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## Engineering Design Challenges in Realization of a Very Large IP-Based Television Facility

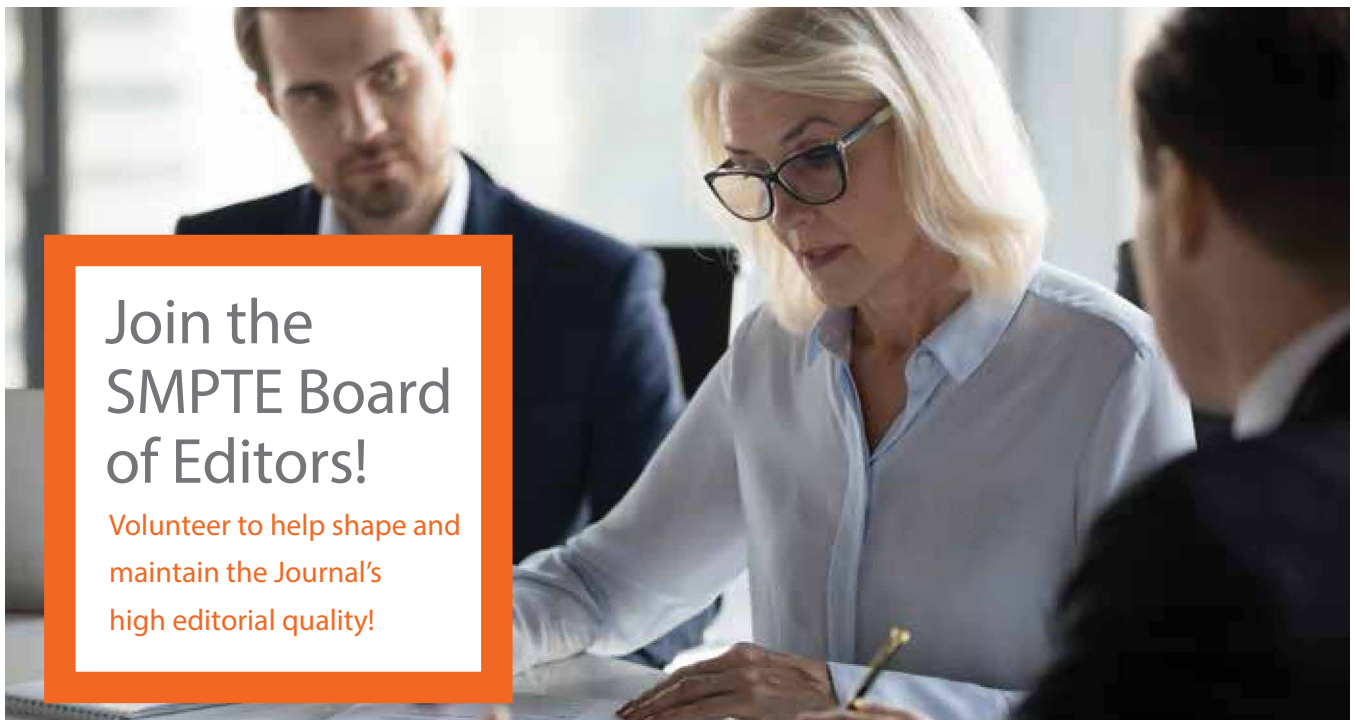
By Steve Sneddon, Chris Swisher, and Jeff Mayzurk

In 2016, NBCUniversal broke ground on Telemundo Center, the new Miami-based global headquarters for Telemundo Enterprises. The facility, which features 13 production studios and 7 control rooms supporting scripted episodic content, daily live news, and sports programming, went live in Spring 2018 with coverage of the

Fédération Internationale de Football Association (FIFA) World Cup. At the time of the launch, Telemundo Center was home to the largest SMPTE ST 2110 environment in the world, consisting of over 12,000 unique HD sources and 150,000 multicast streams across audio and video. The technical decision to use a software-defined video network infrastructure was essential to supporting the scale and flexibility of a facility of this magnitude. This article explores the major considerations and challenges in building such a large scale, all-IP broadcast production facility, including design factors around switching of video flows, redundancy, control and orchestration, PTP master clock systems and handoffs to multimanufacturer SMPTE ST 2110 devices as well as non-IP enabled devices. We also review our experiences and lessons learned by utilizing a software-defined network (SDN) control plane and routing commands that abstract the underlying physical and link-level connectivity.



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