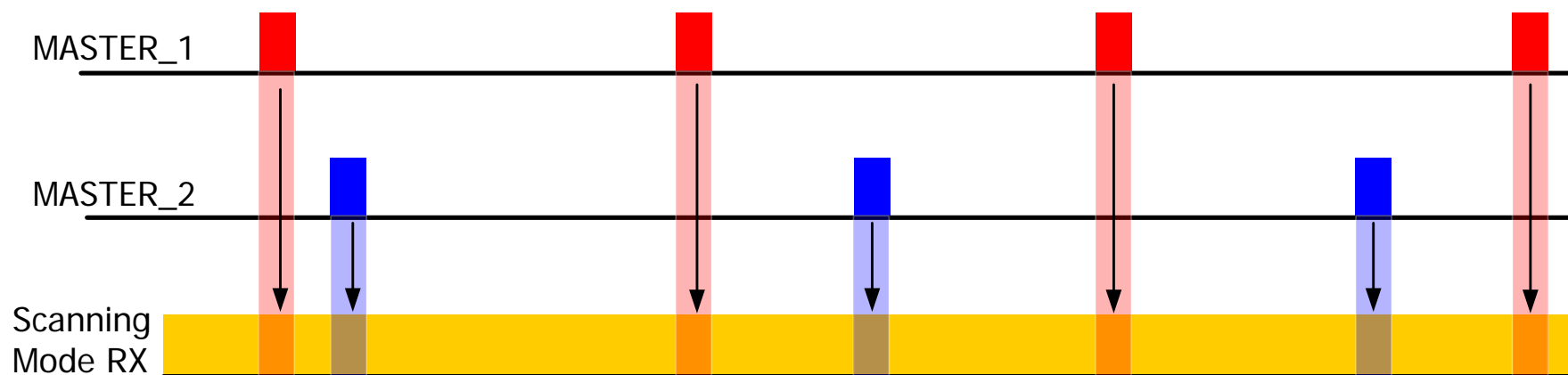
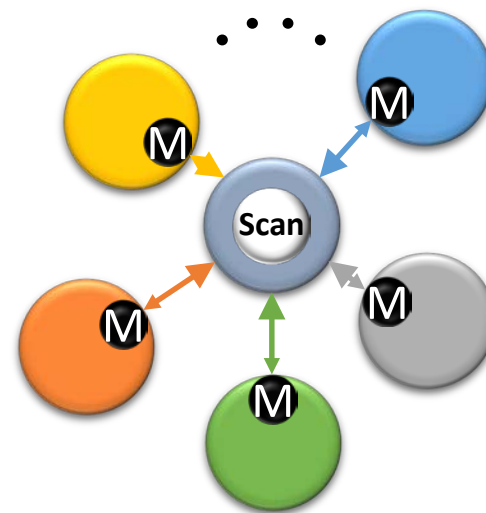
# BIDIRECTIONAL CHANNELS





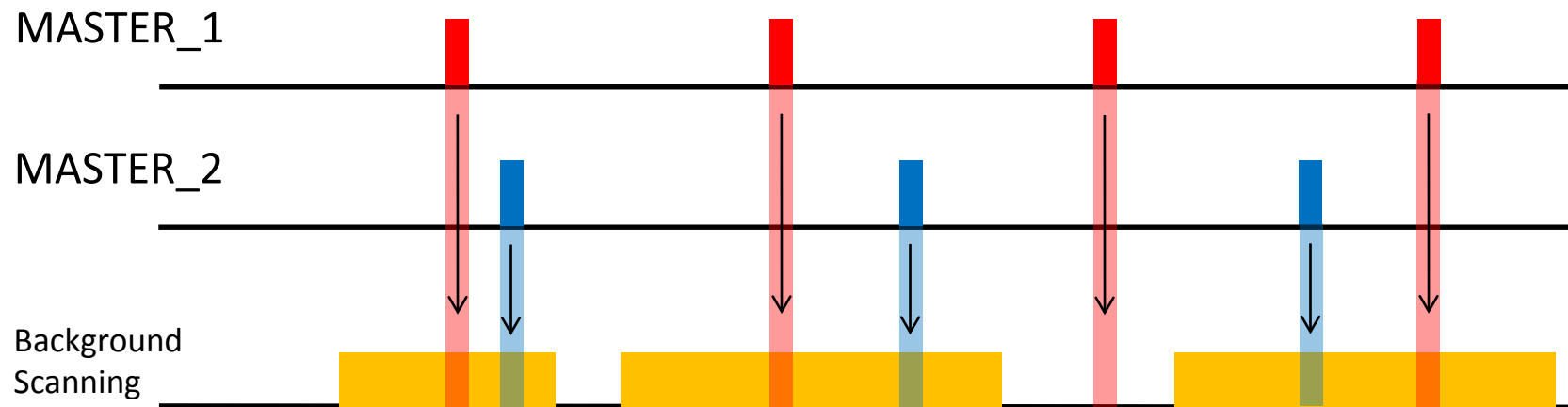
# CONTINUOUS SCANNING MODE

- 'Always on' receiver: higher power
- Low latency
- Fully bi-directional

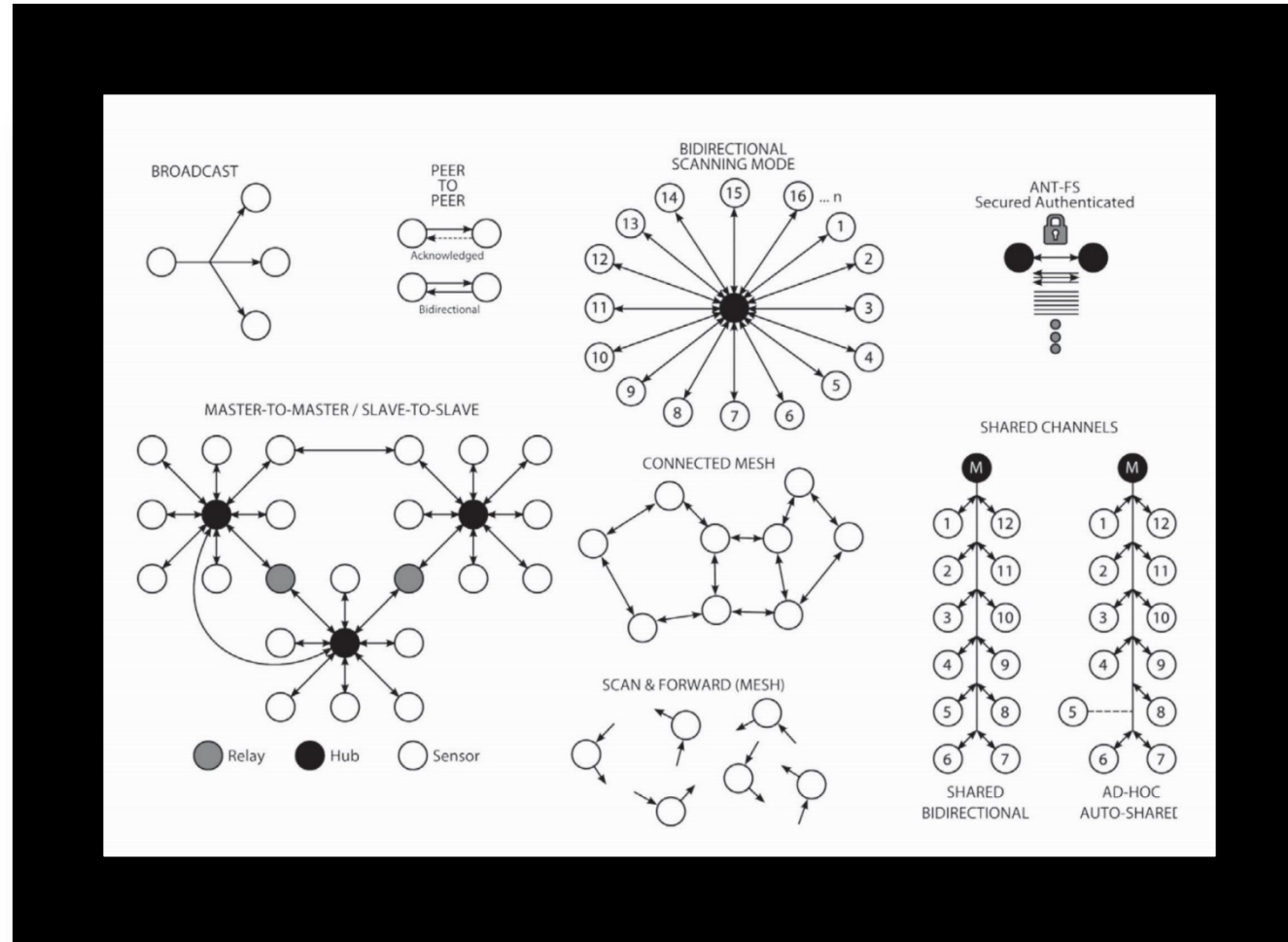


# BACKGROUND SCANNING CHANNEL

- Fully bi-directional
- Allows independent channels to stay open on the same physical radio
- Duty cycled
- High Duty Search
- Useful to create asynchronous topologies, monitor messages, pairing, etc

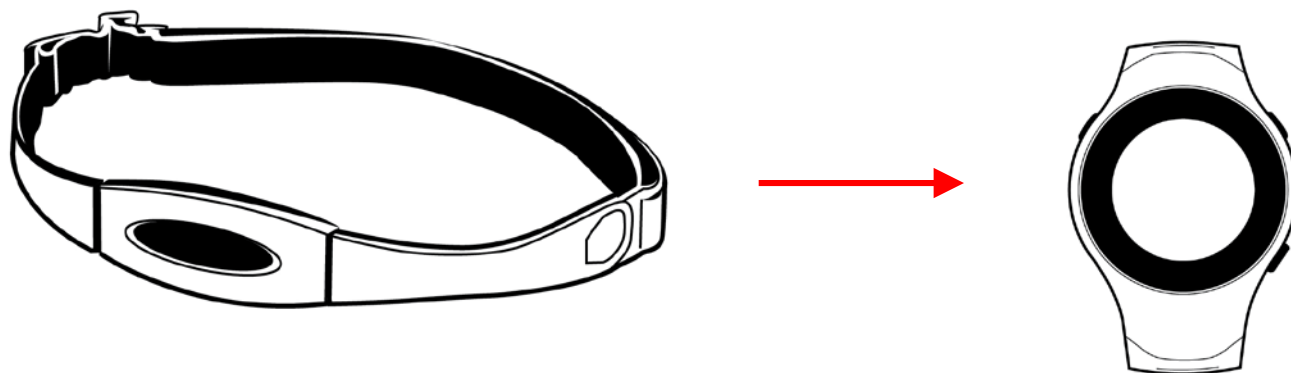


# TOPOLOGIES



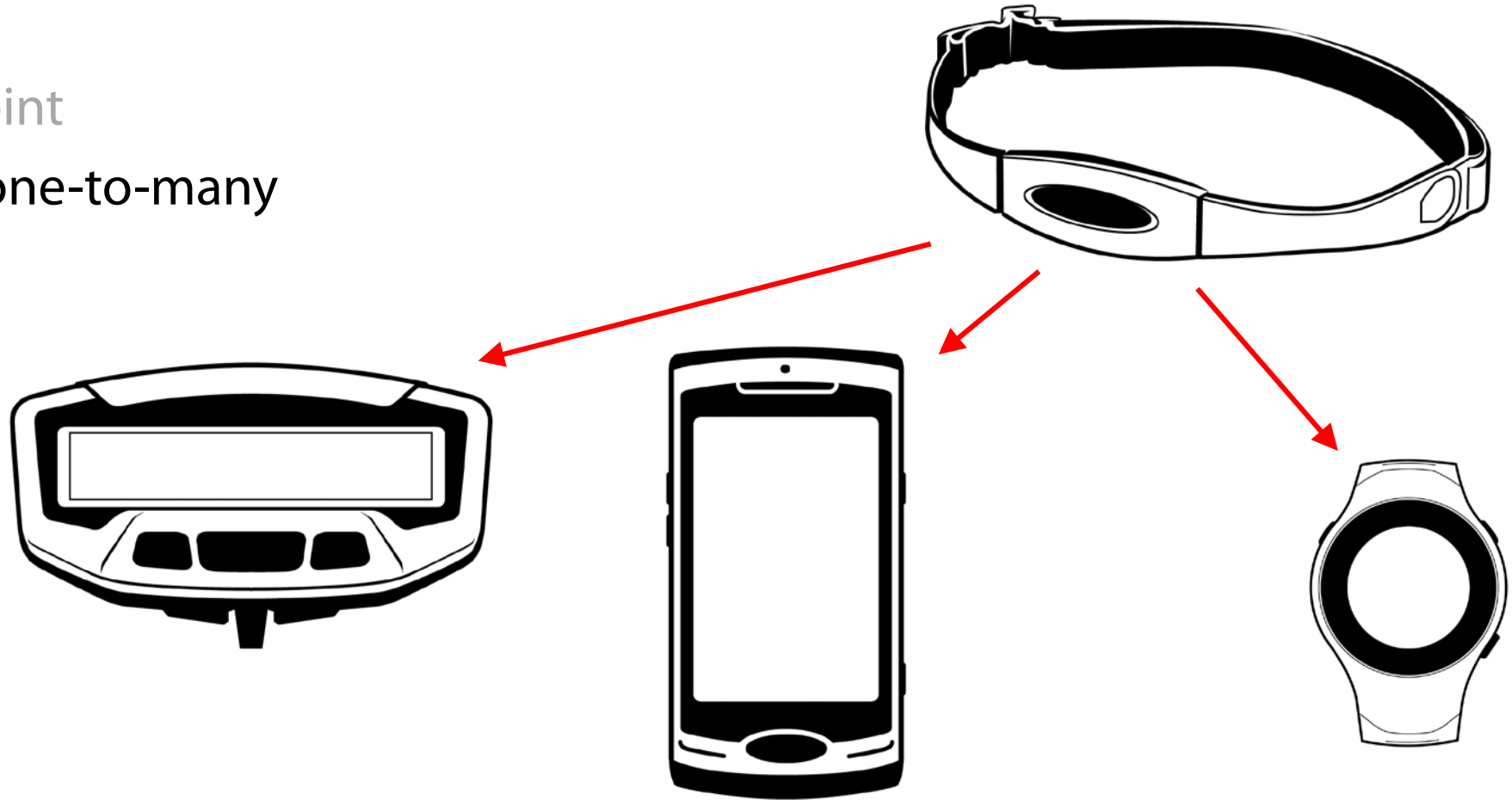
# BUILDING ANT NETWORKS

- Point-to-point



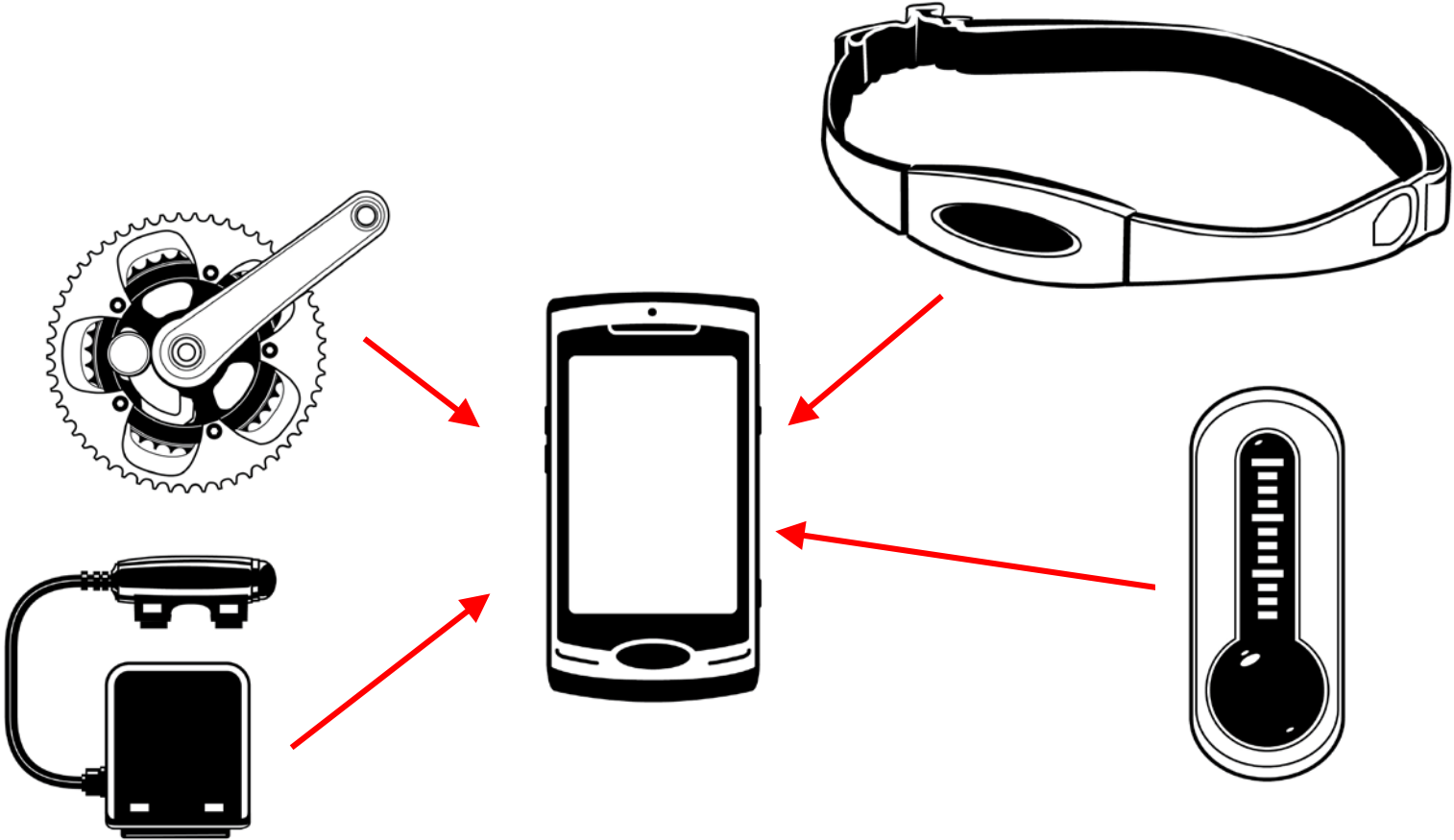
# BUILDING ANT NETWORKS

- Point-to-point
- Broadcast one-to-many



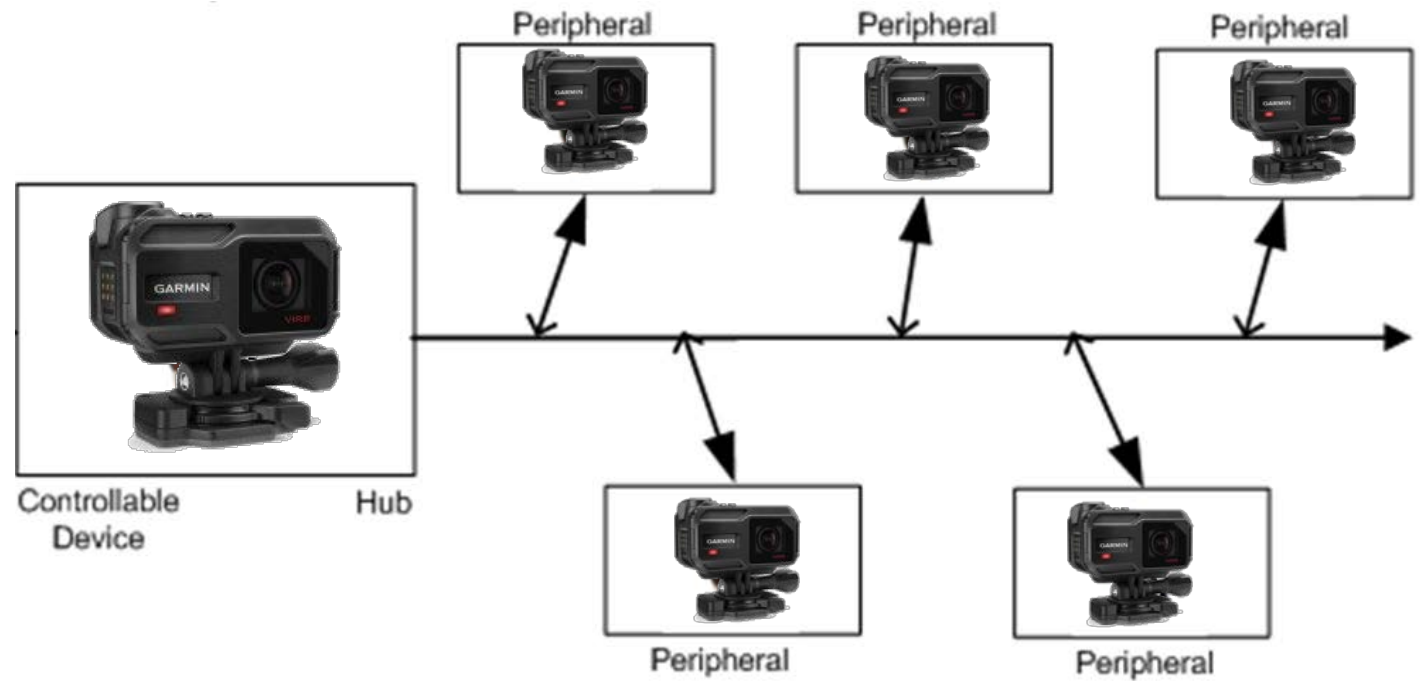
# BUILDING ANT NETWORKS

- Point-to-point
- Broadcast one-to-many
- Star



# BUILDING ANT NETWORKS

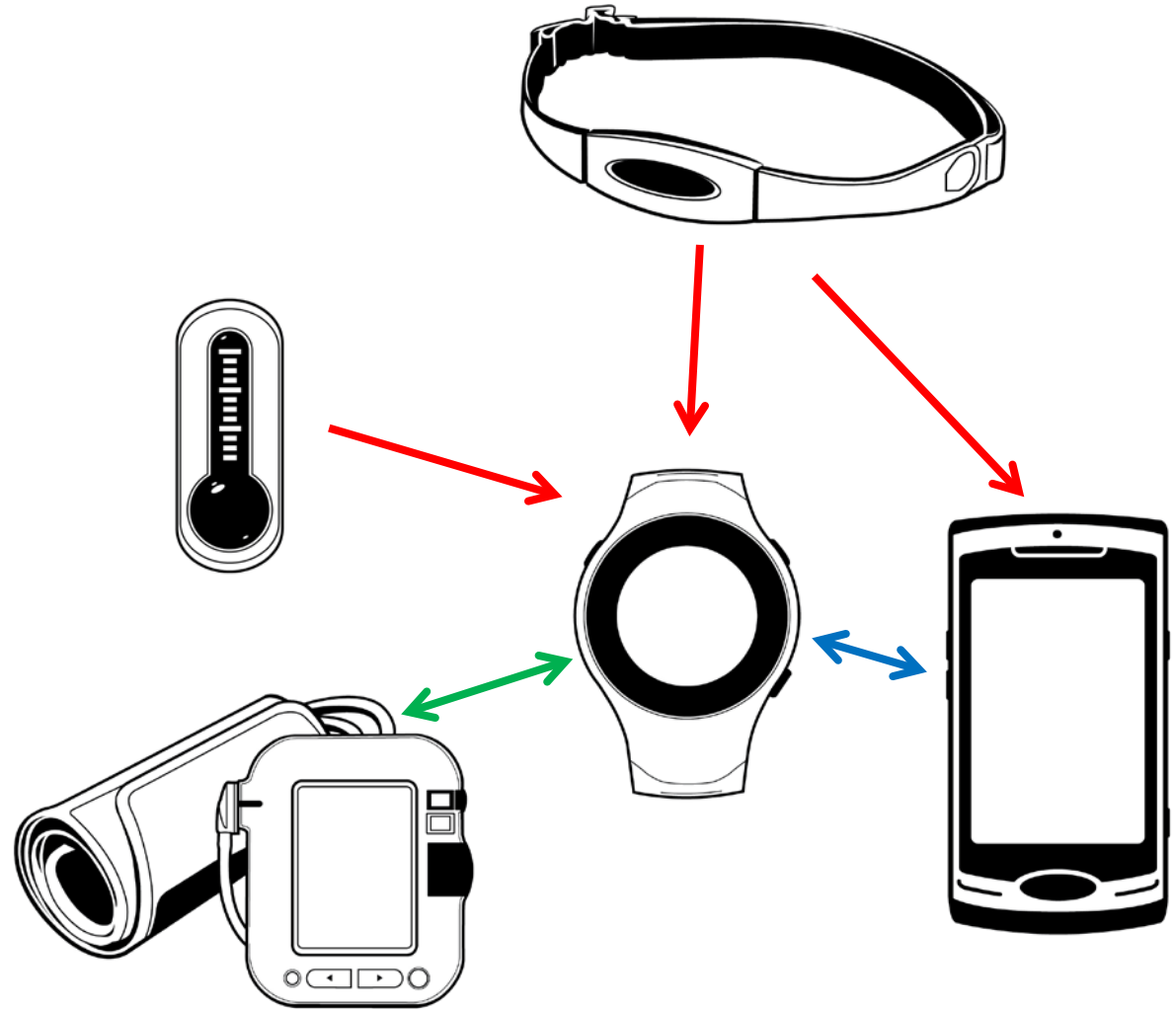
- Point-to-point
- Broadcast one-to-many
- Star
- Shared





# BUILDING ANT NETWORKS

- Point-to-point
- Broadcast one-to-many
- Star
- Shared
- Mix and match to form sophisticated networks



# BUILDING ON TOP OF ANT

<b>ANT</b>	Wireless Protocol
<b>ANT+</b>	Managed Network
<b>FIT</b>	Data Storage
<b>ANT-FS</b>	File Sharing
<b>ANT BLAZE</b>	Mesh Networking Solution

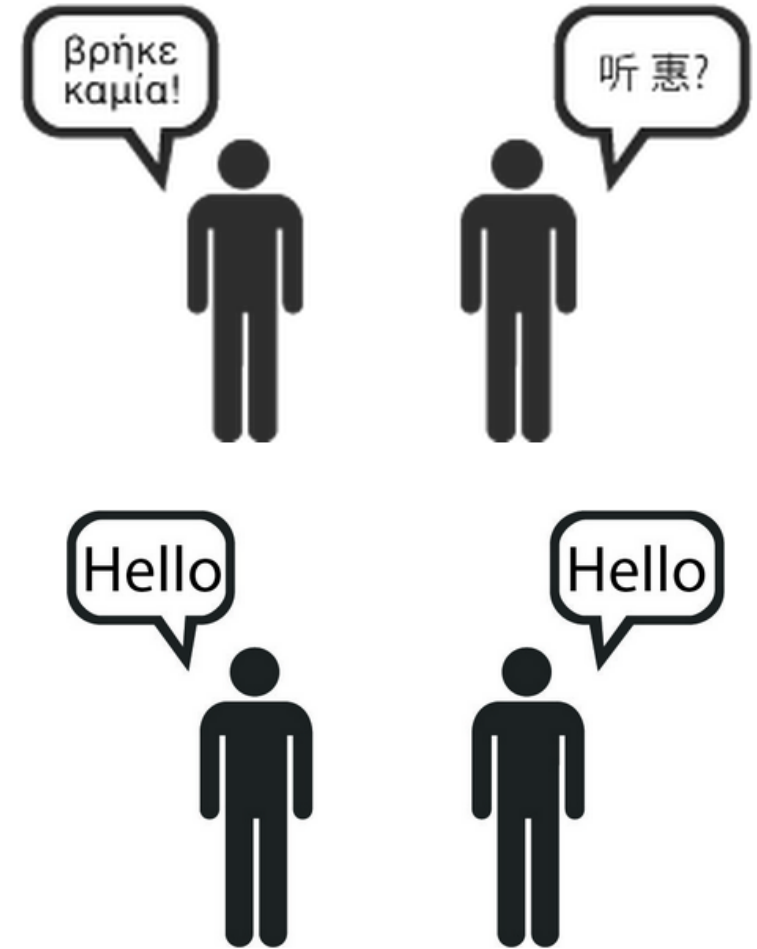
# ANT vs. ANT+

- ANT is the protocol

Being a protocol it does not define what high level information may be contained within the data.

- ANT+ is the managed network

that defines standards for different ANT use cases to achieve interoperability and assure quality.



# ANT+ DEVICE PROFILES

- Open definitions for device-level interoperability
  - Channel configuration
  - Data format
  - Data exchange mechanisms



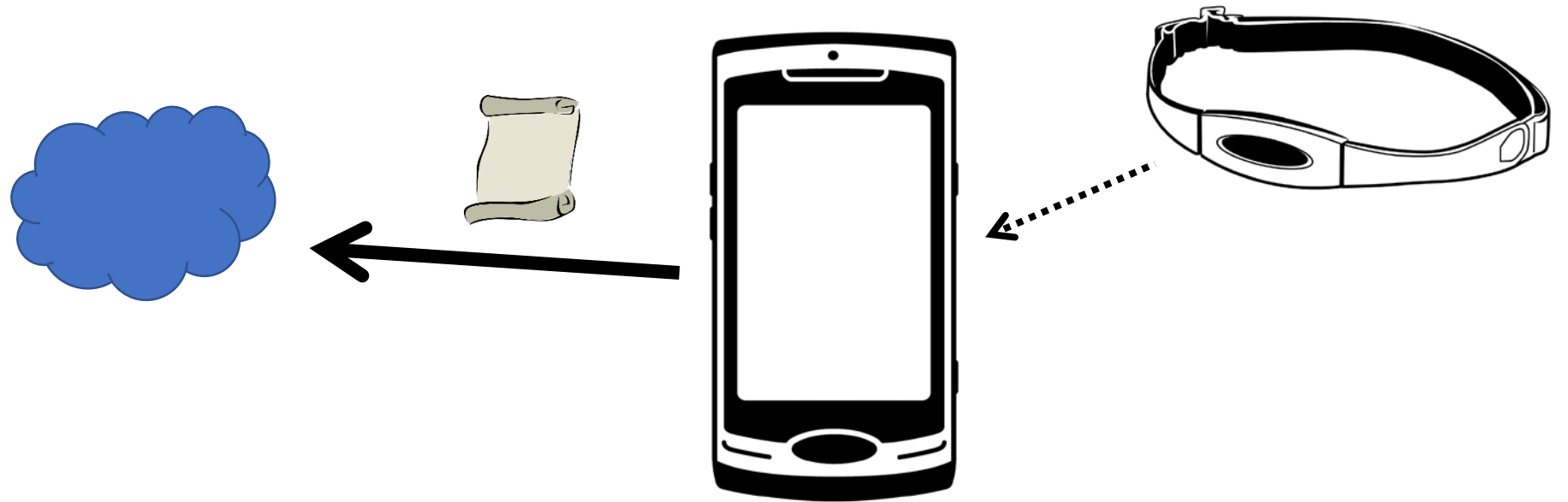
# ANT+ DEVICE PROFILES



- Bike Power
- Bike Speed and Cadence
- Heart Rate
- Foot Speed
- Fitness Equipment – Control
- Bike Lights
- Bike Radar
- Weight
- Muscle Oxygen
- Controls: Generic, Audio, Video
- Shifting
- Suspension
- Seat Post

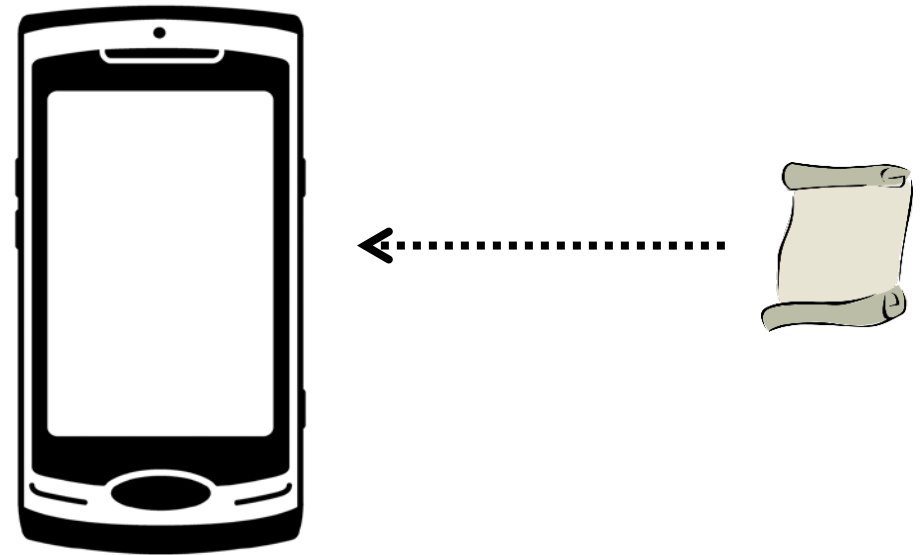
# FIT FOR DATA STORAGE

- Extendable and scalable for different device type data
- Platform independent
- Forward and backward compatible



# ANT-FS FOR FILE SHARING

- File transfer protocol
- Files transferred using burst data
- Defines state machine for
  - link establishment
  - authentication
  - Transport
- Over-the-air software updates





# ANT BLAZE

- Mesh networking solution
- Offers high node count IoT solutions
  - Lighting control
  - Asset management
  - Environmental monitoring
  - Location determination
- Built on top of ANT



# ANT BLAZE

WEDNESDAY, SEPTEMBER 27, 2017

1:45 PM - 2:00 PM

COFFEE BREAK

2:00 PM - 4:30 PM

Convention Facility

WORKSHOP

## INTERFACING A SENSOR HUB WITH THE ANT BLAZE MESH NETWORK

*Pratyush Dave, Nordic Semiconductor*

Learn how to interface real-time data to an ANT BLAZE mesh network using a low power Nordic nRF52 Series based sensor platform. Participants will learn how to transfer selected sensor and text data from the low power sensor platform over an ANT channel to the mesh network and be able to view their data through the mesh on a group display. Each participant will receive a complete Nordic Thingy:52 sensor development platform to take home.

**FIND OUT MORE....**  
**VISIT THISISANT.COM**

