Assignment

Day 12

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1. Executive Summary

This report discusses each of the following topics:

1- When does the data rate be dynamic or static in any communication protocol?
2- Communication specs of UART.
3- UART Frame Format.

2. Dynamic Vs Static Data Rate

Static routing and dynamic routing are two methods used to determine how to send a packet toward its destination.

2.1. What is static routing?

Network administrators use static routing, or nonadaptive routing, to define a route when there is a single route or a preferred route for traffic to reach a destination. Static routing uses small routing tables with only one entry for each destination. It also requires less computation time than dynamic routing because each route is preconfigured.

Because static routes are preconfigured, administrators must manually reconfigure routes to adapt to changes in the network when they occur. Static routes are generally used in networks where administrators don't expect any changes.

2.2. What is dynamic routing?

Dynamic routing, sometimes called adaptive routing, is more complex than static routing because it creates more possible routes to send packets across a network. Dynamic routes are typically used in larger, fluid networks where static routes would be cumbersome to maintain and frequently reconfigure. Because dynamic routing is more complicated, it consumes more bandwidth than static routing.

Dynamic routing uses algorithms to compute multiple possible routes and determine the best path for traffic to travel through the network. It uses two types of complex algorithms: distance vector protocols and link state protocols.

3. Communication specs of UART

UART, or universal asynchronous receiver-transmitter, is one of the most used device-to-device communication protocols. This article shows how to use UART as a hardware communication protocol by following the standard procedure.

3.1. Specifications

- Medium: Wired
- Node to Node relation: Peer to Peer
- Mode: Serial
- Direction: Full or Half Duplex
- Synchronization: Sync or Async
- Throughput: 55% - 81%
- Ending: Single Ended

4. UART Frame Format

In UART, the mode of transmission is in the form of a packet. The piece that connects the transmitter and receiver includes the creation of serial packets and controls those physical hardware lines. A packet consists of a start bit, data frame, a parity bit, and stop bits.

4.1. Start Bit

The UART data transmission line is normally held at a high voltage level when it's not transmitting data. To start the transfer of data, the transmitting UART pulls the transmission line from high to low for one (1) clock cycle. When the receiving UART detects the high to low voltage transition, it begins reading the bits in the data frame at the frequency of the baud rate.

4.2. Data Frame

The data frame contains the actual data being transferred. It can be five (5) bits up to eight (8) bits long if a parity bit is used. If no parity bit is used, the data frame can be nine (9) bits long. In most cases, the data is sent with the least significant bit first.

4.3. Parity

Parity describes the evenness or oddness of a number. The parity bit is a way for the receiving UART to tell if any data has changed during transmission. Bits can be changed by electromagnetic radiation, mismatched baud rates, or long-distance data transfers.

4.4. Stop Bits

To signal the end of the data packet, the sending UART drives the data transmission line from a low voltage to a high voltage for one (1) to two (2) bit(s) duration.

5. References

5.1. https://www.techtarget.com/searchnetworking/answer/Static-and-dynamic-routing

5.2. https://www.analog.com/en/analog-dialogue/articles/uart-a-hardware-communication-protocol.html