



THE UNIVERSITY OF TEXAS AT EL PASO

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## CAN Bus Visualizer System

Team 4 - Tech Cats

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# GUI, Database Integration, Project Configuration Page, Open Existing Project



React

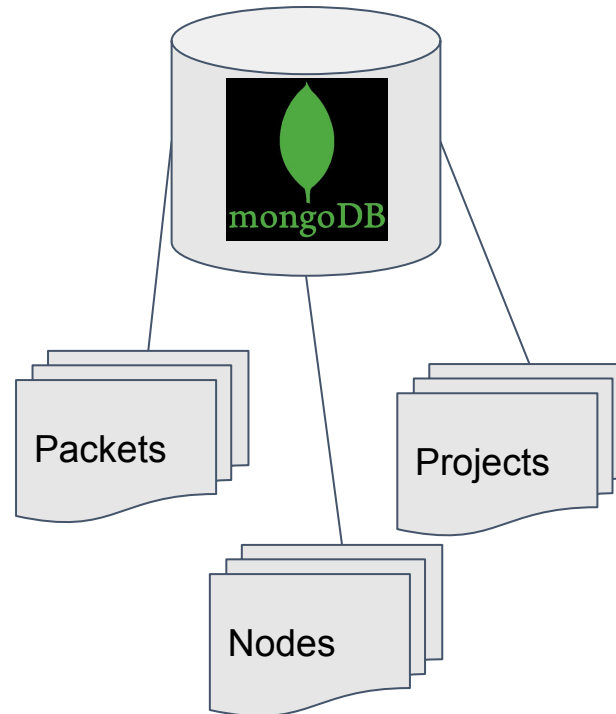


React-Bootstrap



React-Flow

- React - Javascript library for UI based on components for an interactive and efficient web application. (Pages, Forms, Navigation bar and Buttons)
- React-Bootstrap - CSS framework to style React components.
- React Flow - a react library for node based diagrams. (CAN Map)

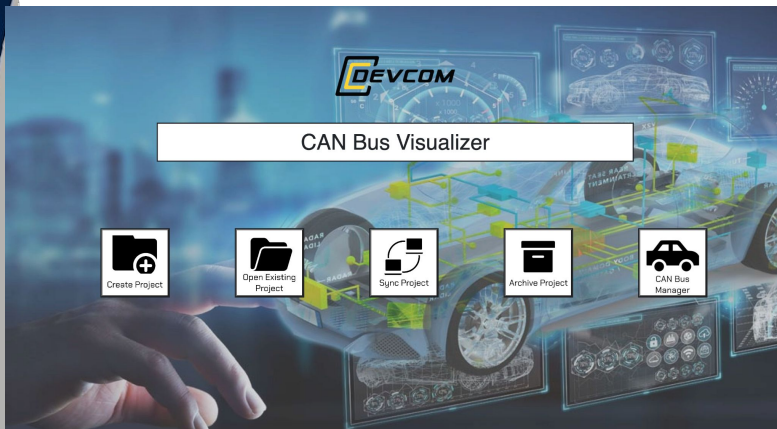


- Python Flask (POST and GET)
- Javascript (POST and GET)

A screenshot of a web application's 'Create Project' configuration page. The form includes the following fields and controls:

- Project Name (Required):** Text input with value 'DEMOPURPOSE'.
- Stored Location (Required):** 'Browse...' button and text 'No file selected.'
- User Initials (Required):** Text input with value 'DP'.
- Event Name (Required):** Text input with value 'EV1'.
- Event Date (Required):** Text input with value '11/29/2022'.
- Can Connector ID (Required):** Text input with value '1250'.
- Vehicle ID (Required):** Text input with value '500'.
- Baud Rate (Required):** Text input with value '2500'.
- Import DBC File:** 'Browse...' button and text 'dbc-file.dbc'.
- Import Off-limits File:** 'Browse...' button and text 'off-limits-list-file.csv'.
- Buttons:** 'Cancel' and 'Create Project' at the bottom.

- React to generate UI, receive User Input, and post to backend.
- Python Flask to receive requests from User Input and Post to MongoDB.



# Packet Reader Functionality

TrafficCAN Map

FileViewPacketTraffic

Timestamp	Type	ID	Data	Name	Comment
183fd3e0d7c	1	0xf02bfe	13ad04eefec	CN	Crash Notification
183fd3e0d7c	1	0x4f032fe	1335d31dee2	LDISP	Linear Displacement Sensor
183fd3e0d7c	1	0x8f02dfe	16a777bbd8e	ACCS	Acceleration Sensor
183fd3e0d7c	1	0x8f110fe	d73e178932	B2	Brakes 2
183fd3e0d7c	1	0xc01fe	1341b3ea534	TC1	Transmission Control 1
183fd3e0d7d	1	0xc08fe	123e12a0c4e	AUXIO5	Auxiliary Input/Output Status 5
183fd3e0d7d	1	0xc0afe	d9f1ef0168	CCVS2	Cruise Control / Vehicle Speed 2
183fd3e0d7d	1	0xc0bfefe	15756f71582	AEBS2	Advanced Emergency Braking System 2
183fd3e0d7d	1	0xc1bfefe	135547c721a	HVES1C1	High Voltage Energy Storage 1 Control 1
183fd3e0d7e	1	0xc1dfefe	129ecc66864	EIC	Engine Ignition Controller
183fd3e0d7e	1	0xc99fe	a913c2d7a2	JLCM	Joystick Lamp Command Message
183fd3e0d7e	1	0xcd1fe	c698d3ea22	ASC6	Air Suspension Control 6
183fd3e0d7e	1	0xcf002fe	140dcb1ff70	ETC1	Electronic Transmission Controller 1
183fd3e0d7e	1	0xcf004fe	125c1242b08	EEC1	Electronic Engine Controller 1
183fd3e0d7e	1	0xcf00cfe	1539ee60a78	ETC8	Electronic Transmission Controller #8

FileNodesMap

label:  
Node 1

background:  
#eee

hidden:☐

Click to Network

Block InformationLand Levelling System Operational InformationElectronic Transmission Controller #5Joystick Lamp Command MessageAir Suspension Control 6Electronic Transmission Controller 1Electronic Engine Controller 1

Advanced Emergency Braking System 2Cruise Control / Vehicle Speed 2Auxiliary Input/Output Status 5Transmission Control 2Engine Ignition ControllerCrash NotificationLinear Displacement SensorAcceleration SensorBrakes 2

+ -

React Flow

Packets being read via our own simulation.

Dummy test data with a DBC file in decoding packet information and decoded information.

Nodes are being populated with Decoded Information as live traffic flows.

Nodes do not update automatically.

# Visualization Functionality

## Supported Features

- Ability to Drag Nodes to desired position
- Ability to Export the CAN Bus Map via PNG
- Ability to Export CAN Bus Nodes via CSV, JSON, or XML
- Ability to Export Packets via CSV
- Ability to Export Off-limits List (OLL) via CSV
- Ability to Pause and Play Traffic
- Ability to View Off-Limits List

## Features In Development

- Replaying Packets (No Real Hardware or CAN Bus Used)
- Modify Off-Limits (Adding and Removing in the works)
- Edit Packets (No Real Hardware or CAN Bus used)
- Sorting & Filtering Table (UI and Backend not connected)



# Sync Functionality (Setup)

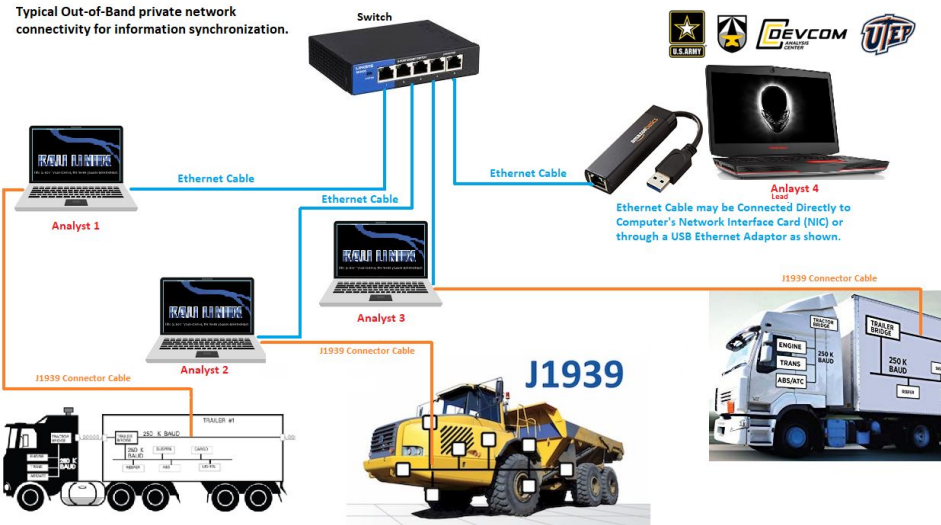


Figure 1. Ideal Setup

## VMWare Settings (BOTH MACHINES)

- Dongles routed to Kali
- VMWare Setting > Network adapter > Custom > Host Only

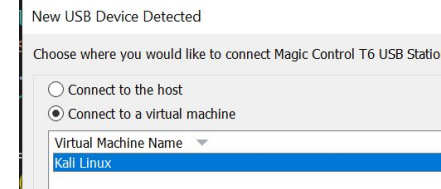


Figure 3. VMWare USB Prompt

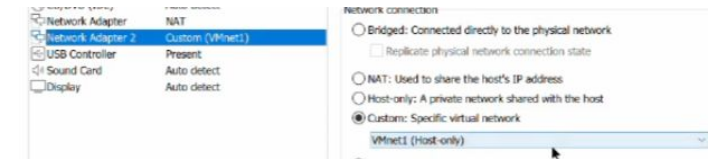


Figure 4. VMWare Network Connection

## Kali Network Settings (BOTH MACHINES)

- Right click connection > Create new "Ethernet" connection > Modify "Ethernet" (shown below) > Modify "IPv4 Settings" (shown below)

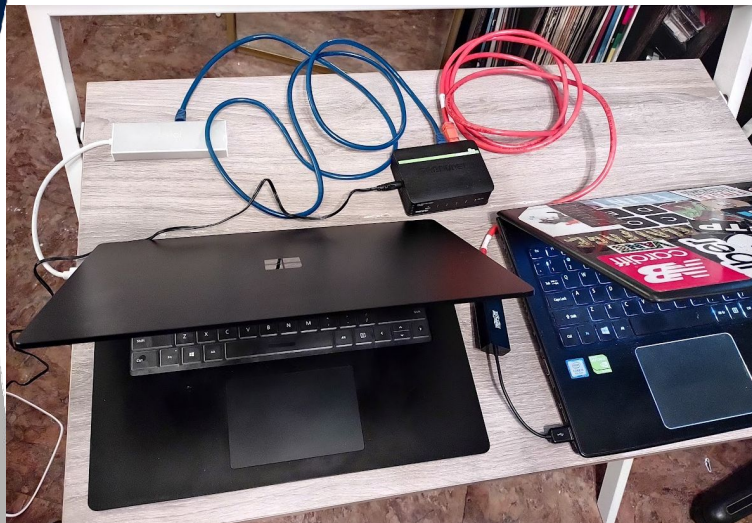


Figure 2. Emulated Setup

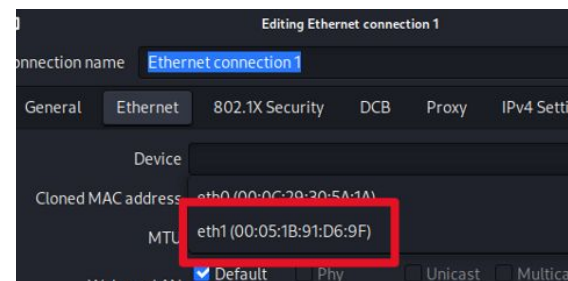


Figure 5. Ethernet settings

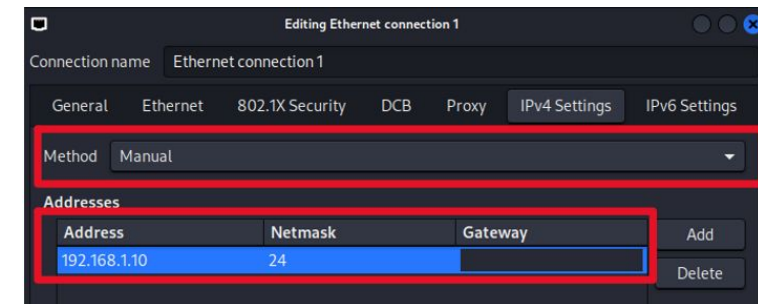


Figure 6. IPv4 settings

# Sync Functionality

## Sync Prerequisites

- Both machines must have surpassed “fingerprint” verification

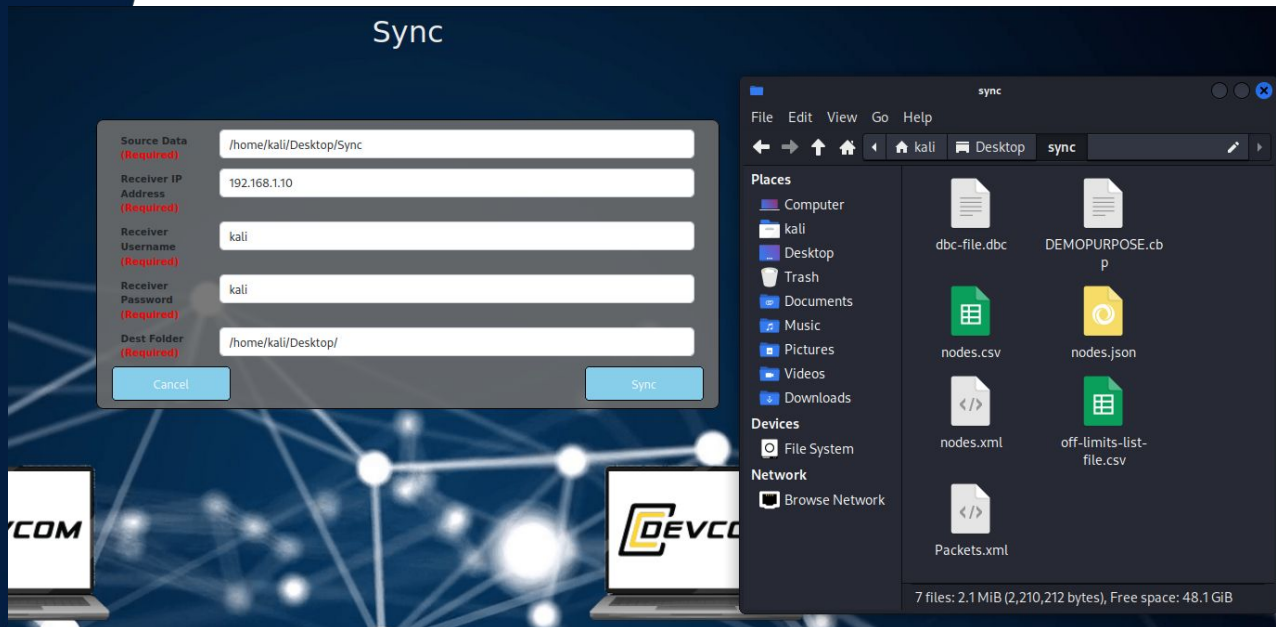


Figure 1: Sender view

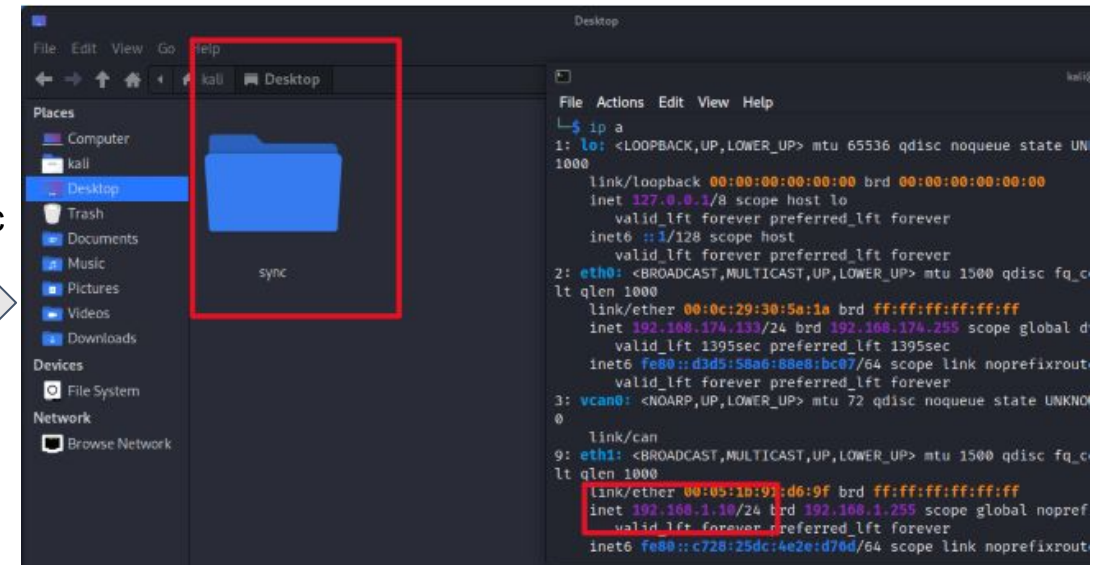


Figure 2. Receiving View

# Export Functionality

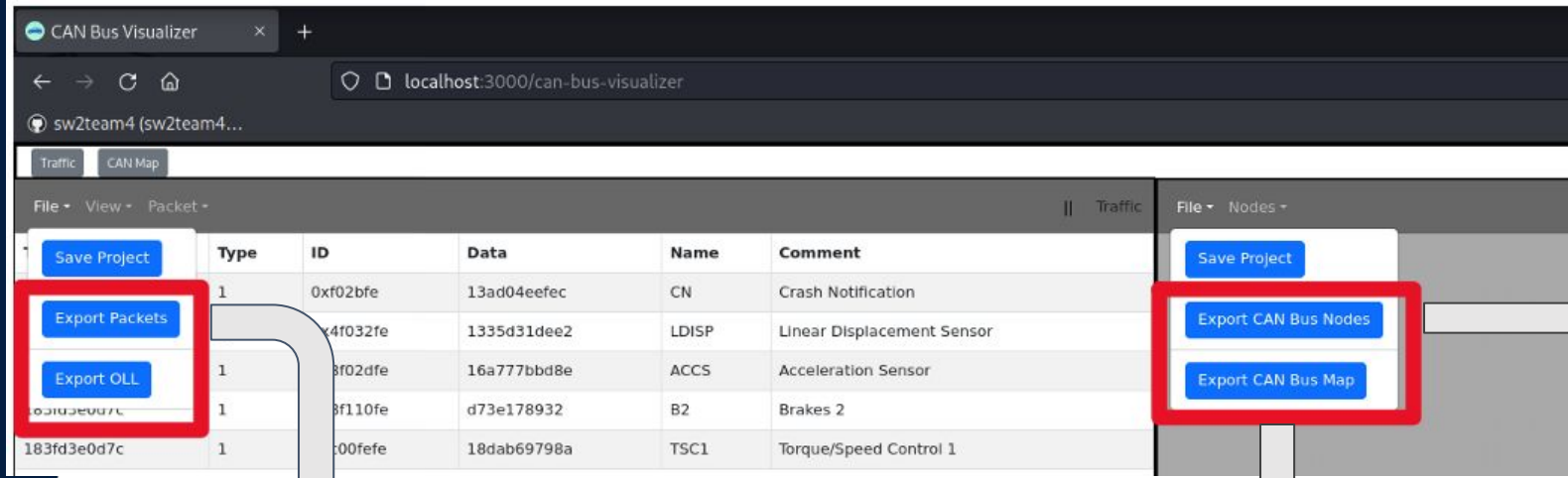


Figure 1. CAN Bus Visualizer file tabs expanded

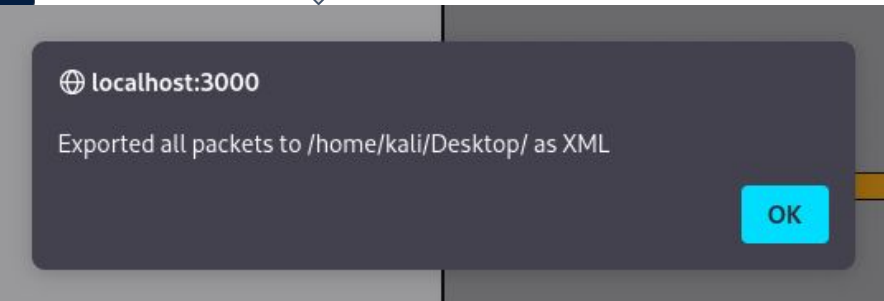


Figure 2. Export packets popup

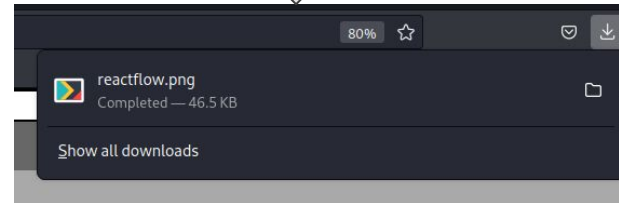


Figure 3. Export map popup

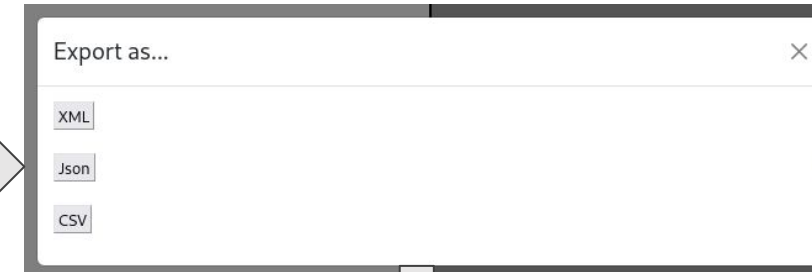


Figure 4. Export nodes prompt

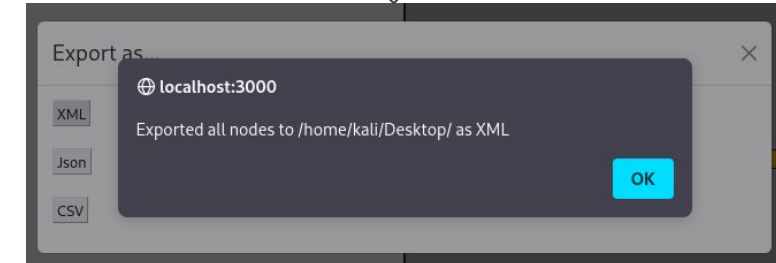


Figure 5. Export nodes completed popup

- **Packets** > Saved to Desktop as XML
- **Off Limits List (OLL)** > Saved to Desktop as CSV
- **Nodes** > Saved to Desktop as specified format
- **CAN Bus Map** > Saved to Downloads as PNG

# Unsupported Functionalities & Explanations

- **Reading Network Traffic**
- Auto Recovery
- Archive Management
- Can Bus Manager



# References

[1] 4310 Class - Spring 2022 - Guidance Team., "CAN Bus Visualizer Software Requirements Specification", The University of Texas at El Paso, Version 1.29, Dec. 2022.