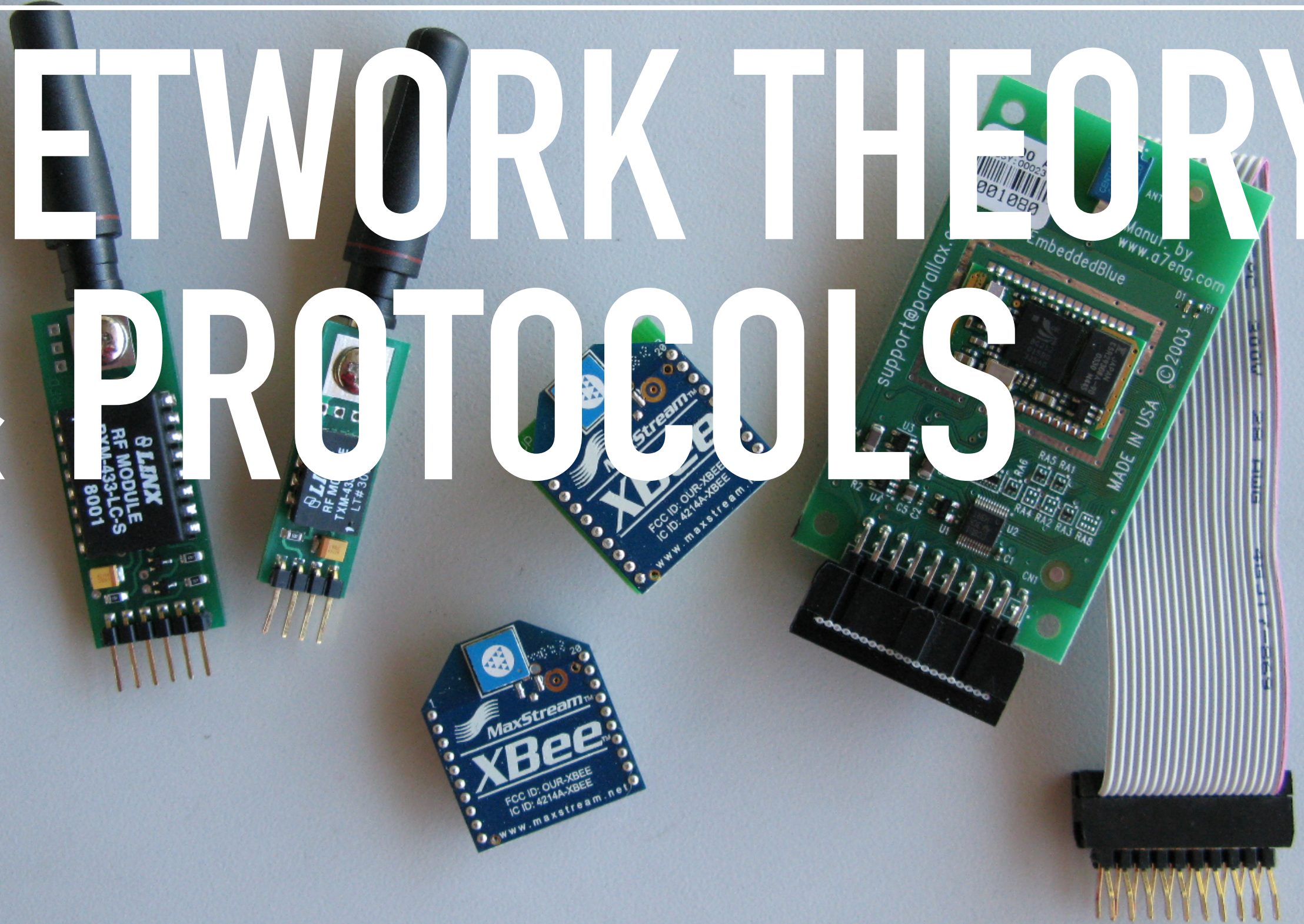


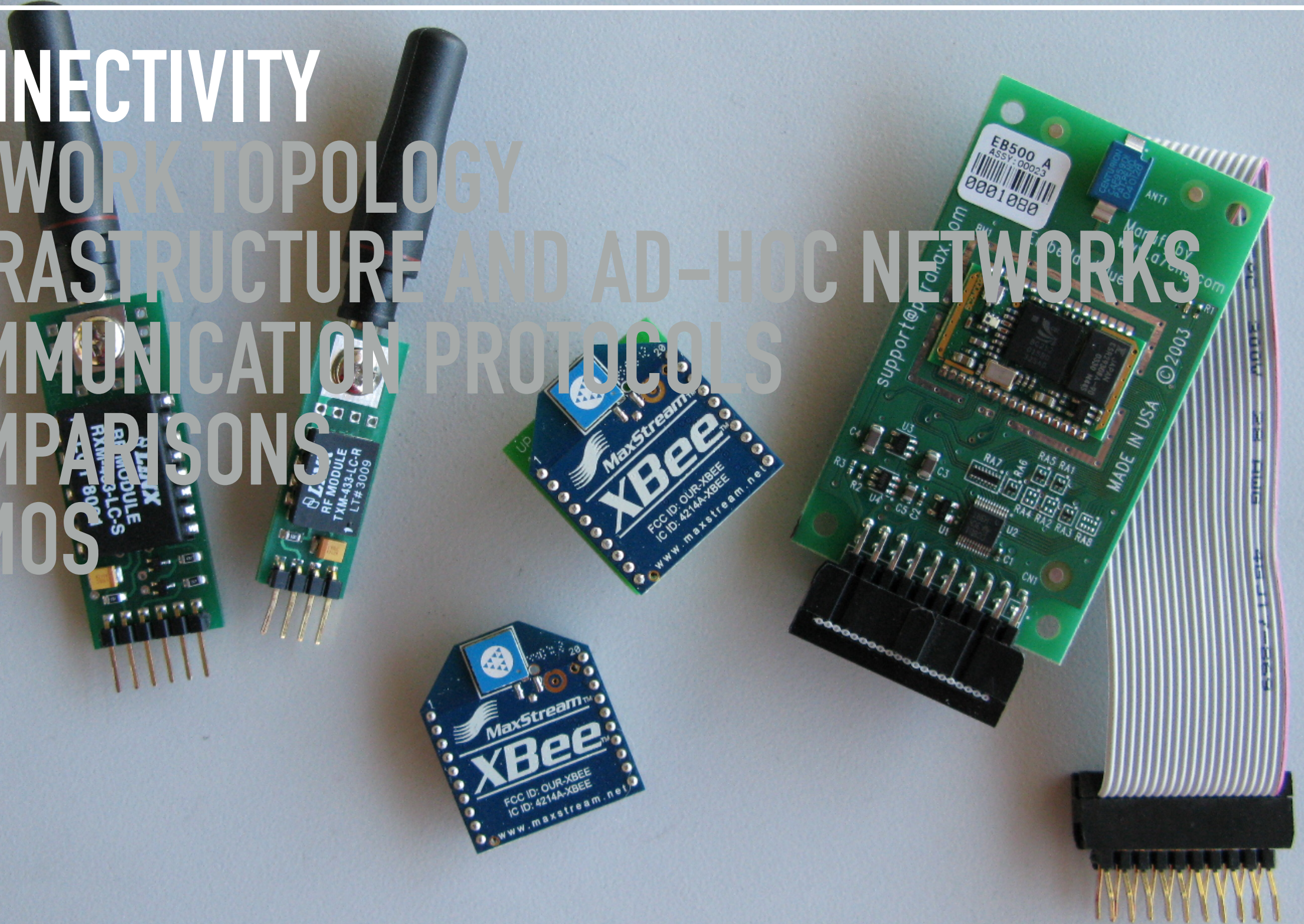
TANGIBLE MEDIA & PHYSICAL COMPUTING

NETWORK THEORY & PROTOCOLS



AGENDA

CONNECTIVITY
NETWORK TOPOLOGY
INFRASTRUCTURE AND AD-HOC NETWORKS
COMMUNICATION PROTOCOLS
COMPARISONS
DEMOS



CONNECTIVITY

WIRELESS [WIFI] OR WIRED [ETHERNET]

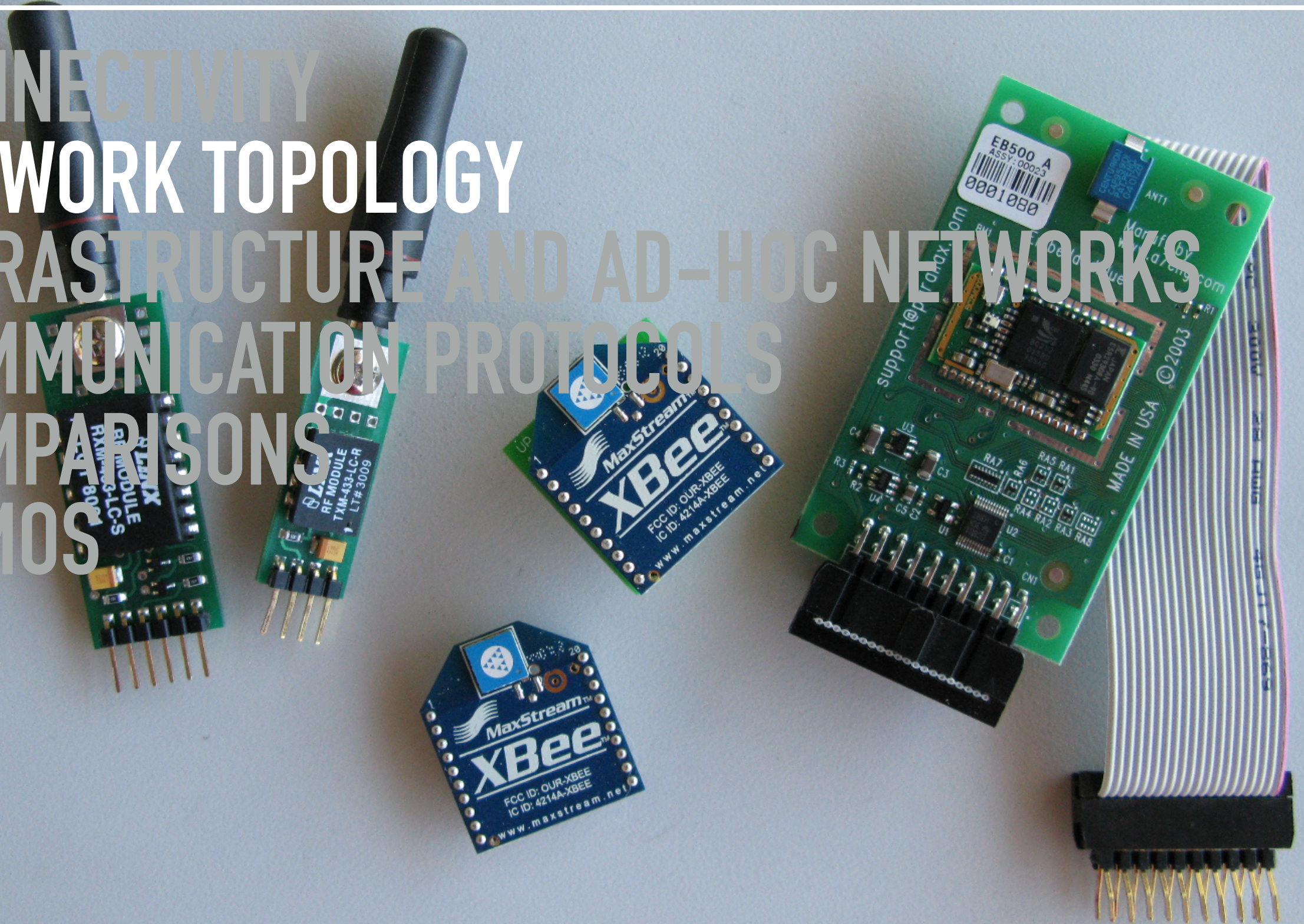
POWER [TRANSMISSION] & RANGE

DATA TRANSMISSION RATE

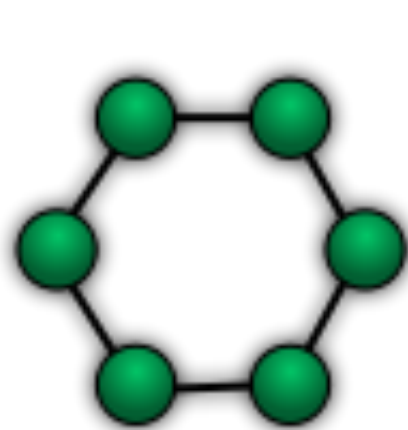
NETWORK INFRASTRUCTURES

AGENDA

CONNECTIVITY
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INFRASTRUCTURE AND AD-HOC NETWORKS
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DEMOS



NETWORK TOPOLOGY



Ring



Mesh



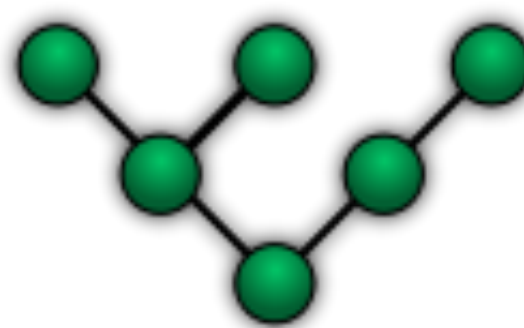
Star



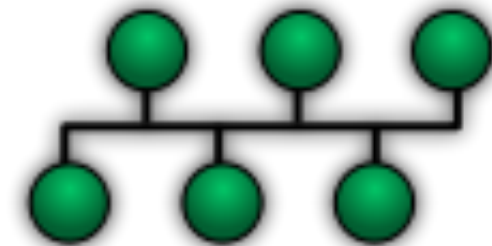
Fully Connected



Line

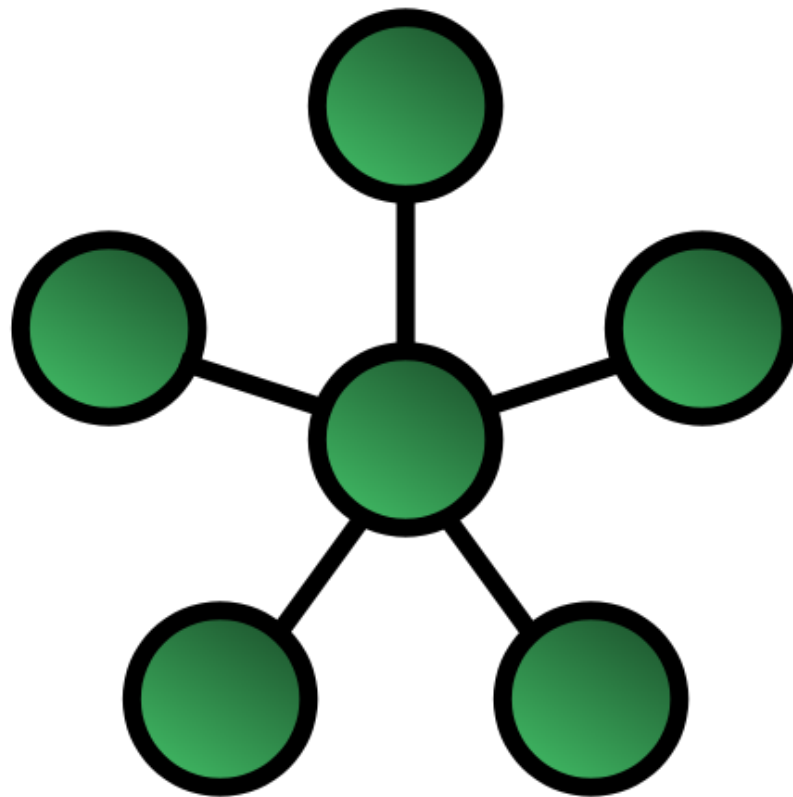


Tree

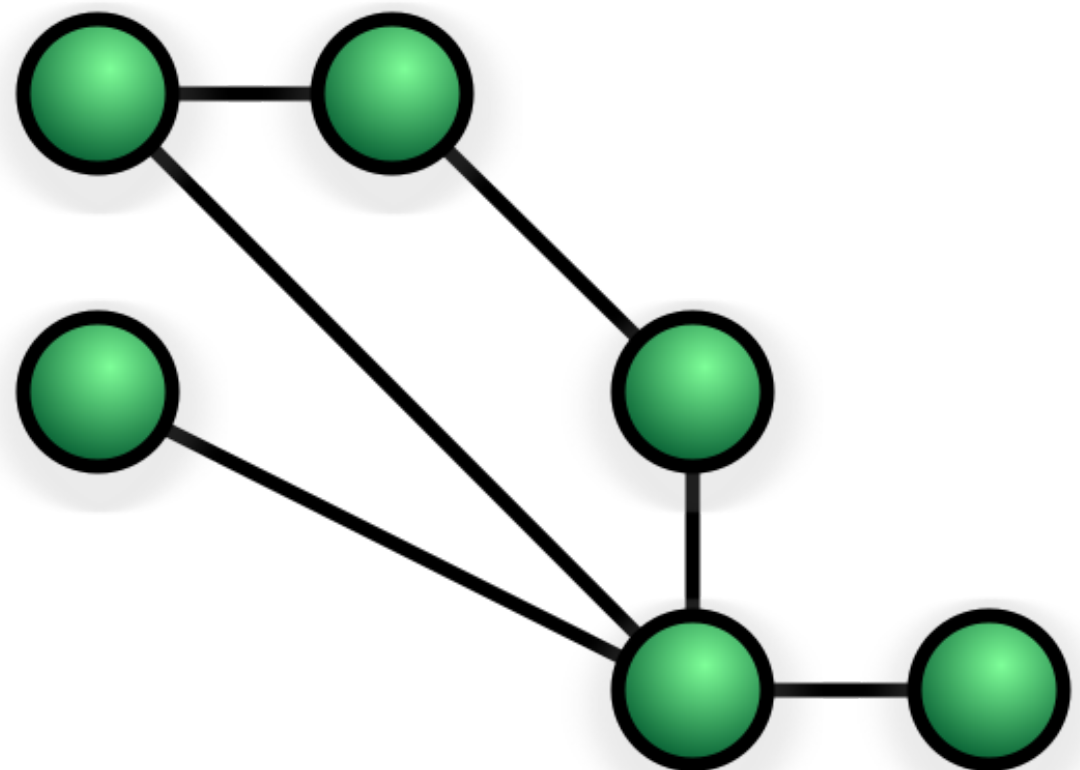
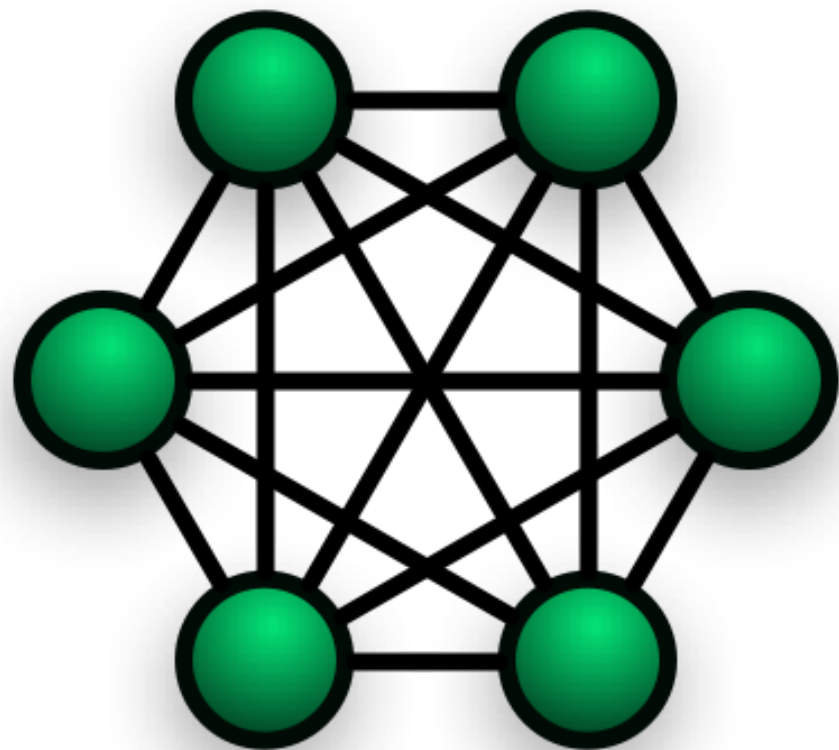


Bus

NETWORK TOPOLOGY: STAR

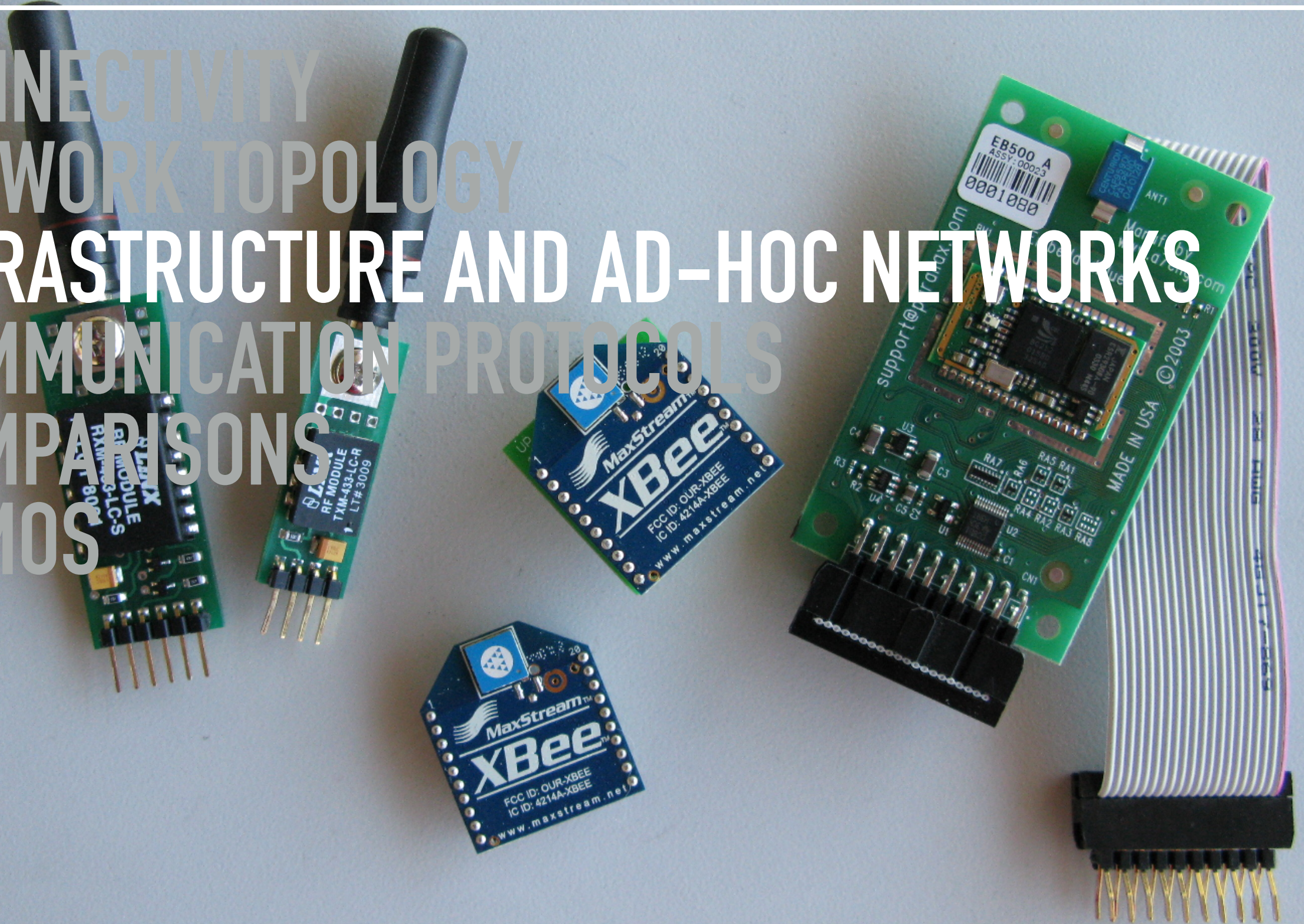


NETWORK TOPOLOGY: MESH

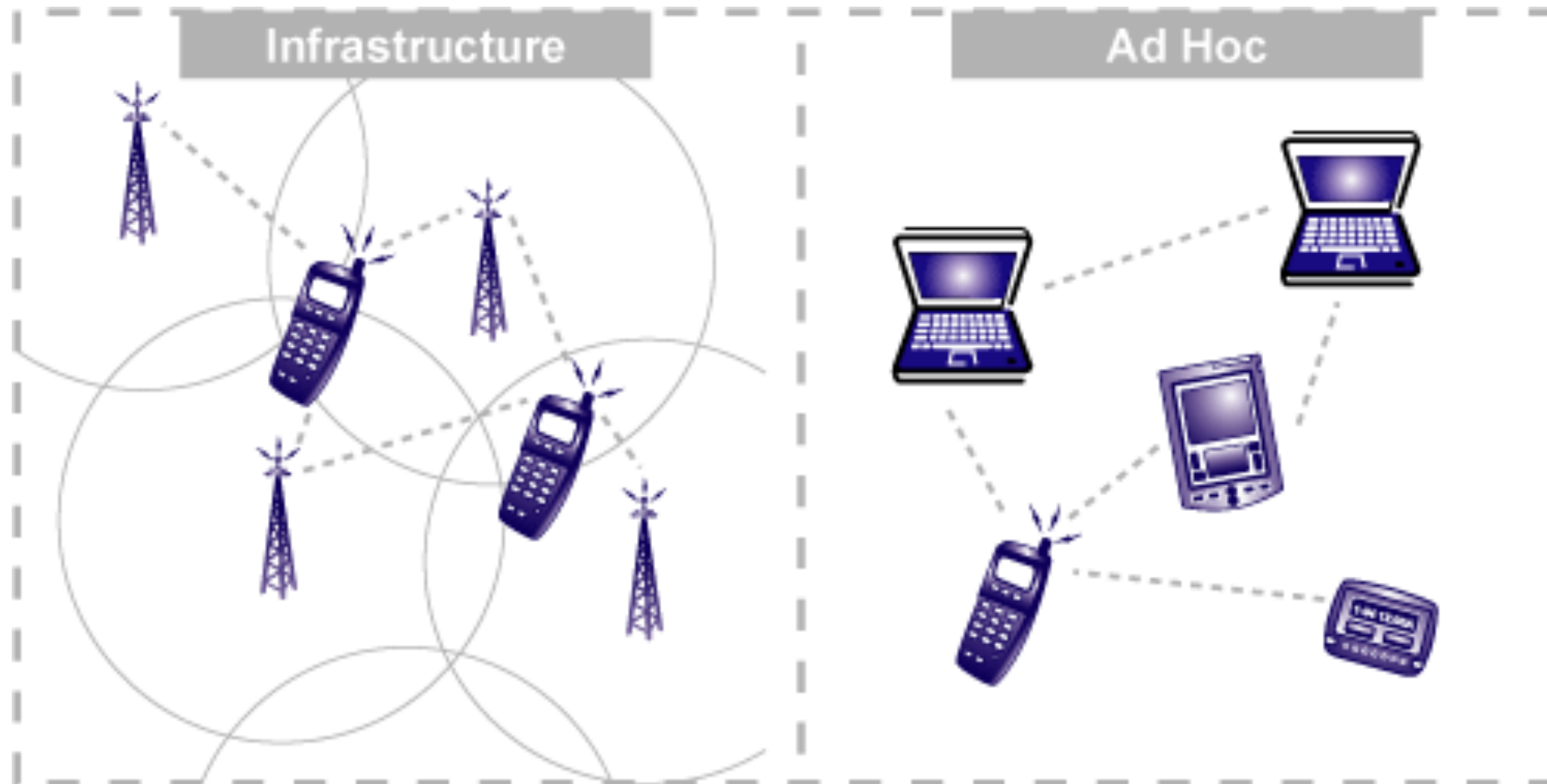


AGENDA

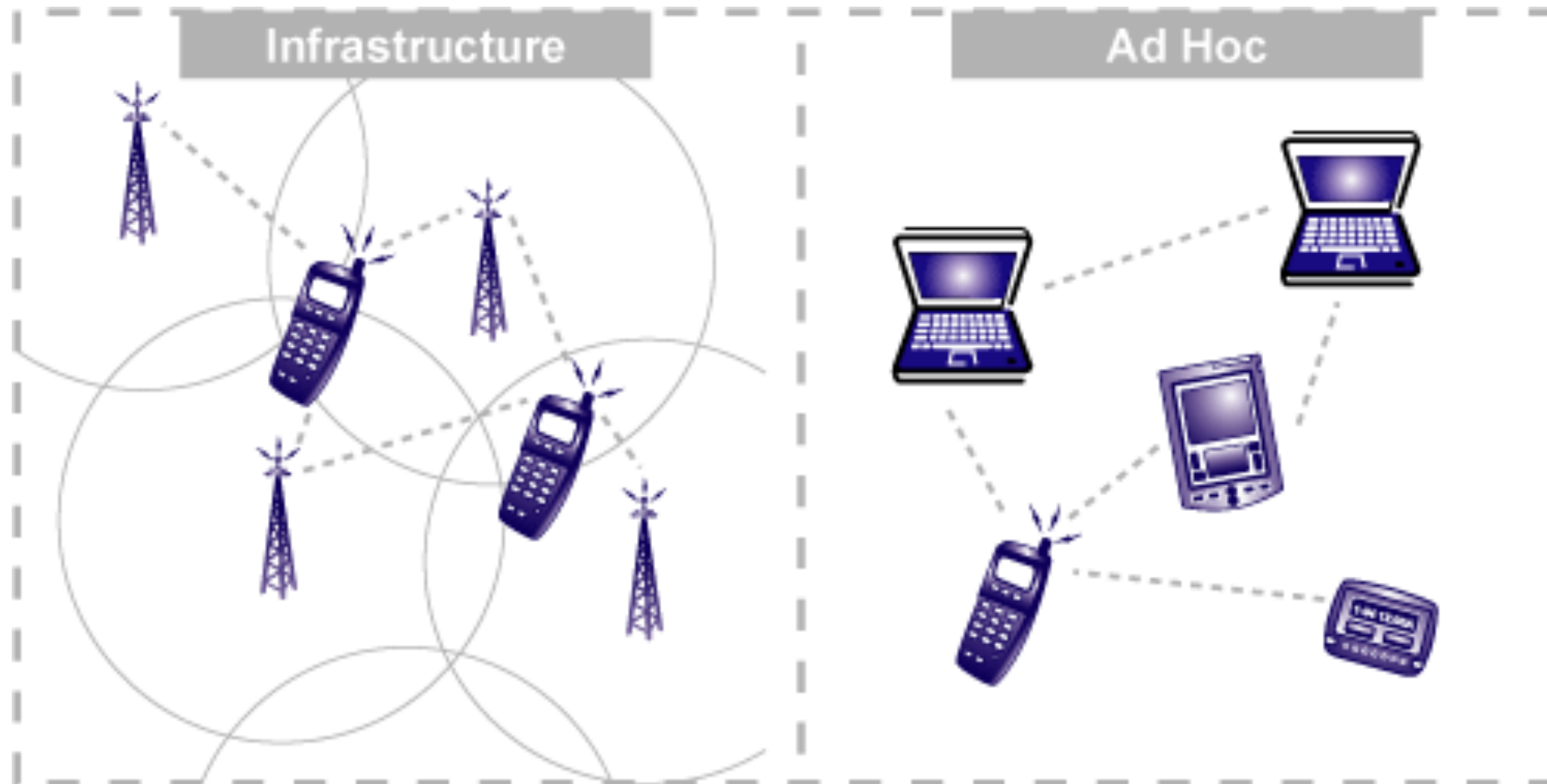
CONNECTIVITY
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INFRASTRUCTURE AND AD-HOC NETWORKS
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INFRASTRUCTURE AND AD-HOC

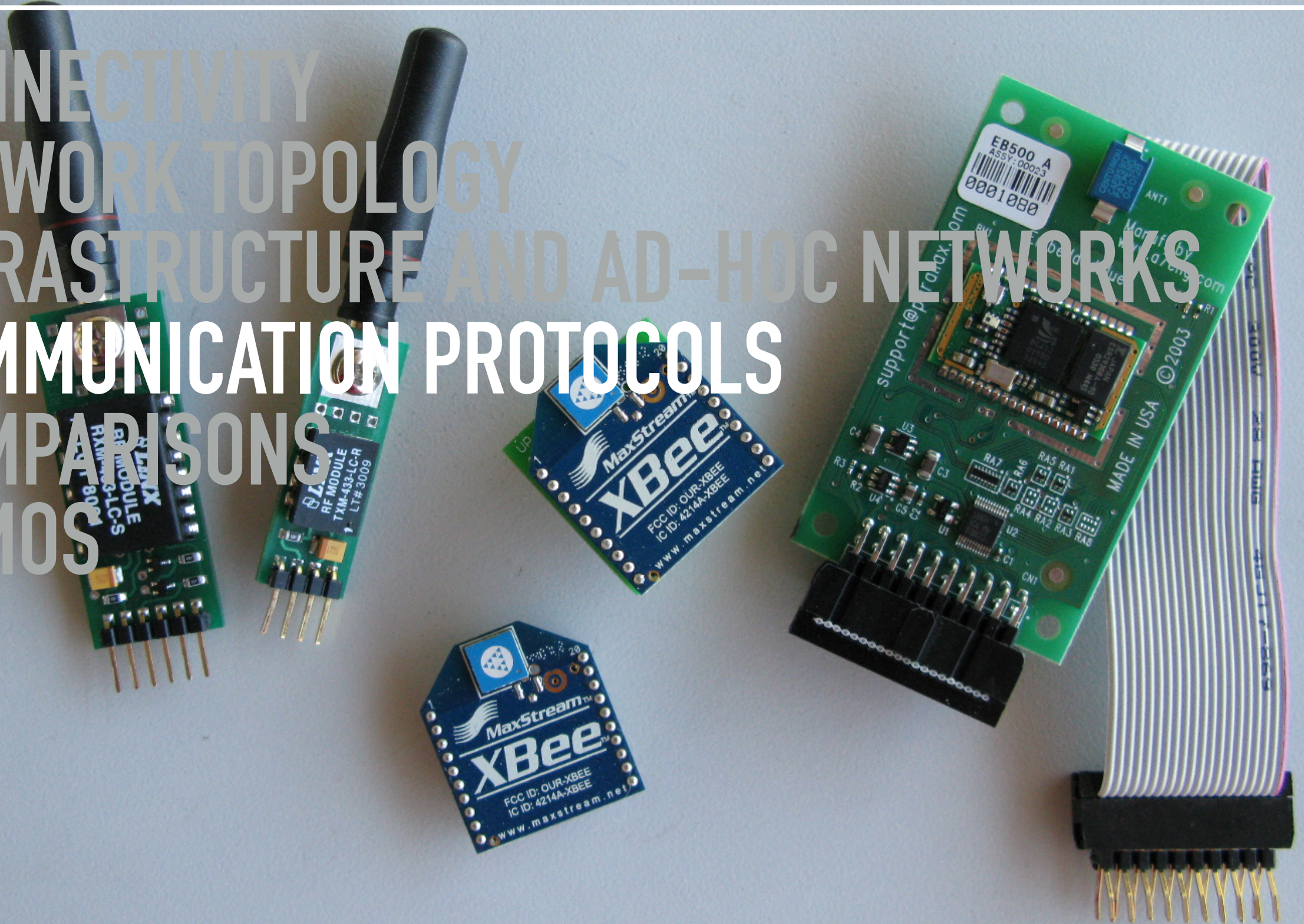


INFRASTRUCTURE AND AD-HOC



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WIFI

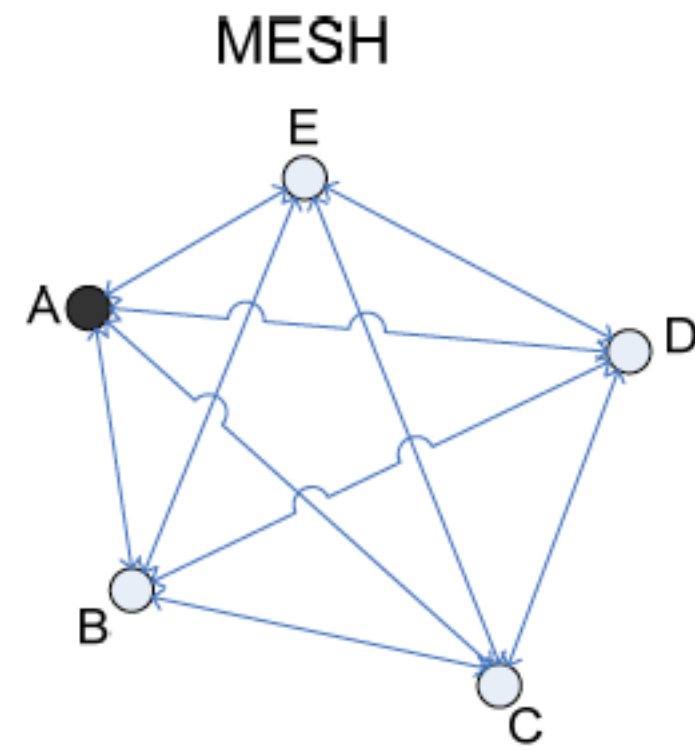
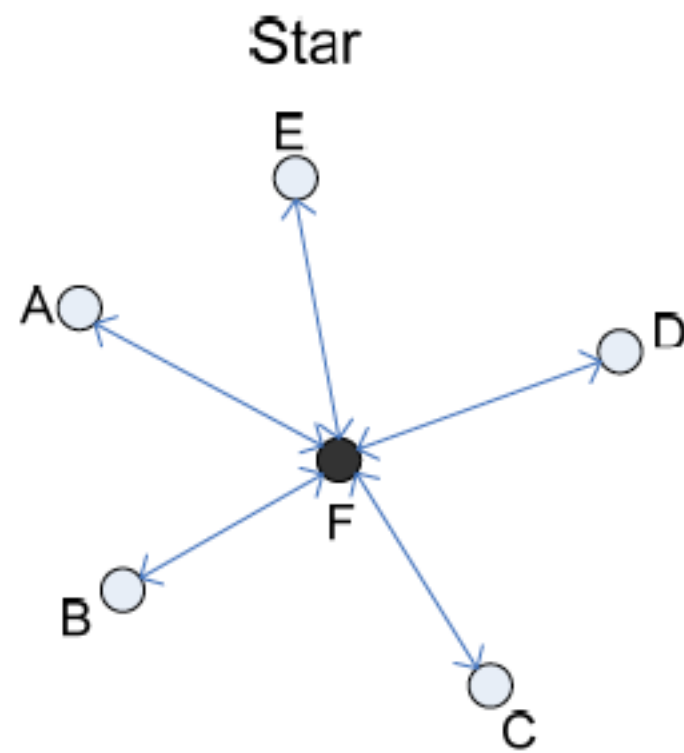


ZIGBEE [XBEE]



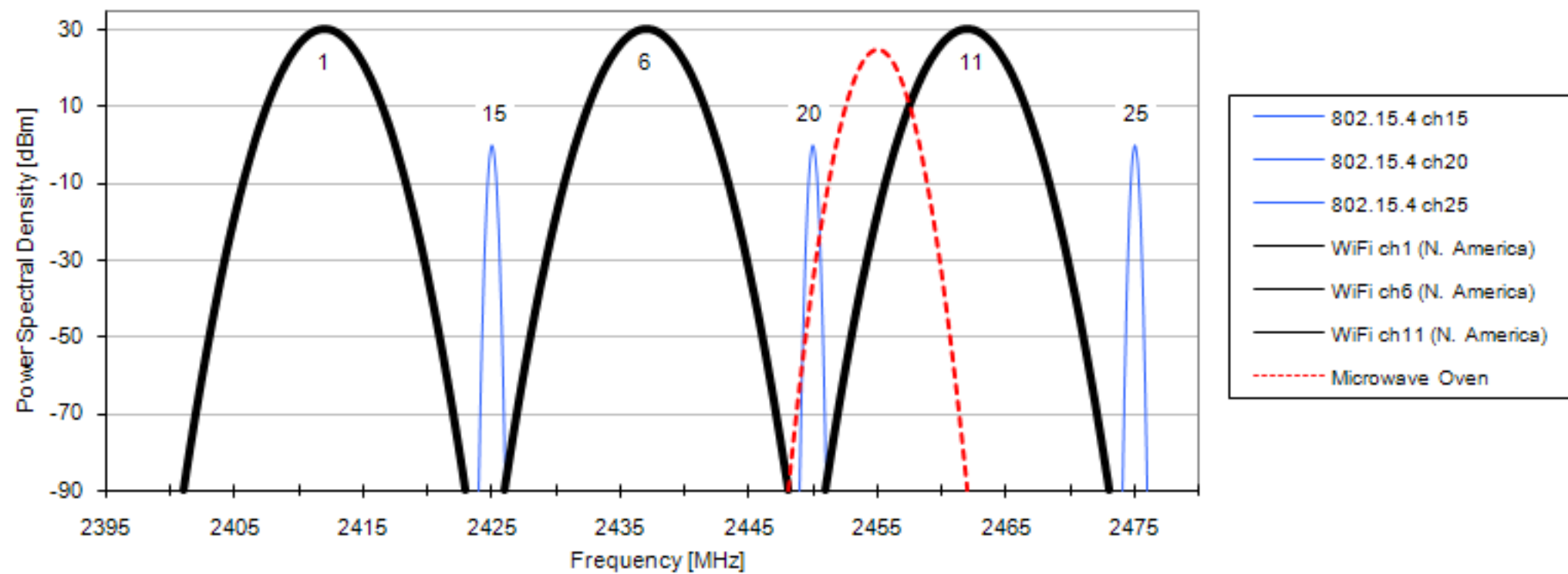
ZigBee[®]
Alliance

ZIGBEE [XBEE]



○ Network Node
● Network Coordinator

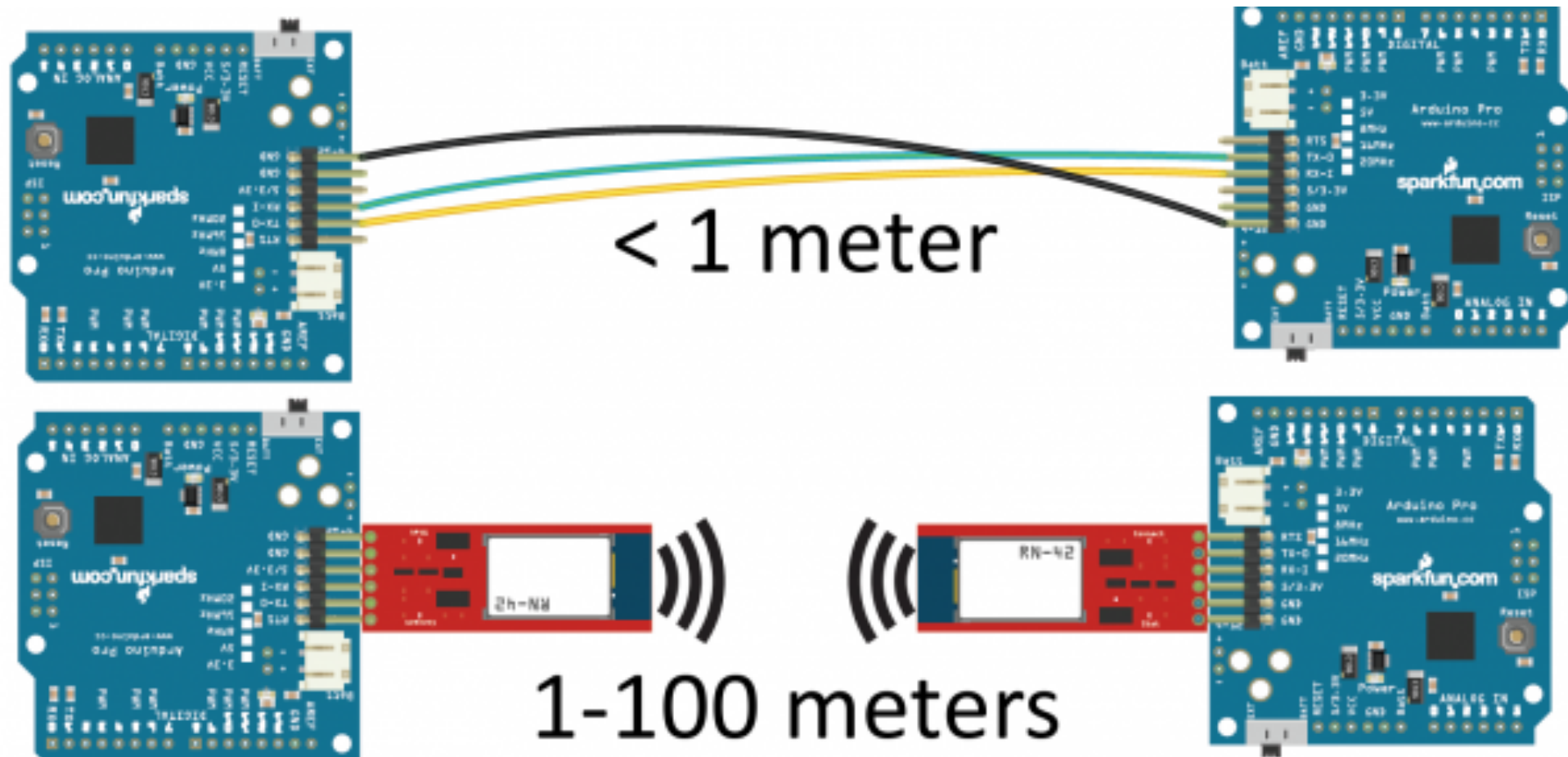
ZIGBEE [XBEE] CO-EXIST WIFI



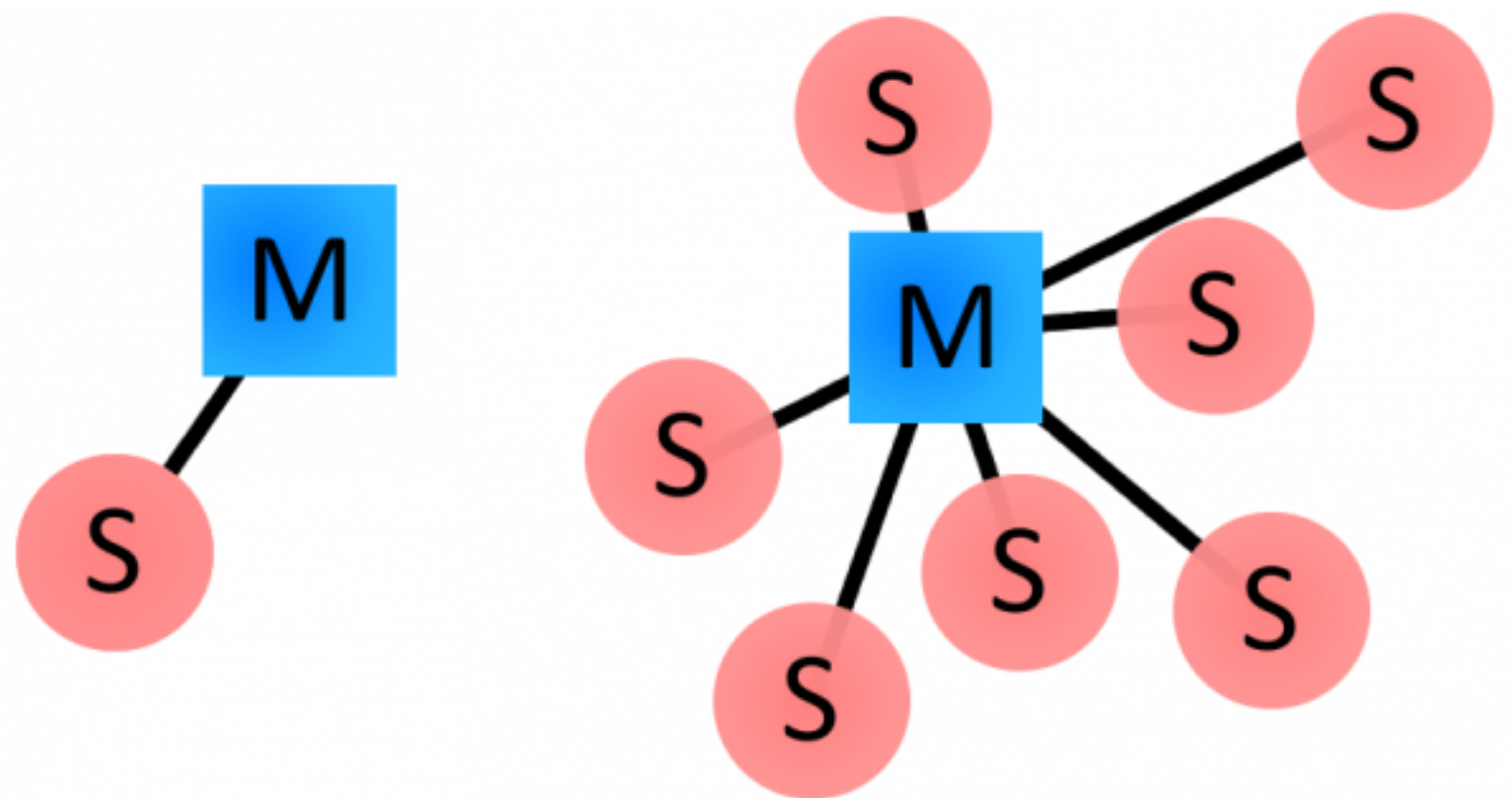
BLUETOOTH



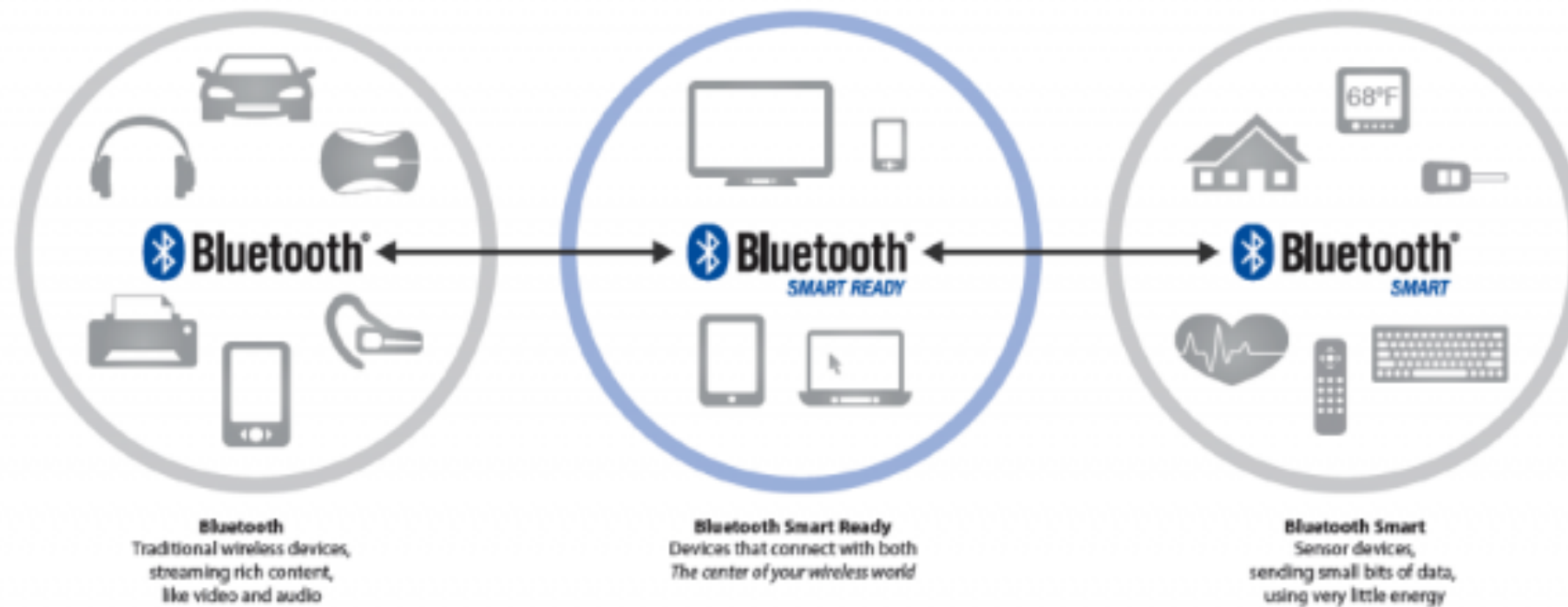
BLUETOOTH CLASSIC



BLUETOOTH CLASSIC



BLUETOOTH FLAVOURS



RFID

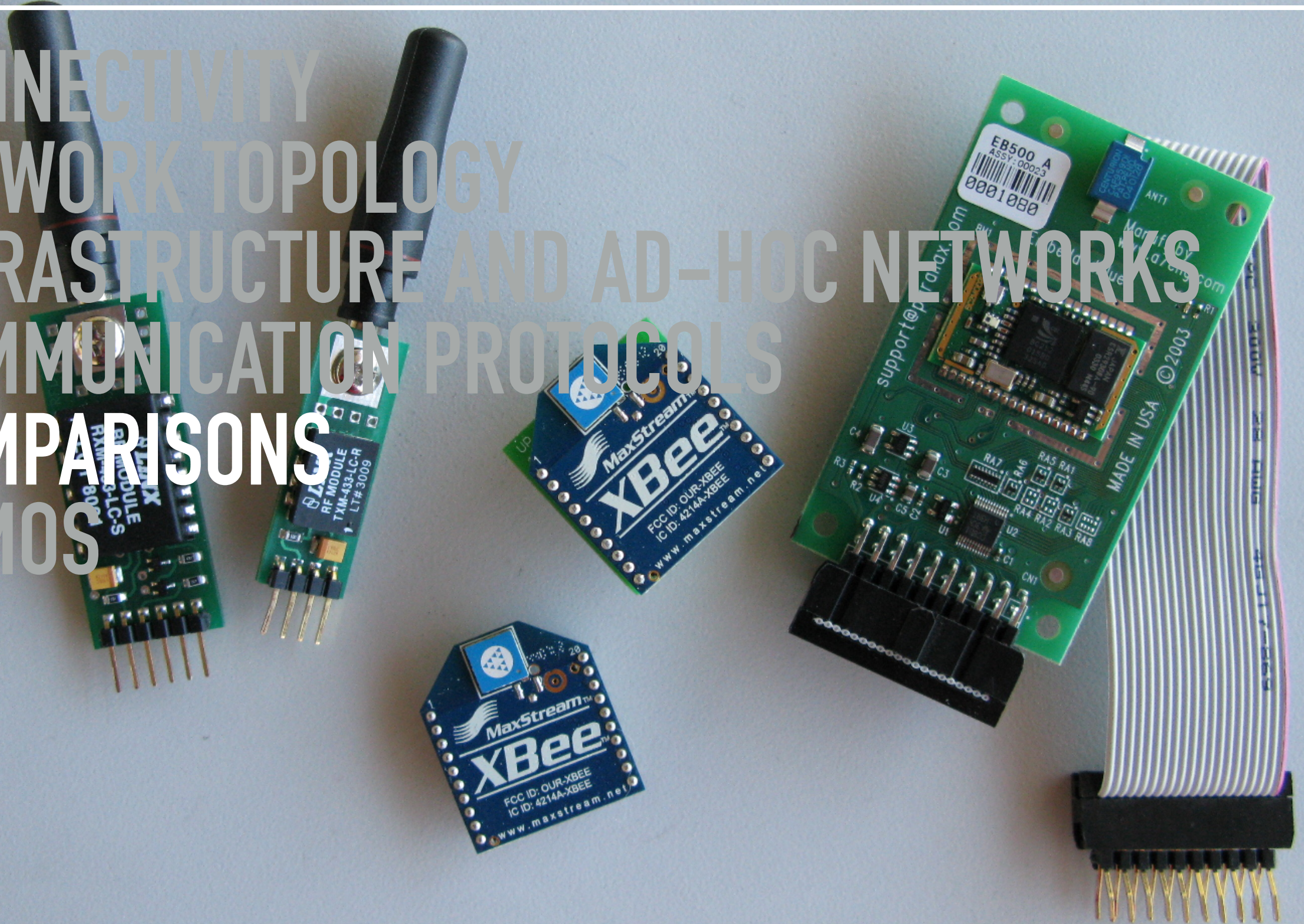


NFC



AGENDA

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COMPARISONS

Name	Bluetooth Classic	Bluetooth 4.0 Low Energy (BLE)	ZigBee	WiFi
IEEE Standard	802.15.1	802.15.1	802.15.4	802.11 (a, b, g, n)
Frequency (GHz)	2.4	2.4	0.868, 0.915, 2.4	2.4 and 5
Maximum raw bit rate (Mbps)	1-3	1	0.250	11 (b), 54 (g), 600 (n)
Typical data throughput (Mbps)	0.7-2.1	0.27	0.2	7 (b), 25 (g), 150 (n)
Maximum (Outdoor) Range (Meters)	10 (class 2), 100 (class 1)	50	10-100	100-250
Relative Power Consumption	Medium	Very low	Very low	High
Example Battery Life	Days	Months to years	Months to years	Hours
Network Size	7	Undefined	64,000+	255

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