Managed Services
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ABOUT EPOC
Over the last decade, the scientific community has experienced an unprecedented shift in the way research is performed and how discoveries are made. Highly sophisticated experimental instruments are creating massive datasets for diverse scientific communities and hold the potential for new insights that will have long-lasting impacts on society. However, scientists cannot make effective use of this data if they are unable to move, store, and analyze it. The Engagement and Performance Operations Center was established in 2018 as a collaborative focal point for operational expertise and analysis and is jointly led by Indiana University (IU) and the Energy Sciences Network (ESnet). EPOC provides researchers with a holistic set of tools and services needed to debug performance issues and enable reliable and robust data transfers. By considering the full end-to-end data movement pipeline, EPOC is uniquely able to support collaborative science, allowing researchers to make the most effective use of shared data, computing, and storage resources to accelerate the discovery process.

EPOC supports six main activities:
- **Roadside Assistance and Consultations** via a coordinated Operations Center to resolve network performance problems with end-to-end data transfers;
- **Application Deep Dives** to work more closely with application communities and understand full workflows for diverse research teams in order to evaluate bottlenecks and potential capacity issues;
- **Network Analysis enabled by the NetSage** monitoring suite to proactively discover and resolve performance issues;
- **Data Transfer Testing/ Data Mobility Exhibition** to check transfer times against known good end points;
- **Provision of managed services** via support through the IU GlobalNOC and our Network Partners;
- **Coordinated Training** to ensure effective use of network tools and science support.

MANAGED SERVICES
EPOC is developing a set of service definitions for common R&E infrastructure components that could be run by a third party as a *Managed Service*. The goal of these definitions is to provide guidance for our Regional Partners to implement, maintain, and operate (potentially for a fee) the service as a benefit for downstream connectors. In doing so, the costs associated with design, specification, and installation could be ameliorated for a larger population than would otherwise have access to this technology due to the burdens of entry which may include not having knowledgeable staff or enough compelling use cases to invest time and money.

The typical design and implementation involves an EPOC regional partner expressing interest in working on managed services to be deployed/managed centrally or targeted directly at a member school. However, due to pandemic-related access restrictions and the resulting shifting priorities at our partner institutions, these efforts were stalled in mid 2020 and for the foreseeable future.

Prior to 2020, EPOC was targeting the following examples of Managed Services:
- perfSONAR in a Box: a widely-deployed active test and measurement infrastructure that is used by science networks and facilities around the world to monitor and ensure network performance.
- Science DMZ in a Box: Dedicated network infrastructure specifically configured for the security and performance implications required for scientific use cases.
- Data Transfer Node in a Box: PC-based Linux servers built with high-quality components and configured specifically for wide area data transfer.

However, these were suspended due to time and partner interest at the onset of COVID-19 pandemic restrictions. The only Managed Service in active development after 2020 is the *Modern Research Data Portal (MRDP)*, as detailed at http://es.net/science-engagement/technical-and-consulting-services/modern-research-data-portals. The MDRP design pattern makes use of the Science DMZ model and DTNs to scale up the data transfer functionality of a data portal. EPOC is experimenting with the concept of a self-contained Data Portal to assist scientific data sharing needs. The goal is to create an easy to install set of software that can be run on campus or regional hardware and expose a set of scientific data. The current Pilot Portal is based on the MRDP, uses Docker, supports a front-end with federated authentication, and works using Globus Endpoints.