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Developing a REST Framework for Medical Device Data using FHIR Standards

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Background

- Healthcare technology development and advancements require more device interoperability and information exchange.
- Electronic Health Records currently are limited to close sourced applications and hinder the use of applications and devices available from third parties.
- Fast Healthcare Interoperability Resources (FHIR) allows for developers to use agreed upon standards and design new APIs for easier data exchange.
- The researchers aimed to show current medical devices could be updated to FHIR standards and stream data via protocols using a RESTful framework.

Methods

- Welch Allyn Atlas Monitor was connected with a network bridge and streamed EKG and heart rate data from a simulation mannequin.
- Data was sent over the network to a gateway that interpreted the information and formed FHIR commands.
- Commands were queued and serviced consecutively via a resource hierarchy.
- Messaging protocols using FHIR standards were developed to route the generated data into the correct queue.
- Device data was collected in real time and compared to the data provided from the Atlas monitor itself to confirm data retrieved.

Use Case Scenario

- A medical situation was developed and used to identify the different resources needed.
- The scenario used a 67 year old male with angina, elevated heart rate, and premature ventricular contractions.
- This allowed for the simulation mannequin to demonstrate the expected data values.
- This data was streamed and compared to show the device was sending it correctly.

960 data points (6 seconds) were taken from the Atlas monitor and converted to a waveform image represented below. This was compared to the actual print off from the Atlas monitor to confirm data retrieval.

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