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Chairman Tillis, Ranking Member Coons, Members of the Subcommittee, as the Chief Information Officer (CIO) for the Library of Congress, I appreciate this opportunity to provide a technological perspective on the progress of Copyright Modernization at the Library. Ensuring that the American people have a nimble, state-of-the-art, and efficient copyright system at their service is a top priority for Congress; for the Library; for the Copyright Office; and therefore, it is a top priority for the Office of the Chief Information Officer (OCIO) and for me.

As a side note, I want to thank you, Chairman Tillis and Ranking Member Coons, for facilitating the opportunity for the Register and me to speak with copyright stakeholders last month about modernization. That kind of dialogue goes a long way to increase transparency and clarify OCIO's role in the copyright modernization process. Your efforts are very much appreciated.

Thanks in large part to the generous and ongoing support of Congress and the vision of the Librarian of Congress, the Library has invested heavily in the optimization and centralization of information technology (IT) over the last few years. Those efforts have already begun to pay off. I can happily attest that, from a technological perspective, the Library of Congress today is a fundamentally different institution than it was just three short years ago when Dr. Hayden took the helm.

Building on the recommendations to improve IT at the Library made by the Government Accountability Office (GAO) and the Library's Office of the Inspector General (OIG), we have removed long-standing inefficient and ineffective silos and aligned the Library's IT expertise and resources to optimally support the Library's digital transformation. We created the Project Management Office to provide one authoritative voice for guiding IT projects. We consolidated and strengthened IT security to protect our valuable assets. And we united software development and IT infrastructure teams to allow talent sharing and efficiencies.

Following industry best practices for streamlining IT governance, investments, and resources, we've created an entirely new IT governance structure for the Library, a multi-year IT planning process, and an IT funding model based on the transparent 'Technology Business Management' framework. Combined, all of those ensure IT activities are strategically aligned to meet the Library's mission and goals.

Recognizing that we need a better infrastructure to support digital growth, we've launched a multi-year data center transformation project that is building the Library a technology foundation that is robust, flexible and scalable for future needs. We are expanding our IT infrastructure with

a new hybrid hosting environment. As part of that transition, our legacy systems and applications are being reviewed and updated as necessary to ensure they can operate efficiently.

The sweat equity that we have put into stabilizing and optimizing our infrastructure and systems over the last few years is now allowing the Library to move forward with an agency-wide IT modernization effort that is transforming how we use technology to support Congress, stakeholders like the creative community, and the general public.

Centralizing IT activities for the Library was a carefully considered strategic decision. The commitment to centralization by Congress and the Librarian ensures that my colleagues across the Library can focus their full attention on their missions with confidence that the technology and IT expertise they need will be there when they need it. Let me be clear, centralized technology does not mean one-size-fits-all technology. That is one of the things that makes the team of IT professionals we have in OCIO so remarkable. Unlike a lot of other federal agencies, OCIO does more than buy software and run wires. We also build systems and software applications. Our service units at the Library have complex and often unique mission-specific needs, and we build – frequently from scratch – mission-specific solutions to meet those needs.

It is in that context that OCIO is partnering with the Copyright Office to modernize their technology, and develop what we are calling ECS – the Enterprise Copyright System. This collaboration is a great example of centralization in action.

Rather than build a traditional monolithic IT system that is difficult to use, and nearly impossible to keep modern, ECS has been envisioned from the start as a set of shared services used across the Copyright enterprise – like a payment tool or a communication hub – combined with applications that support specific Copyright Office business functions, such as recordation and registration. This modern design approach allows us to build a custom solution that will fully support the complex and unique mission of the Copyright Office, while allowing each piece to be updated as necessary without requiring expensive and extended "modernization" efforts in the future.

For this effort we are using the industry-best practice agile methodology. We have been using agile at the Library for our most complex and demanding projects for over a decade because it is product-focused and iterative. Work is done a few weeks at a time in short development sprints. That cadence allows the team to quickly build things, try them out, and adjust their work based on feedback from real users. Agile is also flexible; we can easily incorporate changing realities as necessary throughout the life of the project.

Under agile methodology, the Copyright Office is the business owner. This means that the Copyright Office defines the business functions that ECS must accomplish, and prioritizes the work that is done. Copyright Office subject-matter-experts and OCIO technical staff then work together on a day-to-day basis as an integrated team to ensure that the applications are developed to successfully deliver the functionality that the Copyright Office needs.

We know that ECS must serve a wide range of people – from copyright experts to those coming online one-time to register their life's masterwork. Therefore at the front of the ECS project is a

large user experience design effort, focused on translating copyright law, public and industry feedback, examiner needs, and user expectations into an intuitive, easy-to-use interface for both users and the Copyright Office staff who will be working with ECS every day. OCIO user experience design experts have engaged in extensive collaboration with the Copyright Office, conducting in-depth information gathering from the copyright community, the public, and Copyright Office staff to ensure that technology needs are understood and incorporated. While the system will be composed of a range of applications with specific functions, we are building a common front-end design that will provide a seamless user experience.

Under the hood, we are building ECS as a cloud native application with native support for mobile technology. That minimizes the system's reliance on traditional IT infrastructure and ensures that we can easily scale-up as necessary to meet future needs.

Copyright IT modernization remains an ambitious and technologically sophisticated undertaking. Rather than adapting technology solely to existing workflows and structures, we are working with the Copyright Office to create a system that is future-proofed, able to accommodate future legal or regulatory responsibilities, or structural changes for the Copyright Office that Congress deems necessary.

Now that initial planning and development has been done, we are making great progress. The pilot version of the new Copyright Recordation system is being finalized, and we will be working with the Copyright Office to roll it out to a limited group of public users this spring. We will be collecting extensive user feedback on that pilot to allow us to make iterative improvements to the recordation application, and inform the work underway for the rest of ECS.

We are also on track to deliver limited public prototypes for at least one type of copyright registration submission and the new Copyright public records user interface by the end of 2020. Those prototypes will follow the model of the upcoming recordation pilot, incorporating any lessons learned from that activity.

Overall, Copyright IT modernization is on-schedule and on-budget. It will be fully functional and available for everyone to use as planned over the next five years. But we will not simply be handing it over and walking away when initial development is complete. ECS is, and will remain, a major IT program for the Library and we will keep it in continuous development. This means that, like other well-established OCIO products such as Congress.gov and LOC.gov, we will release updates as often as every three weeks based on user feedback to improve functionality and incorporate the evolving business needs of the Copyright Office and the creative community.

Finally, a note of reassurance for those being asked to entrust their work to us. As confidential consultants to the Congress, administrator of the national copyright system, and stewards of the nation's cultural history, the Library is well aware of the need to ensure the security of the digital content in our care.

We have significantly increased our IT security posture over the last few years. We have implemented NIST security standards, with role based security, to ensure that users only have

access to the data they are supposed to see. All Library IT systems have had complete security reviews and are continuously monitored. We conduct regular penetration testing of our high value assets. And we are implementing encryption – at-rest and in-motion – for all sensitive Library data, including e-deposits. We have also created a dedicated information security office staffed with true cybersecurity professionals to conduct proactive monitoring, testing, and incident management. Security is always a top priority for all Library IT.

In closing, I want to emphasize that my job is to ensure that Library IT resources are used strategically – and effectively – to meet the mission of the Library, which includes providing a fully functional, easy-to-use, secure Enterprise Copyright System that will grow with this important segment of the economy.

I have great confidence in my team; and I have great admiration for the dedication and commitment of staff in the Copyright Office. Together, we will deliver the IT solutions that allow the Library to fulfill its important responsibilities to the creative community and the American public. As I promised Dr. Hayden on her first day as The Librarian, technology will not be a problem for the Library.

Thank you again for this opportunity to provide OCIO's perspective on technology at the Library and our partnership with the Copyright Office. I am happy to answer any questions.