INVENTION DISCLOSURE

1. **Invention Title.**

   Methods for detecting loops in Ethernet Networks

2. **Invention Summary.**
   This invention describes a couple of methods for detecting loops in Ethernet networks.

3. **Invention Description**.

Background:
Ethernet, while very popular, does not provide a way for switches to detect loops. Spanning Tree Protocol (STP) was developed for loop prevention. STP is control plane protocol and takes time to converge and while the network is converging the loops can exist. Loops in the Ethernet network can cause havoc and bring down the switches and servers. Only if there was a TTL field in the Ethernet frame, it could be used to count the number of hops a frame has taken and if the TTL count is higher than a certain number the frame could be dropped which would allow for the network to not crash and burn while control plane protocols are working on preventing the loops.

Disclosure:
Option#1: Potential idea here is to define a new Tag Protocol Identifier (TPID), which when present in the frame will repurpose the VLAN ID field as TTL. Each switch, after identifying the TPID, will simply increment the VLAN ID and if the VLAN ID is higher than X (a configurable number), the frame will be dropped.

Option#2: There is also a possibility of using preamble field (in the Ethernet Frame) for this purpose. There is already precedence for this where the EPON folks repurposed the preamble field in the Ethernet frame and are using it to identify the Logical Link ID (LLID). The good thing is that the LLID is only meaningful in EPON network. For networks other than EPON, we could use the preamble field as TTL to keep track of the number of hops, where each switch will be responsible for increasing the hop count and if the hop count is higher than a certain number (configurable), the frame will be dropped.

Option#3: The 802.2 (Logical Link Control) fields could also be re-purposed to provide TTL functionality. Adding 802.2 to an Ethernet frame provides 3 additional fields; Destination Service Access Point (DSAP), Source Service Access Point (SSAP), and Control, between the length and data fields. Just as a DSAP/SSAP value of 0xAA indicates the presence of a SNAP header, a DSAP/SSAP value could be specified to indicate the use of the Control field as a TTL field.

4. **HOW is this invention different from existing products, processes, systems?**
   This is a novel idea since no products currently support Time to Live concept in Ethernet for loop detection.