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| Proposed IEEE-SA Publicity for Nendica Data Center Activity | | | |
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## Abstract

This is a contribution to the IEEE 802 Network Enhancements for the Next Decade Industry Connections Activity (Nendica). It proposes text intended to be provided to IEEE-SA for use in publicity regarding the Nendica LLDCN Work Item on Lossless Data Center Networks.

## Background

I have communicated with IEEE-SA about publicity for the Nendica LLDCN Work Item on Lossless Data Center Networks, including the Nendica Report on “The Lossless Network for Data Centers” and the 10 November IEEE 802/IETF Data Center Workshop. IEEE-SA staff have suggested a brief article and that they “can place it in Beyond Standards and from there it can go in the Newsletters and on social media.”

## Proposed Content

**Laying the Foundation for the Lossless Data Center**

Modern data centers are tasked with delivering intelligent multi‐media responses to real‐time human interactions. Massive amounts of data are being churned and sifted by highly parallel applications, such as Online Data Intensive Services and Artificial Intelligence. New advancements in high‐speed distributed solid‐state storage are allowing parallel environments to run atop more generalized next generation cloud infrastructure. Generalized cloud infrastructure is also being deployed in the telecommunication operator’s central office. A key to advancing cloud infrastructure to the next level is the elimination of loss in the network, including loss due to latency. Congestion is the primary source of loss and leads to dramatic performance degradation. New technologies are arising to combat loss in the data center network.

Within the IEEE 802 Standards Committee, engineers in the IEEE 802.3 Working Group develop and advance the specifications underlying Ethernet technology, which forms links between devices in the data center. Also within IEEE 802, the IEEE 802.1 Working Group standardizes technologies for systems of such devices, working to optimize the behavior of the larger network of devices and the interconnecting switches, of which the data center is one example.

In addition to developing standards, IEEE 802 conducts pre-standardzation activities, including work under the IEEE-SA Industry Connections program, which provides an environment for building consensus and developing shared results that may complement or precede IEEE Standards projects. In 2017, IEEE 802 initiated such an effort to develop a vision of future roles for IEEE 802 networks, known as the IEEE 802 Network Enhancements for the Next Decade Industry Connections Activity (Nendica).

In August 2018, Nendica addressed key data center issues in delivering its first Nendica Report, entitled “The Lossless Network for Data Centers.” The report addresses major data center use cases, explaining why modern applications increase congestion in the data network and why such congestion leads to packet loss that may force retransmission and to unacceptable delays. It explores several approaches to reduce congestion in an effort to eliminate packet loss.

This first Nendica report has already spun off one authorized standardization project. The P802.1Qcz Project was authorized by IEEE-SA on 27 September 2018 to develop a standard to support the isolation of congested data flows within data center environments, enabling systems to individually identify flows creating congestion, adjust transmission selection for packets of those flows, and signal to neighbors.

In order to broaden the exchange of information on this topic, IEEE 802 and the IETF, which develops

and promotes Internet standards, co-organized the IEEE 802/IETF Data Center Workshop, held in Bangkok on 10 November 2018. This workshop provided a unique opportunity to assemble key technologists from both organizations to discuss and explore new and developing standardization activities for the data center environment, intending to catalyze future collaboration between the two organizations on data center technologies, with an emphasis on congestion management, load-balancing, routing, and simplified management. The workshop, attended by 55 registered participants, included presentations on the Nendica Report and P802.1Qcz along with five presentations on budding IETF activities designed to provide higher-layer technologies for improved efficiencies and services in data center applications. “We’ve received tremendous positive feedback from the participants of the joint workshop and look forward to future collaboration between these two SDOs”, said Paul Congdon, workshop organizer and editor of the published Nendica Report. Details, and links to the presentation material, are available on the Nendica web site.

“IEEE 802 Nendica Report: The Lossless Network for Data Centers” is publicly available by free download from the Nendica web site. The report includes an invitation to respond with comments that are forwarded to Nendica for consideration of a possible futre revision of the report. Meanwhile, work continues in Nendica on its second Work Item, addressing Flexible Factory IoT and the challenges of adding wireless networking into the latency-sensitive factory network. Information on all these activities is available at the Nendica web site <https://1.ieee802.org/802-nendica>.