SESSION 113
INTEGRATING TABLETS

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CTO – Chetco Digital Instruments
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Today's Overview

1. Getting Data to your Tablet
2. Pulling Vessel Data
3. Pushing Vessel Data

Getting Data to your Tablet

1. Point to Point
2. Ad Hoc Network
3. Infrastructure Network

Getting Data to your Tablet

Point to Point

- **Serial/USB Cable**
  - Attach directly to sensor
  - 16 feet max
- **SD/USB Memory Card**
  - Remote data log and retrieve
- **Bluetooth**
  - Wireless with 100 ft range
- **WiFi - 802.11**
  - Wireless 300 ft range
  - Widely supported

Getting Data to your Tablet

Point to Point

- **Direct Serial**
- $IIXDR,G, 54##00,G,P
- $IIXDR,G, 54##00,G,P FUEL
- $IIXDR,G, 54##00,G,P FUEL
- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B

Getting Data to your Tablet

Point to Point

- **USB Memory**
- $SDDPT,234.4,*
- $SDMTW,24.6,C
- $SDDPT,234.4,*38
- $SDMTW,24.6,C*56
- $SDDPT,234
- $SDMT
- $S 38
- .6,C*56
- ,24.6,C*56

Getting Data to your Tablet

Point to Point

- **Bluetooth**
- $WIMWV,182.6,R,0.4
- $HCHDT,299.9,T*22
- $TIROT,-5.8,A*1B
- $WIMWV,182.6
- $HCHDT,3
- $WI
- A*21
- $,141.6,T,0.2,N,A*25

Getting Data to your Tablet

Point to Point

- **WiFi 802.11 b/g**
- $WIMWV,182.6,R,0.4
- $HCHDT,299.9,T*22
- $TIROT,-5.8,A*1B
- $WIMWV,182.6,R,0.3
- $HCHDT,300.0,T*2A
- $WIMW
- $
- $
- $ WV,141.6,T,0.2,N,A*25

Getting Data to your Tablet

Point to Point

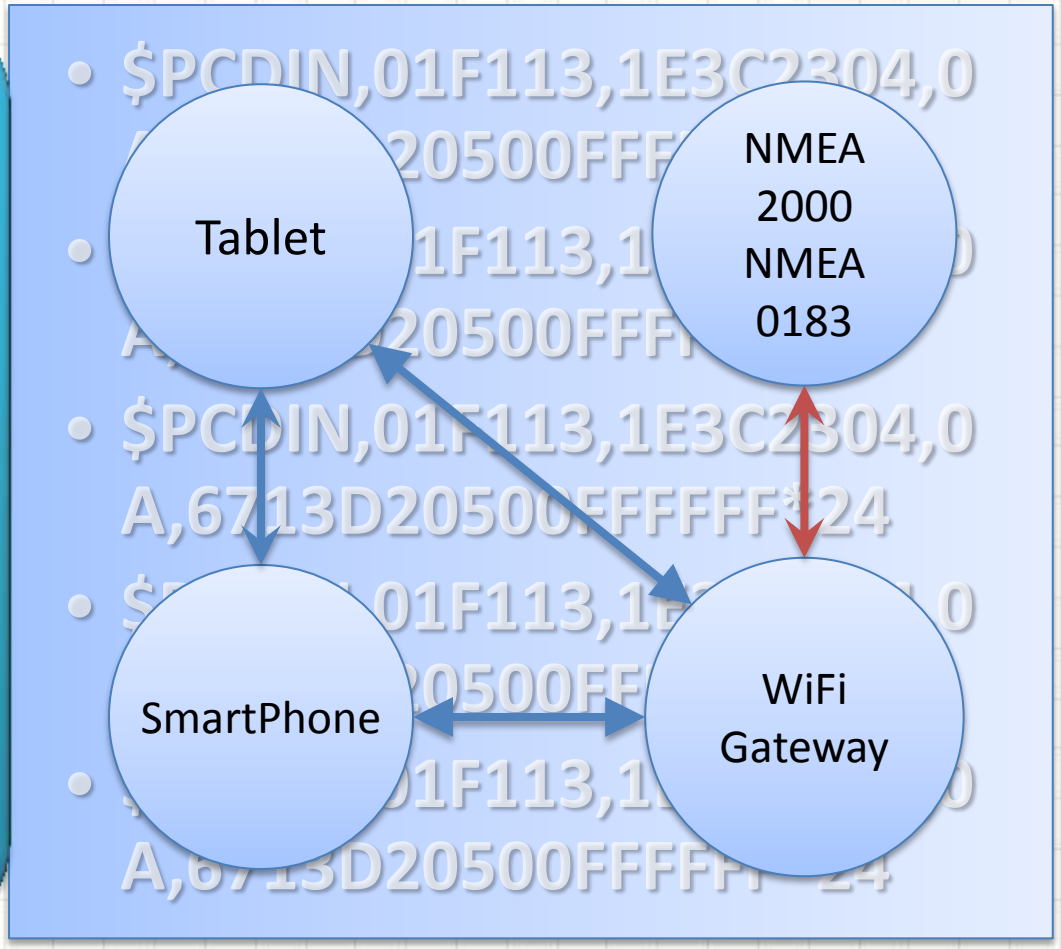
- **Analog Gateway**

- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P 8*0B
- $IIXDR,G, 54##00,G,P 7*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B
- $IIXDR,G, 54##00,G,P TEMP 9*0B
- $IIXDR,G, 54##00,G,P OIL 8*0B
- $IIXDR,G, 54##00,G,P FUEL 9*0B

NMEA – Ethernet – WiFi – USB - Serial

Getting Data to your Tablet

Ad Hoc Network



Getting Data to your Tablet

Ad Hoc Network

- **Connect Multiple Sensors**
  - Common bus (Ethernet/802.11 WiFi)
  - Utilize Gateways to bridge protocols (NMEA 2000 to TCP/IP)
- **Simple Setup**
  - Auto-configure
  - Multiple Tablet Devices
- **Local Access**
  - Wireless 300 ft range
  - 802.11 b/g Widely supported

Getting Data to your Tablet

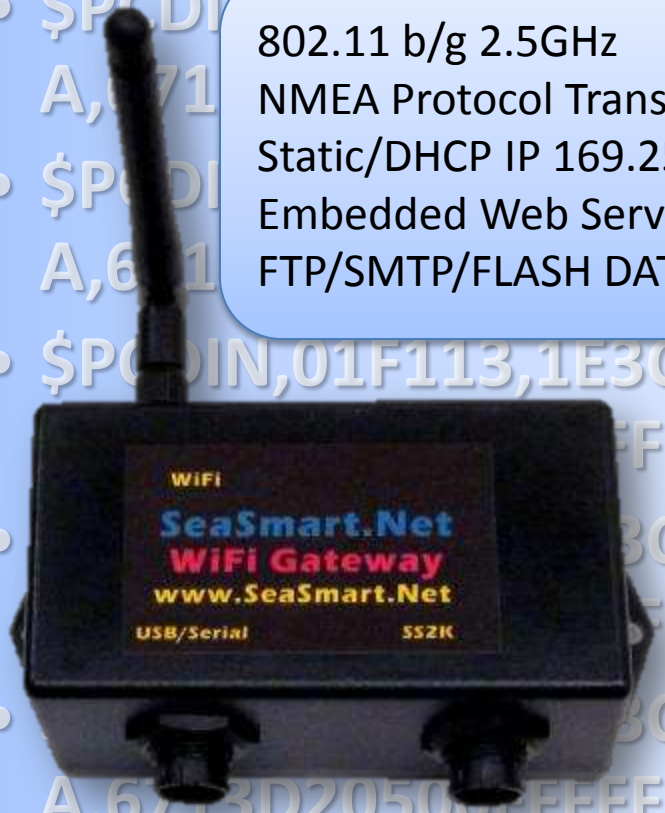
Ad Hoc Network

- **NMEA 0183**
  - Point to Point/Daisy Chained
  - Convert Serial (RS232) to TCP/IP
- **NMEA 2000**
  - Multiple Sensors on one bus (100's)
  - Convert CAN Frames to TCP/IP
  - Requires NMEA Certified Gateway
- **Direct Analog**
  - TDM channels into single TCP Port
  - Requires Analog Gateway

Getting Data to your Tablet

Ad Hoc Network

802.11 b/g 2.5GHz
NMEA Protocol Translation
Static/DHCP IP 169.254.X.X
Embedded Web Server
FTP/SMTP/FLASH DATA LOG



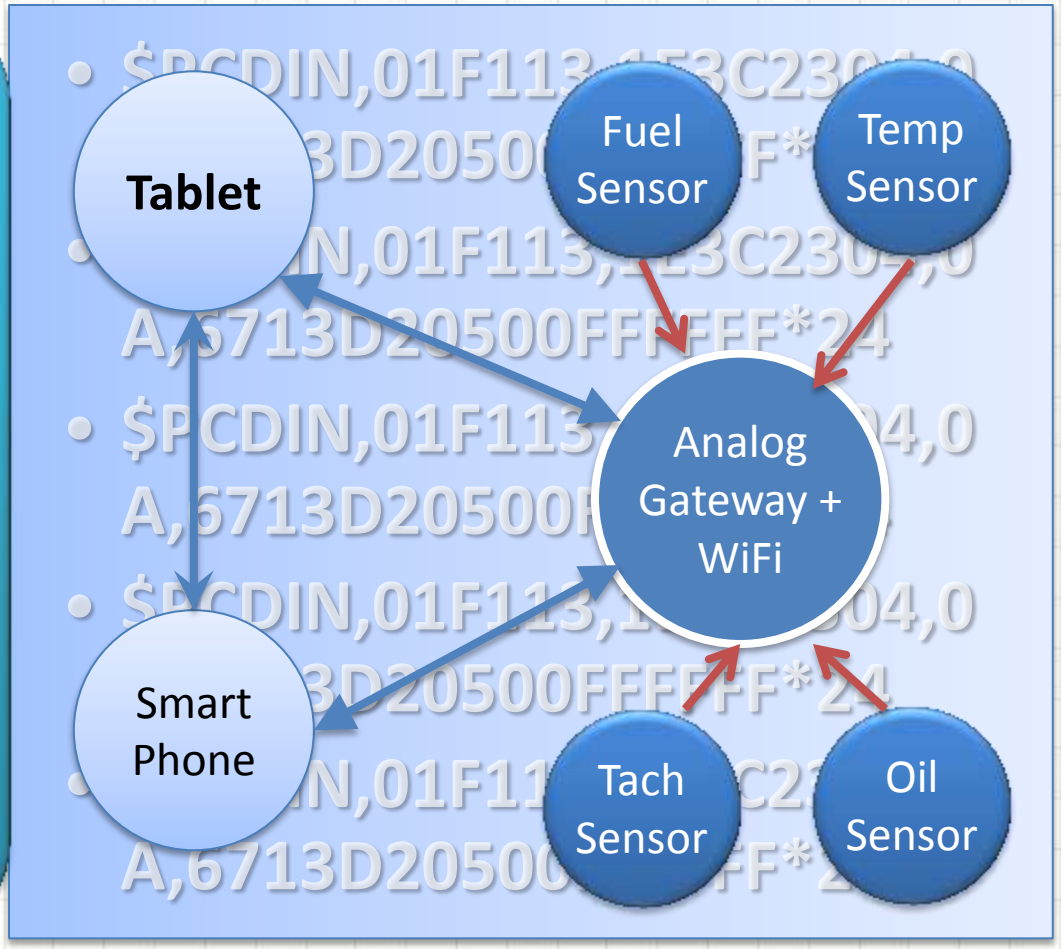
Getting Data to your Tablet

Ad Hoc Network

NMEA 2000 Interface
Separate NMEA 0182 port
Combines to Single TCP port
USB Interface to PC/Laptop
NMEA 2000/USB Bus Powered

Getting Data to your Tablet

Ad Hoc Network



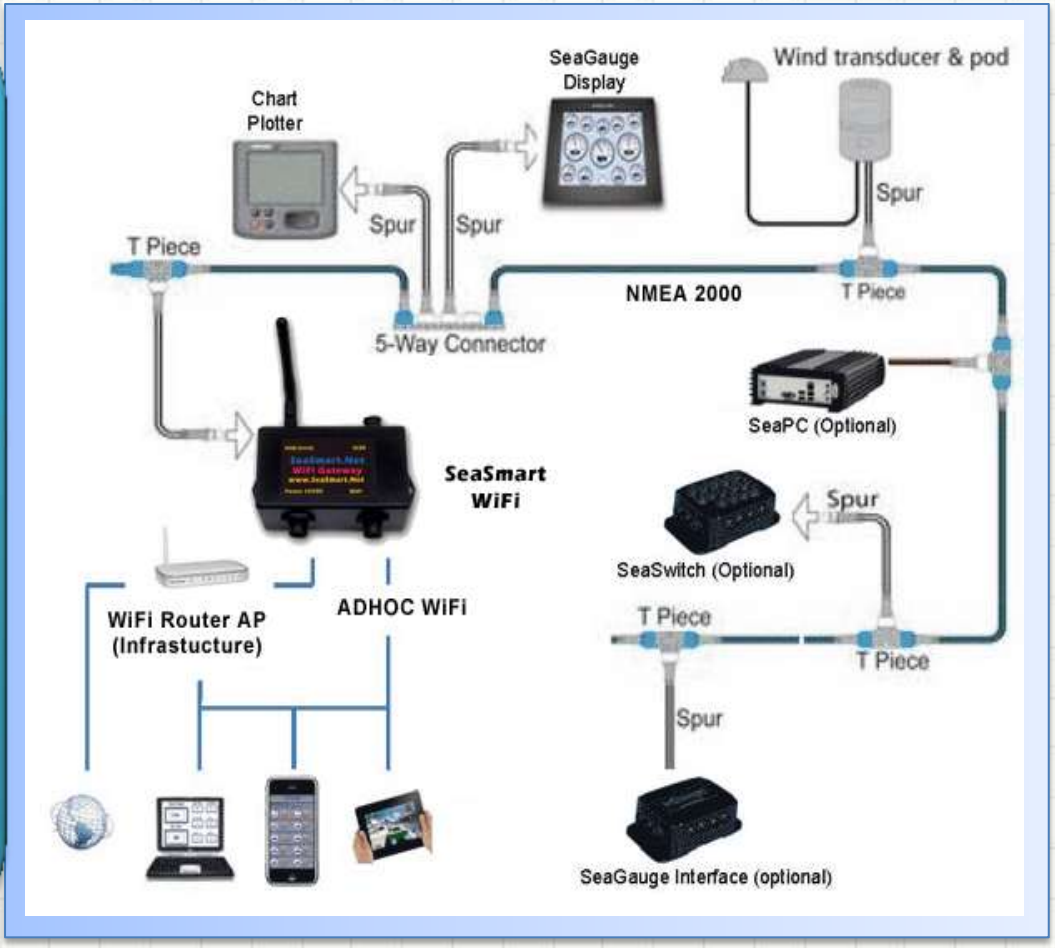
Getting Data to your Tablet

Ad Hoc Network

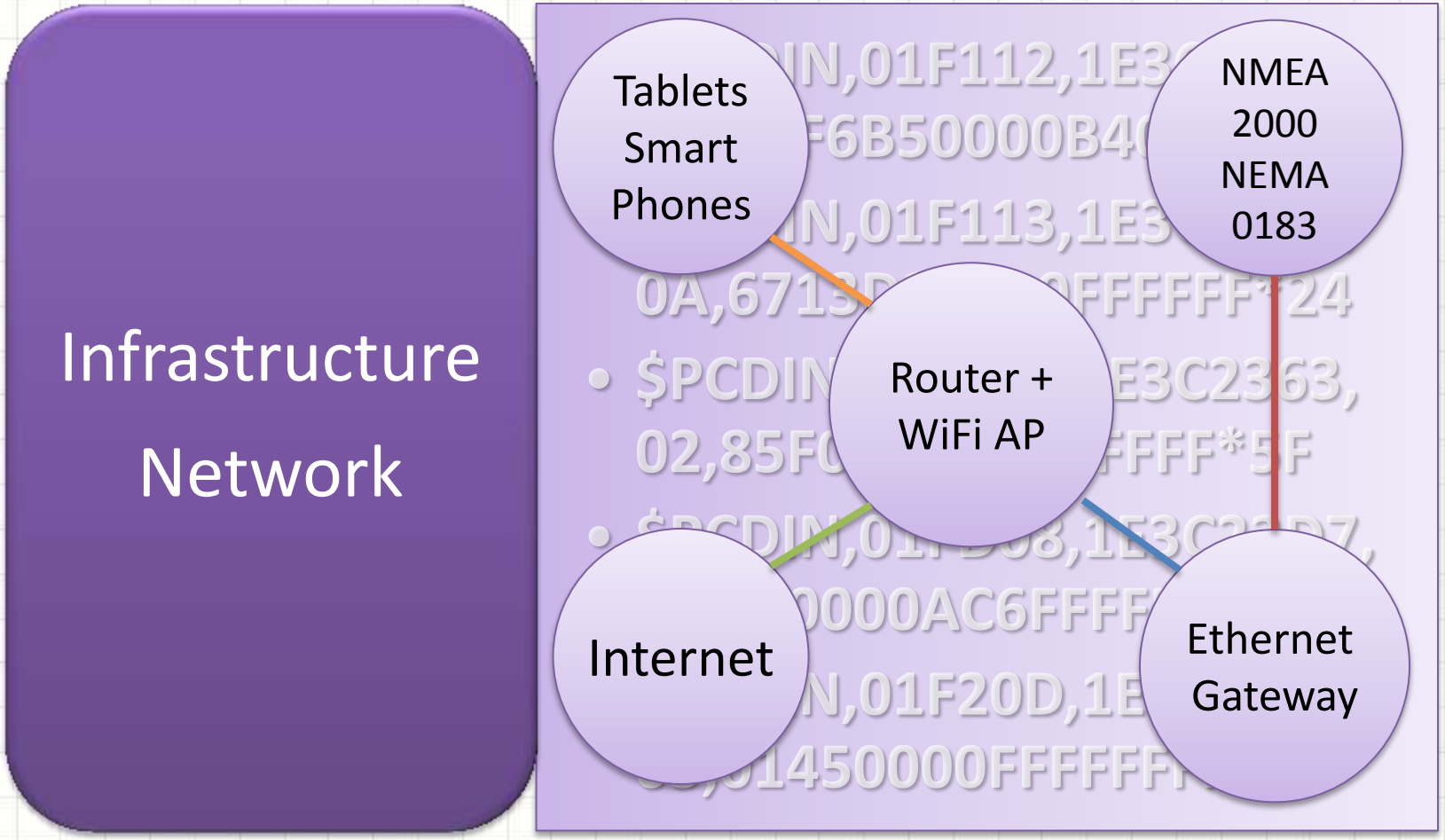
8 channel analog Interface
802.11 b/g WiFi
Embedded Web Server
USB Interface to PC/Laptop
12VDC/USB Bus Powered

Getting Data to your Tablet

Ad Hoc Network



Getting Data to your Tablet



Getting Data to your Tablet

Infrastructure Network

- **Connect Multiple Sensors**
  - Common Bus (Ethernet)
  - Utilize Gateways to Bridge Protocols (NMEA 2000/0183)
- **Router Based**
  - Managed network
  - Robust and Expandable
- **Global Access**
  - Internet
  - Cloud Servers

Getting Data to your Tablet

Infrastructure Network

- **NMEA 0183**
  - Point to Point/Daisy Chained
  - Convert Serial (RS232) to TCP/IP
- **NMEA 2000**
  - Multiple Sensors on one bus (100's)
  - Convert CAN Frames to TCP/IP
  - Requires NMEA Certified Gateway
- **Direct Analog**
  - TDM channels into single TCP Port
  - Requires Analog Gateway

Getting Data to your Tablet

Infrastructure Network

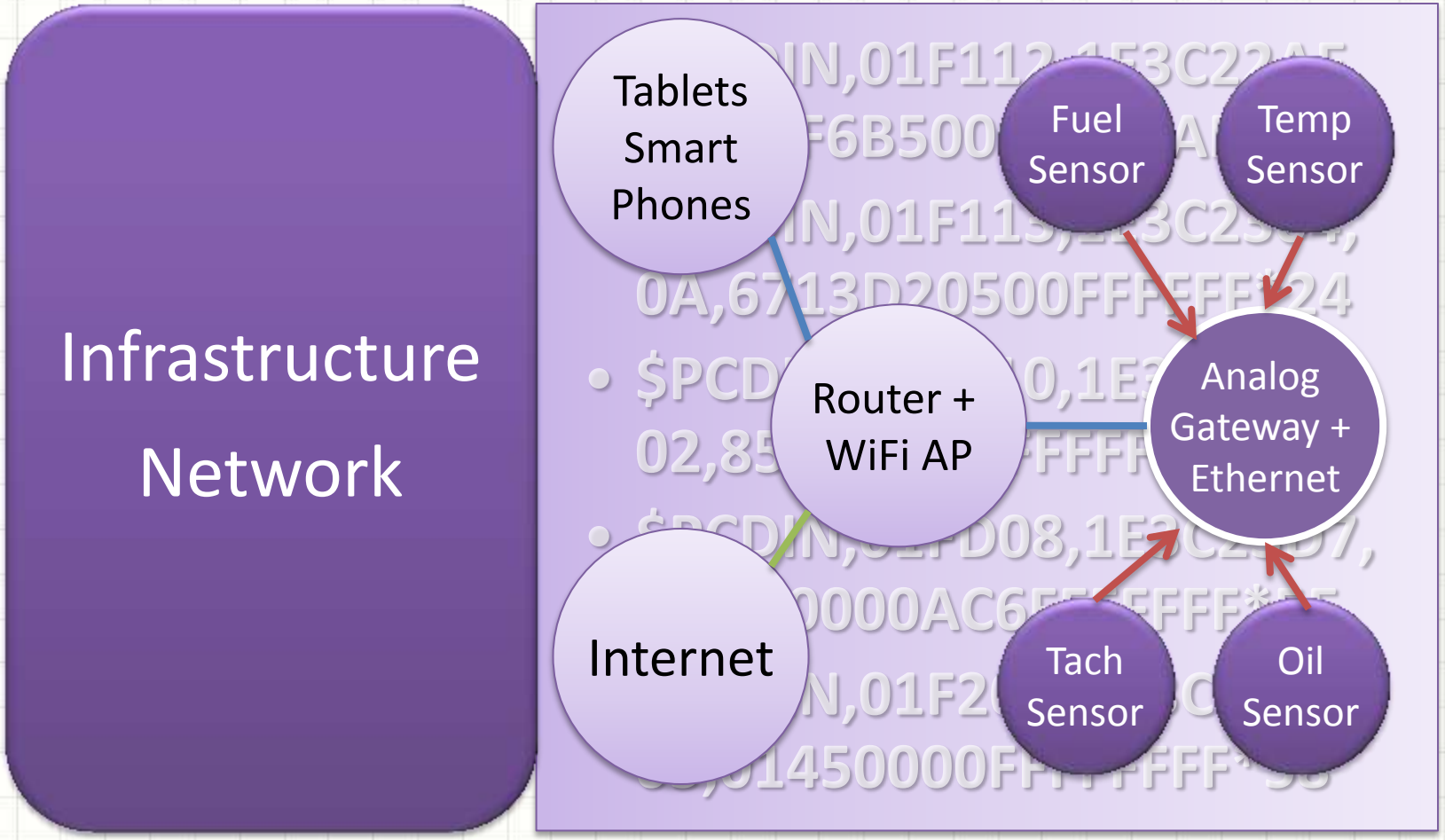
* 10/100 MB Wired Ethernet 300 ft
* NMEA Protocol Translation
* Static/DHCP IP with Gateway IP
* Embedded Web Server
* FTP/SMTP/FLASH DATA LOG

Getting Data to your Tablet

Infrastructure Network

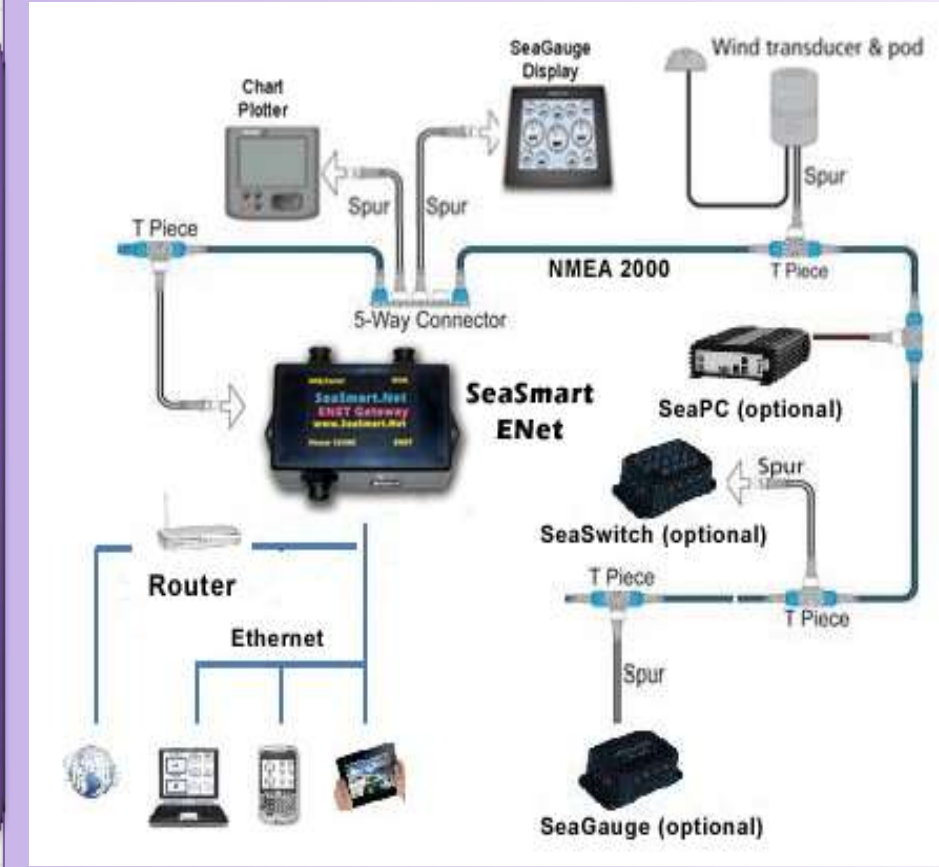
* NMEA 2000 and 0183 Interface
* Combines inputs to single TCP port
* USB Interface to PC/Laptop
* NMEA 2000/USB Bus Powered

Getting Data to your Tablet



Getting Data to your Tablet

Infrastructure Network



Pulling Vessel Data

1. App Based
2. Browser Based

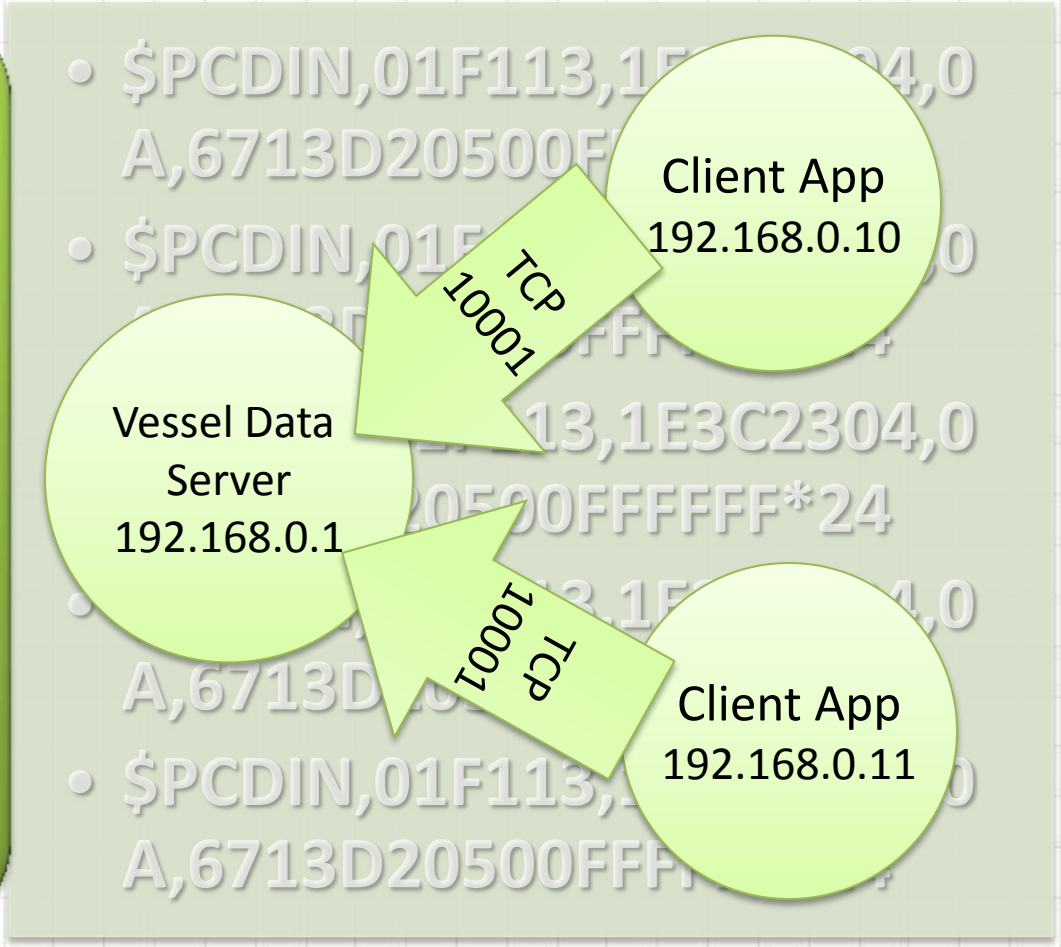
Pulling Vessel Data

App Based

- **Application Initiated**
  - Client to Network IP (known)
  - Managed by Client
- **Server TCP Port Number**
  - Supports multiple clients (5-10)
  - Connection is closed by client
- **UDP Broadcast**
  - Uses Client local IP Address
  - Data sent to all nodes on local Network

Pulling Vessel Data

App Based



Pulling Vessel Data

App Based

Pulling Vessel Data

App Based

- **Vendor Specific**
  - Usually Fee based
  - Closed Architecture
  - Platform Dependent
- **Better Client Response**
  - Data rendered locally
  - Real time viewing
- **Remote Access**
  - Can connect over Internet
  - Data Log Option

Pulling Vessel Data

App Based

iNavX: http://www.inavx.com/

Pulling Vessel Data

App Based

NMEAremote: http://www.zapfware.de/en/

- $PCDIN,01F113,1E3C2304,0

- $PCDIN,01F113,1E3C2304,0
A,6713D20500FFFFFF*24

Pulling Vessel Data

App Based

nGauge: http://www.millportmedia.com

Pulling Vessel Data

App Based

vDash: http://www.seagauge.com

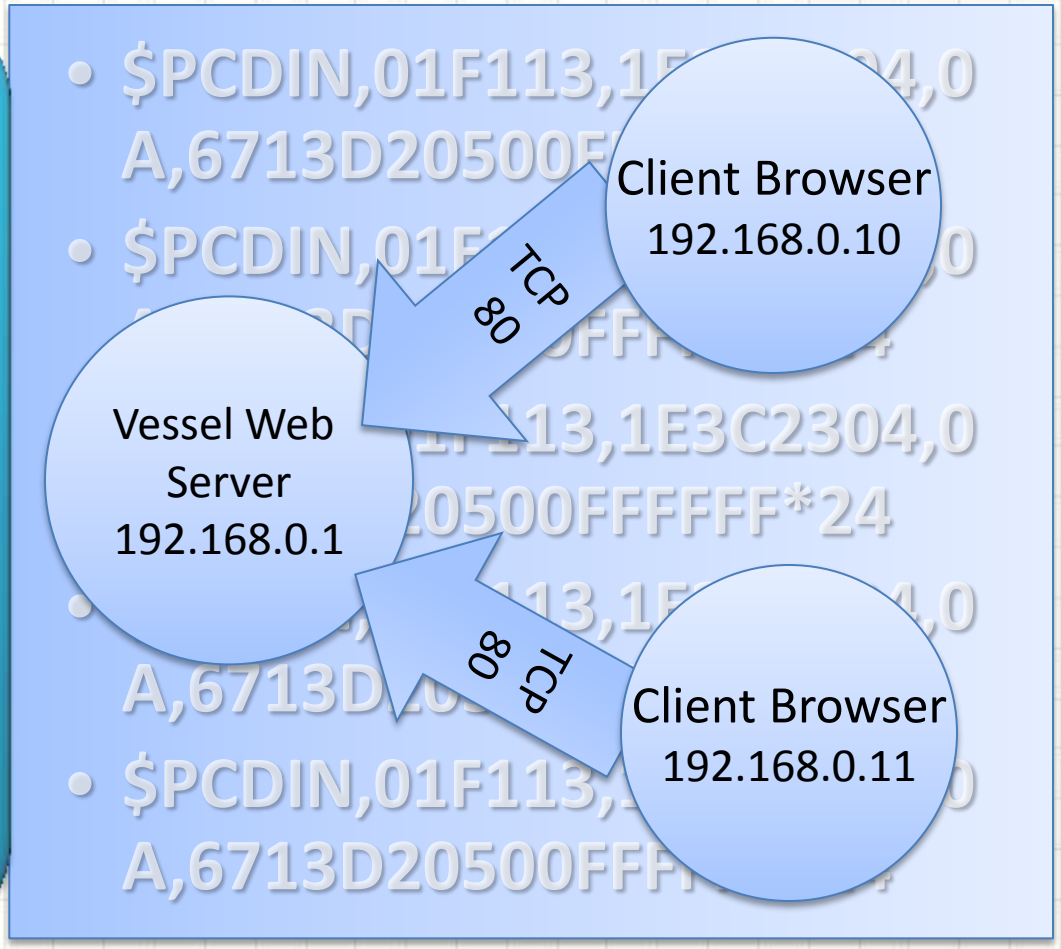
Pulling Vessel Data

Browser Based

- **Cross-Platform Compatibility**
  - Single Server = Multiple devices
  - HTTP Base code = Many Browsers
- **Common HTML/Java**
  - Extensive tool Library
  - Open Source = No royalties
- **Local/Global Access**
  - Intranet
  - Internet

Pulling Vessel Data

Browser Based



Pulling Vessel Data

Browser Based

- **Common User Interface**
  - Local Server
  - Internet Server
- **User Customizable**
  - Flash File Updates
  - XML/CSS Configuration
  - AJAX = real time updates
- **No Fees**
  - Simple setup
  - Global installed base

Pulling Vessel Data

Browser Based

- iPad Safari
- $PCDIN,01F113,15…C2304,0 A,671…F*24
- $PCDI…C2304,0 A,671…F*24
- $PCD…C2304,0 A,671…F*24
- $PCD…C2304,0 A,671…F*24

Pulling Vessel Data

Browser Based

- Explorer
- $PC… 2304,0 A,67… *24
- $PC… 2304,0 A,67… *24
- $PC… 2304,0 A,67… *24
- $PC… 2304,0 A,67… *24

Pulling Vessel Data

Browser Based

- FireFox
- $PCD… 2304,0 A,67… *24
- $PCD… 2304,0 A,67… *24
- $PCD… 2304,0 A,67… *24
- $PCD… 2304,0 A,67… *24

Pulling Vessel Data

Browser Based

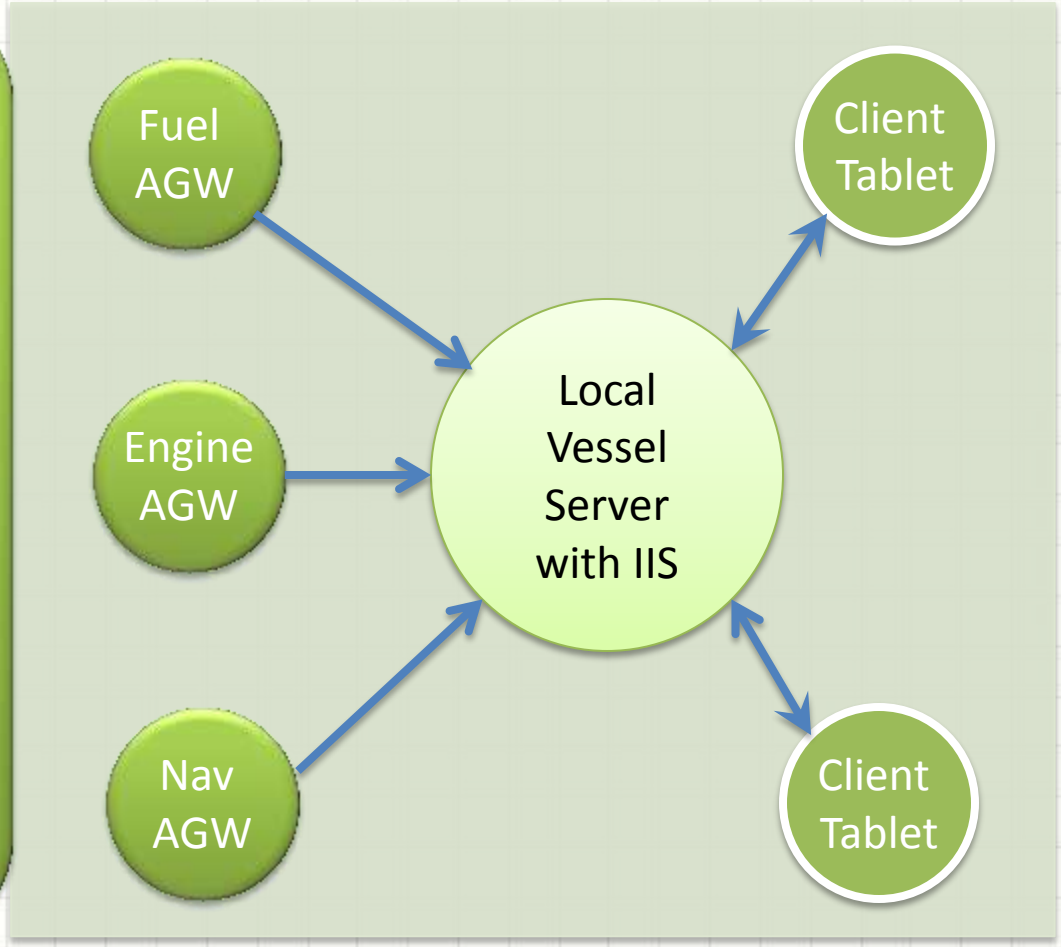
- iPhone Safari
- $PCDIN,01F113,1E3C2304,0A,6713...FFF*24
- $PCDIN,01F113,1E3C2304,0A,6713...FFF*24
- $PCDIN,01F113,1E3C2304,0A,6713...FFF*24
- $PCDIN,01F113,1E3C2304,0A,6713...FFF*24

Pushing Vessel Data

1. Push to Local Server
2. Push to Internet Server

Pushing Vessel Data

Push to Local Server



Pushing Vessel Data

Push to Local Server

- **Vessel Based**
  - Infrastructure Network
  - Single connection point
  - Supports many clients
  - No Internet Required
  - Simple to set-up
- **Local Storage**
  - Data log and Retrieve
  - Always available at sea
- **WiFi via Router/AP**
  - Wireless 300 ft range

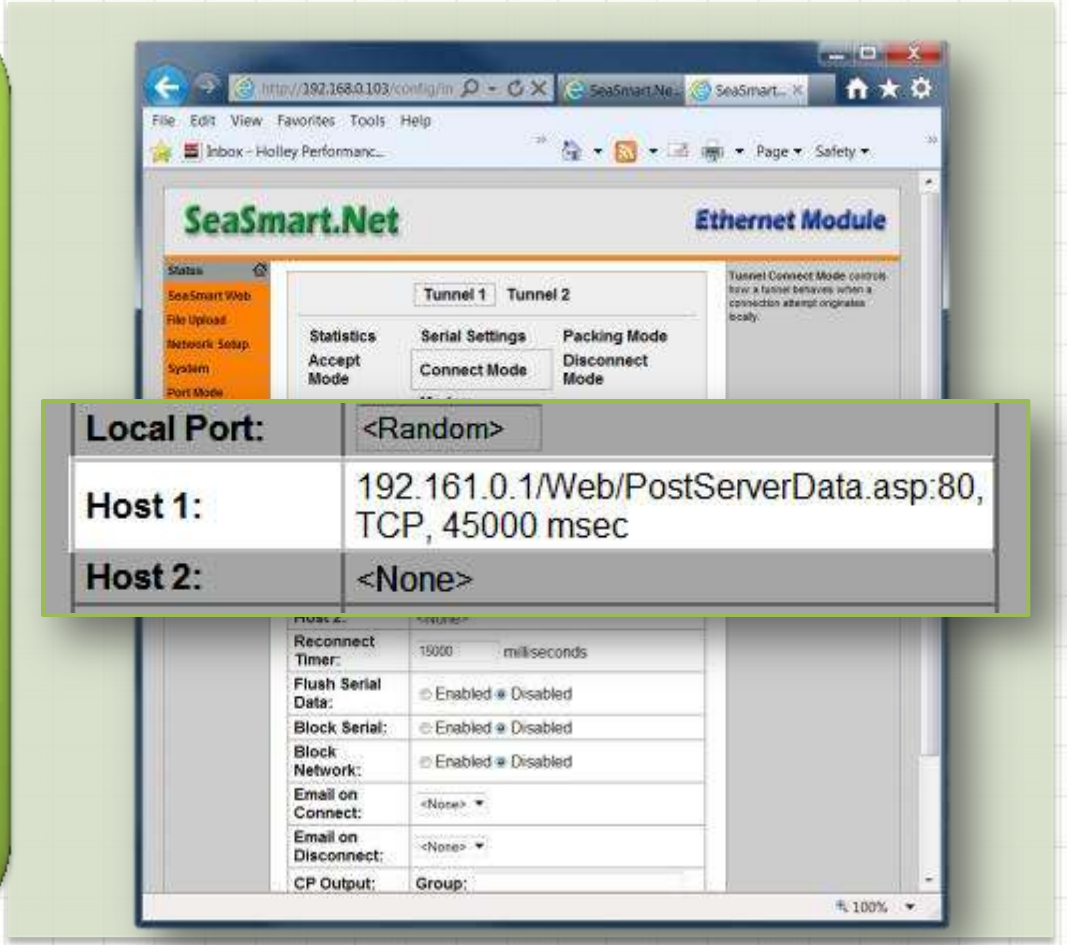
Pushing Vessel Data

Push to Local Server

- **Analog Gateways**
  - Autonomous HTTP POST
  - Network Connectivity
    - NMEA 2000
    - Ethernet
    - WiFi
  - Multiple analog inputs
  - Browser Interfaces
    - Management
    - Sensor Configuration

Pushing Vessel Data

Push to Local Server



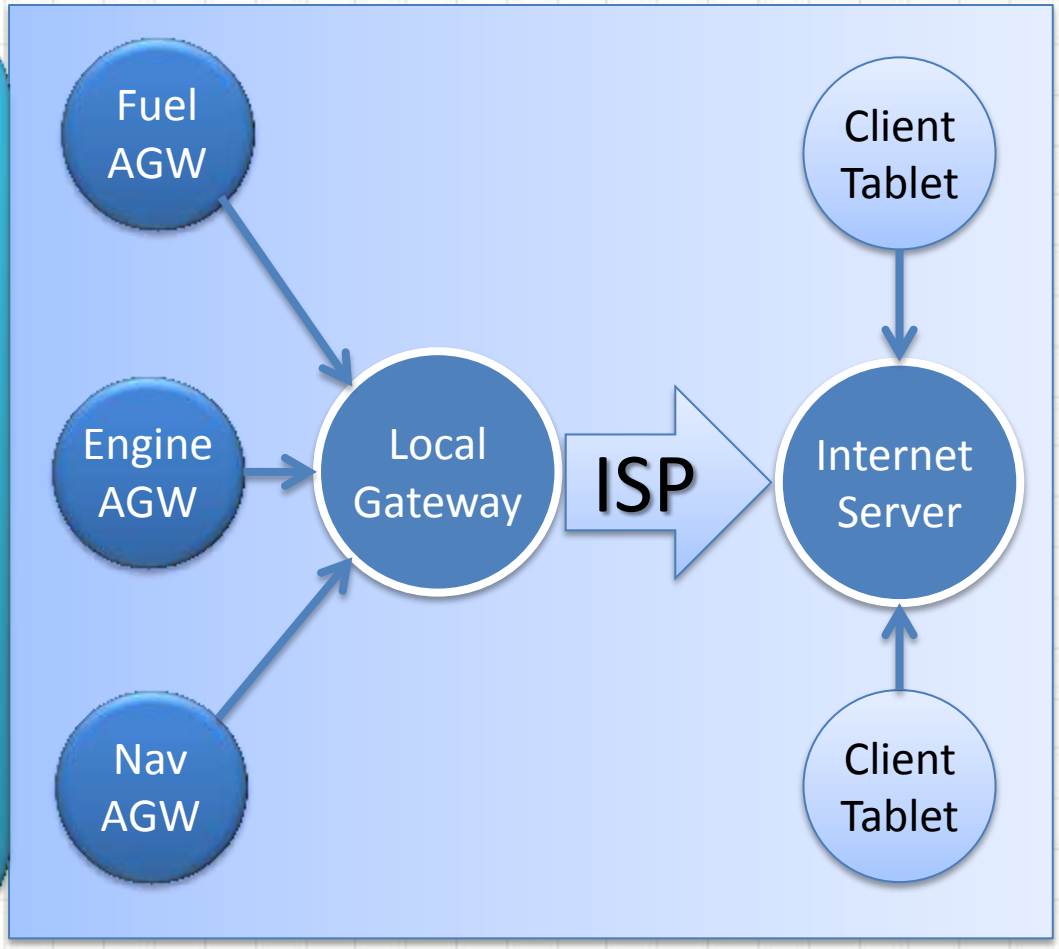
Pushing Vessel Data

Push to Local Server

www.seasmart.net/web/IBEX2012Live.htm

Pushing Vessel Data

Push to Internet Server



Pushing Vessel Data

Push to Internet Server

- **Connect Multiple Sensors**
  - Common bus (Ethernet)
  - Utilize Gateways to bridge protocols (NMEA 2000/0183)
- **Simple Setup**
  - Uses ISP Gateway
  - Minimal Security risks
  - Minimized Hardware
- **Global Access**
  - 24/7 Servers
  - Cloud data storage/retrieve

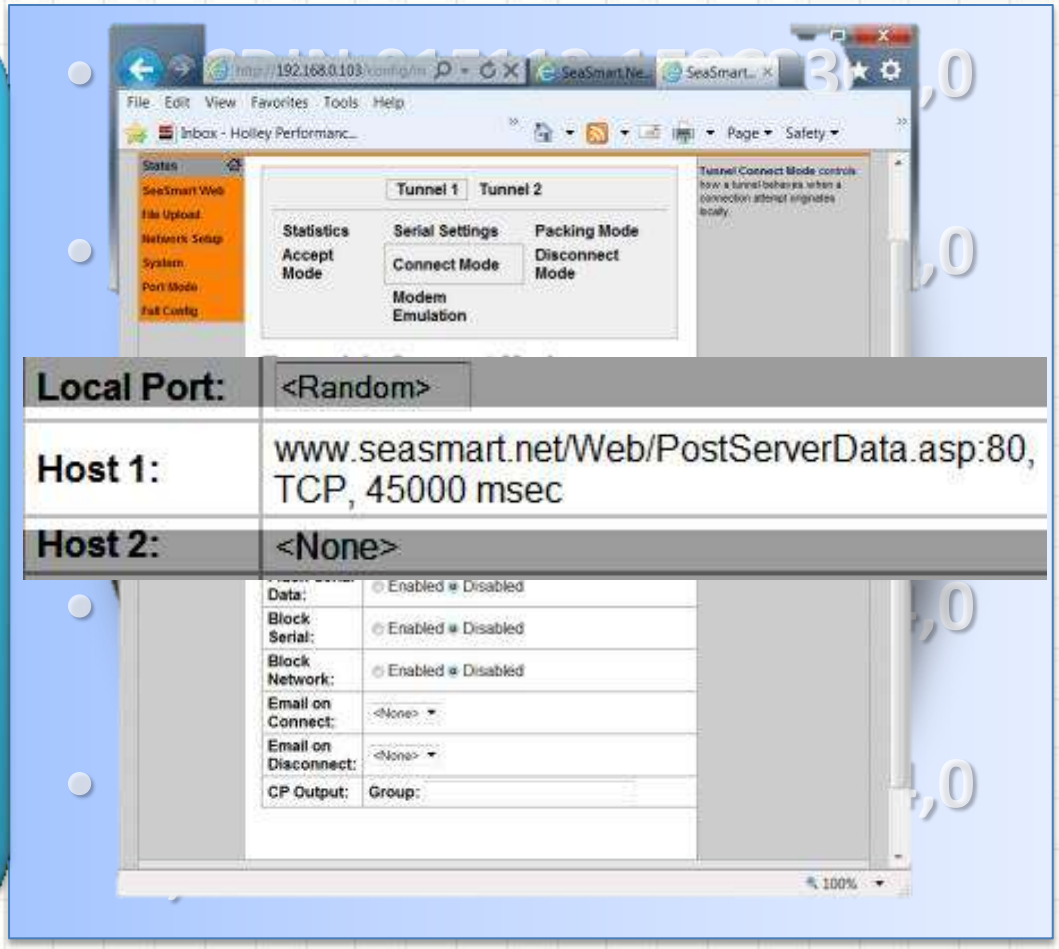
Pushing Vessel Data

Push to Internet Server

- **Gateways push data directly**
  - No local Server required
  - Outbound traffic is minimal security risk
  - Cloud data storage enhances availability and analysis
  - Local network is hidden from public access
  - Browser Management/ Configuration

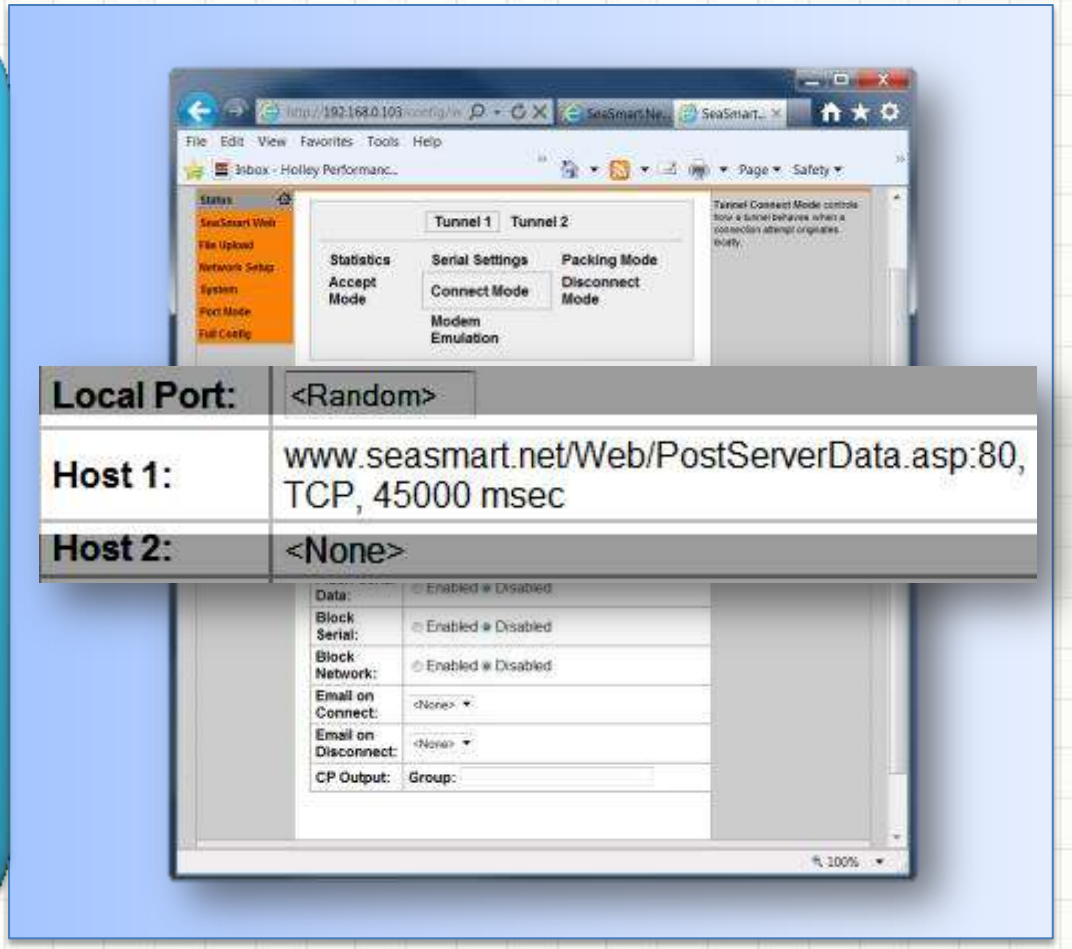
Pushing Vessel Data

Push to Internet Server



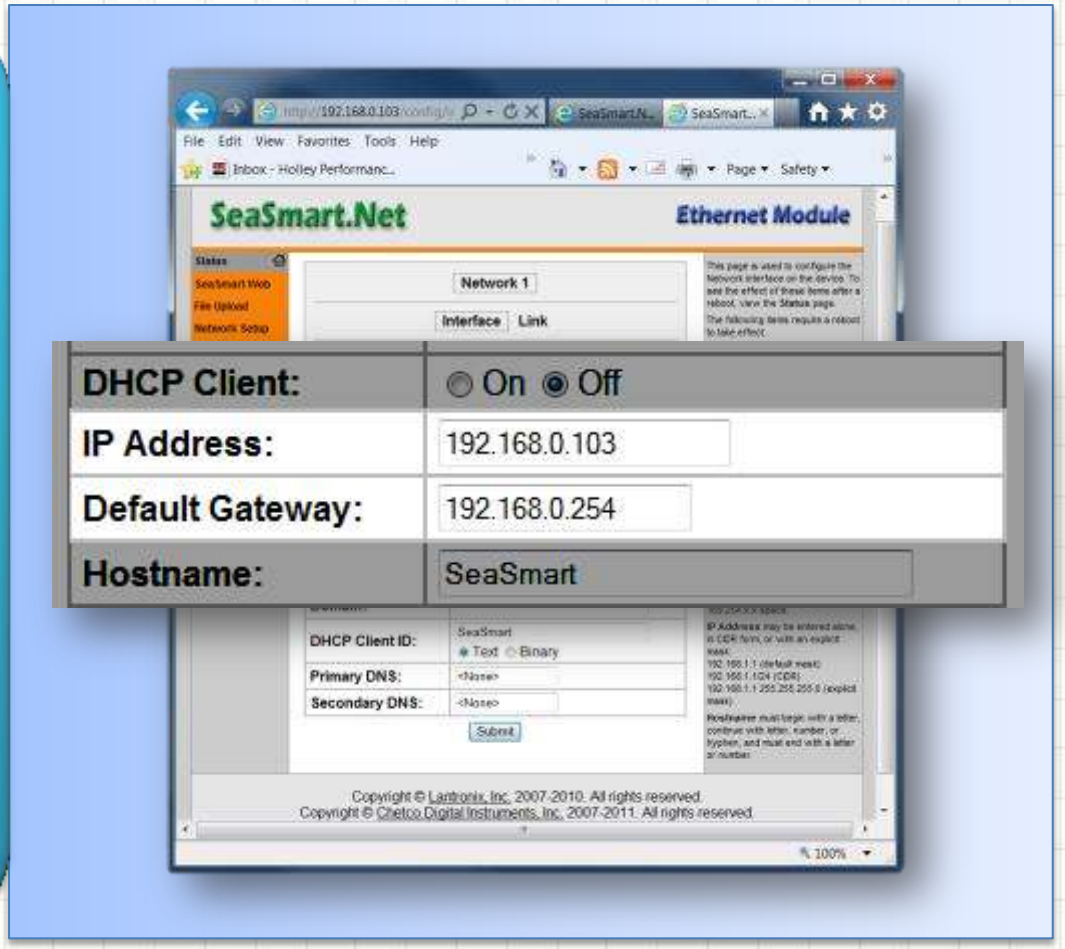
Pushing Vessel Data

Push to Internet Server



Pushing Vessel Data

Push to Internet Server



Pushing Vessel Data

Push to Internet Server

Summary

1. Getting Data to your Tablet
2. Pulling Vessel Data
3. Pushing Vessel Data

Summary

Getting Data to Tablets

- **Point to Point**
  - Single Sensor
  - Single User/Tablet
  - Short Distance
  - High Node Cost
  - Custom App/Protocol
  - NMEA 0183 support
  - Depth/Fuel/Weather/GPS

Summary

Getting Data to Tablets

- **Ad Hoc Network**
  - Wireless 802.11 b/g
  - Multi User
  - Simple Set-Up
  - Requires a Gateway to convert NMEA 2000/0183 to TCP/IP
  - Can support networked Sensors
    - Analog Gateways with WiFi
  - Requires TCP/IP Client App
  - Low Cost

Summary

Getting Data to Tablets

- **Infrastructure Network**
  - Wired Ethernet is faster/reliable
  - Central Router with WiFi AP
  - Supports Internet connection via Gateway and ISP
  - Requires a Gateway to convert NMEA 2000/0183 to TCP/IP
  - Supports Networked Sensors
  - TCP/IP Client App or Browser
  - More Complex Setup/Cost

Summary

Pulling Data

- **App Based**
  - Vendor Specific Protocol Support
    - NMEA 2000/0183/Proprietary
  - Platform Dependent
    - (iPad/PC/Android)
  - High Performance
    - Data rendered locally
  - Client controlled connection (TCP)
    - Allows access over the Internet
- Restricted Development Environment

Summary

Pulling Data

- **Browser Based**
  - Open Protocol Support
    - NMEA 2000/0183/Proprietary
  - Platform **In**dependent
    - (iPad/PC/Android)
  - Medium Performance
    - Data rendered in JAVA/HTML
  - Server controlled connection (HTTP)
    - Allows access over the Internet
- Open Development Environment

Summary

Pulling Data

- **Internet Access Requirements**
  - NAT Required for Internet (inbound)
    - Router must be configured for Port Forwarding
  - Static IP Address Assignments
    - Discover server IP address (DNS)
  - High Security Enabled
    - Block unwanted inbound traffic
  - ISP dedicated Gateway IP Address = $
    - Additional AP costs involved
- Complex to Configure/Maintain

Summary

Pushing Data

- **Using Local Servers**
  - Increased Equipment Costs
    - Server H/W and OS
  - Eliminates Internet access
  - Utilizes Analog Gateways
  - Browser Based access
    - Platform independent
  - Always available
    - Local data storage/retrieve
    - Supports multiple clients

Summary

Pushing Data

- **Using Cloud Servers**
  - Minimizes Equipment Costs
  - Simplifies local network
  - Leverages Distributed computing/data storage
  - Browser Based Access
    - Platform Independent
  - Robust and Expandable
  - Provides Global Access
    - Internet
    - Cloud Servers

Summary

Pushing Data

- **Internet Access Requirements**
  - Local Gateway IP address
    - Provided by ISP equipment
  - DNS must be configured
    - Internet Domain Name Servers
  - Minimal Security Required
    - Only Outbound requests
  - No local server required
    - Minimum Equipment costs
- Simple to Configure/Maintain

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Demos?