EPOC Support for NSF CC*

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What you've signed up for today:

- 2 min EPOC Overview
- NSF CC* Program
  - This year
  - Difference from last year
- How EPOC supports CC* submissions
  - Including typical issues in years past
- Where to get more info:
  - http://epoc.global/cc
  - epoc@iu.edu

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NOTE!

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- NSF and the NSF POs are your best resources for solicitation questions, regardless
- EPOC is a resource, the following is simply our opinion

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- Joint project between Indiana University and ESnet
  - co-PI Zurawski (ESnet) and Jent (IU GlobalNOC)
- Part of CC* program for domestic science support
  - Program Officer: Kevin Thompson
  - Award #1826994, $3.5M over 3 years
- Partnerships with regional, infrastructure, and science communities that span the NSF and DOE continuum of funding

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Why an Engagement Operations Center?

- Today's science is collaborative science
- Collaborative science
  - Multiple partners
  - Multiple data sets
  - Many points of connection
  - Cross agency cooperation
- With better access to data we ask harder questions
- Interactive data sources change the science we do

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Understanding End-to-End Performance is Hard

- Lots of pieces - Host system through networks to host system

- No one controls all the pieces

- End users don't know what performance to expect

- Soft failures are hard to find

- Many, many points of coordination

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EPOC Six Main Focus Areas

1. Roadside Assistance and Consulting
2. Application Deep Dives
3. Network Analysis (NetSage)
4. Data Mobility Exhibition/Portal
5. Services "in a box" (DMZ, testpoint in a box, etc)
6. Training

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Roadside Assistance - Consulting

- Requesting help – contact EPOC@iu.edu
  - Suggestions for your Data Architecture
    - DTNs, DMZs, firewalls and DMZs,
  - Data projections for science fields
  - Expected (real) performance between two sites
  - Advice on how to conduct a performance assessment of a network and applications
  - Or almost anything else

- Results/suggestions added to http://fasterdata.es.net

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NSF Campus Cyberinfrastructure #21-528

- Annual NSF Solicitation that supports networking and other CI elements at a campus
- Updates every year

- **READ THE WHOLE SOLICITATION**
- NSF (Kevin Thompson, Deep Mahdi) for questions

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Significant Changes for 2021

- Two Deadlines
  - March 1, 2021 AND October 11, 2021
- Removal of Cyber Team (was Area 5 in 2020)
- Anticipated funding level and number of awards changed
- Core elements very similar

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Significant Similarities

- <u>Science-driven requirements</u> are the primary motivation for any proposed activity
- Each area has <u>many requirement</u>s, some listed in the summary and some not, so be sure to double check all have been addressed
- <u>Campus CI Plan</u> needed as supplemental document
- <u>Documentation of partnerships</u> required via Letter of Collaboration

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Most Common Questions EPOC Has Received in the Past related to CC* Subs

1) Design/Review of DTN/DMZ/Equipment selection
   - We always ask for info on science drivers to start
   - New docs on 100G DTN and 100G pS Nodes
     - https://epoc.global/materials/
     - Spoiler - you might not need the biggest you can build
2) How to secure a network or IDS
   - We give pointers to Trusted CI http://trustedci.org
3) Future requests for Application Deep Dives
   - Best for planning grants
4) Requests to borrow Viavi tester(1/10/40/100)

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How EPOC Can Help during Proposal Writing

- Pointers for identification of science drivers
  - all 5 Areas
- Review of proposed Data Architecture designs
  - Areas 1, 2, 3, 4
- Questions about measurement and monitoring plans
  - Areas 1, 2, 4
- Pointers to Campus CI plans
  - Areas 1, 2, 3, 4
- Letter of Collaboration
 - Open to any program submission, after discussion
- http://epoc.global/cc

Science Drivers

- Science drivers must motivate the infrastructure requests
- Common Missteps
  - Science drivers say they need more storage, proposal wants to build a DMZ
  - Science drivers support requested a DTN, proposal is for 100G DTN without surrounding CI being up to 100G speeds or application workflow at 100G
- Science drivers too general ("High energy physics" vs "Dr. Chris Smith's virus modeling project")

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EPOC Deep Dive Vision

- Think of this as regular maintenance, oil change, or planning to buy a car

- Based on ESnet facility req'ts reviews
  - Walk through science workflow with the actual scientists
  - Way to understand needs and planning

- Often identifies issues that have **_nothing_** to do with technology specifics, and everything to do with sociology
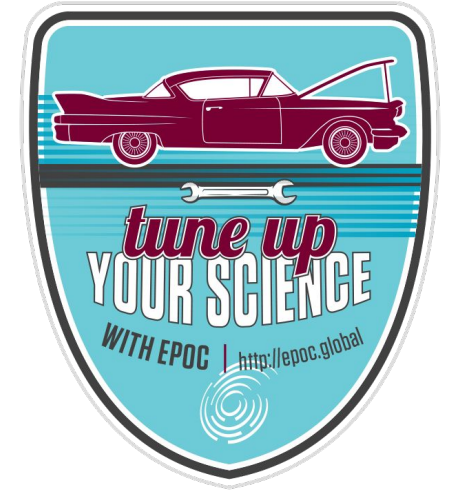
Deep Dive Pitfalls

- Preconceived notions
  - AKA "help me justify the cost of this Science DMZ I ***want***"
  - "We don't need to think about X, no one asks about it"
  - "Cloud storage works for everyone, we don't need a local solution"
- "Listen to Reply" vs. "Listening to Understand"
  - The most important outcomes are social-political – not technical
  - Build bridges with your users, listen to them and understand ***who*** they are, ***what*** they are saying, and ***why*** they are saying it.
  - This will lead to ***how*** you can help, ***when*** it is needed, and ***where*** it should be implemented

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User experience

Design

Common Observations from Deep Dives

1. Storage, storage, storage
   - More space, easier to use, Cloud generally isn't right
2. What should be campus vs researcher owned?
3. Interest in workflow automation, but must be simple for the researcher
4. IT dept focus on networks often isn't bottleneck
5. Computation resources are mixed bag
6. IT dept solution may not be the right one for the researcher

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20

Data Architecture Review

- Areas 1-4 require specification of infrastructure and diagrams
- More than just the Network
- Biggest Missteps
  - Sometimes vendor's will recommend what they'd like to sell, not what meets your needs
  - Important to have end-to-end path "match" to ensure good performance along full path
  - Connect "how this will be used" to "what will be used"

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Data Architecture Review (2)

- Security and Intrusion Detection Systems
  - EPOC collaborates with Trusted CI for this topic
  - Von Welch, https://www.trustedci.org/

- Post-award testing
  - EPOC has a Viavi tester(1/10/40/100) it can loan out

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Data Architecture Review (3)
As you Design your Infrastructure

- Think about how it will be used in real life, not just the theoretical
- Make sure your request matches your science drivers
- For example: DTN Sizing
  - What are typical needs for science use cases?
  - What is on the other end of the data transfer?
  - What can your campus backbone support?
- We find more, smaller DTNs often better than a 100G DTN
  - https://epoc.global/materials

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Measurement and Monitoring Plan

- Requirement of perfSONAR-based measurement for several portions of CC* solicitation
  - Read the solicitation carefully!
- Simply setting up a node which isn't used is NOT sufficient
- EPOC can offer advice on where to test, and what kind of pS node to use
- We collaborate with the pS Consortium: https://www.perfsonar.net/
- About 100G pS Nodes
  - https://epoc.global/materials

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Campus CI Plan

- Required for all areas except planning grants
- Campus-wide CI Plan, not just the proposed work
  - May need someone senior to you to weigh in on this
- Show how the request fits within this space
- EPOC happy to review draft plans

- Samples available at
  https://fasterdata.es.net/campusCIplanning/

Letter of Collaboration-
Post-award Effort with EPOC

- Answer questions about CI and data movement challenges
- Support your use of any EPOC training materials
- Offer presentations to your audience on CI support, data movement, or user engagement (as schedule and budget allows)
- Participate in an advisory committee

https://epoc.global/proposal-collaborations/

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Who do we work with? You!

- Anyone – anywhere – trying to transfer data between there organization and somewhere else

- Don't have to be a partner, NSF or DOE funded, or US domestic

- Does need to be related to education or research in some way

- Doesn't cost anyone anything to do this – this is our job

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Need EPOC support?

- Email to: epoc@iu.edu
- Email anyone on the EPOC team
- Talk to us at a conference
- Phone call
- Carrier pigeon with a USB stick strapped to its leg

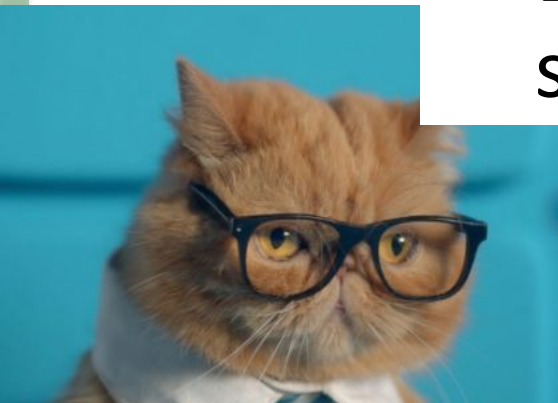EPOC
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Timing

- Writing a proposal takes longer than you think
- Getting people's attention to work with you takes longer than you think
- Your institution may have internal deadlines for grant submissions

- EPOC needs a week for discussion/agreement before any Letter of Commitment

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Takeaways

- EPOC provides a single point of contact to help with end-to-end performance issues
- More about EPOC: http://epoc.global
- EPOC and CC* Program: http://epoc.global/cc

- Contact EPOC: epoc@iu.edu
- Jennifer Schopf: jmschopf@iu.edu
- Jason Zurawski: zurawski@es.net

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