

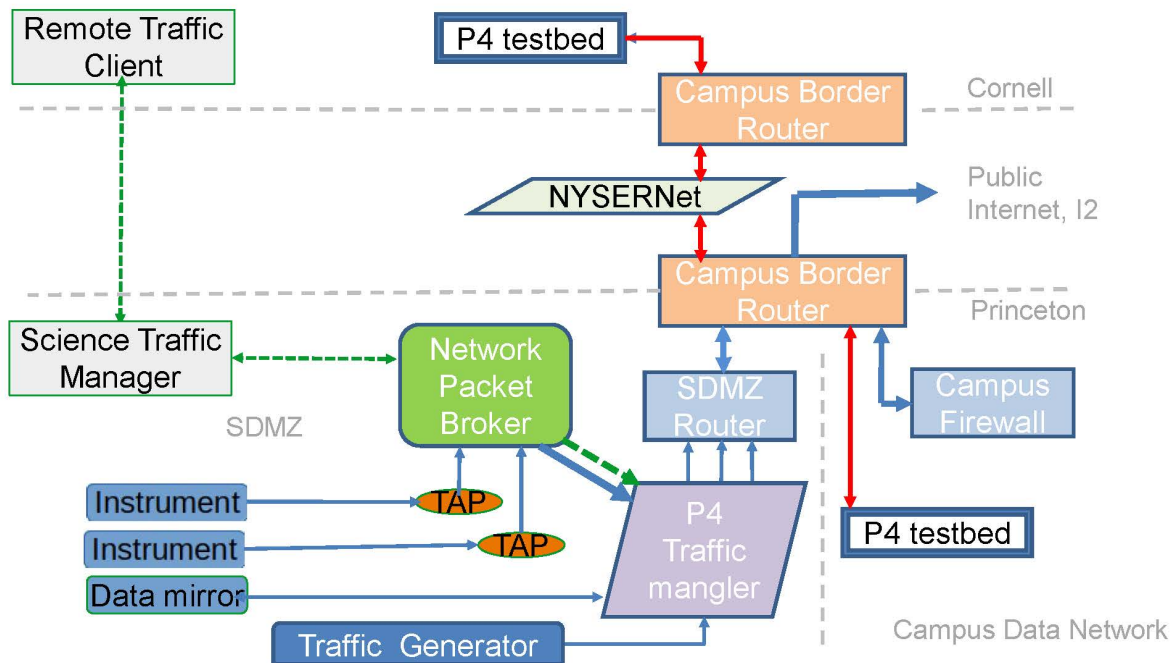
# NSF #2018308 - Science Traffic as a Service (STAAS)

Campus Cyberinfrastructure (CC\*)

Institution(s): Princeton University

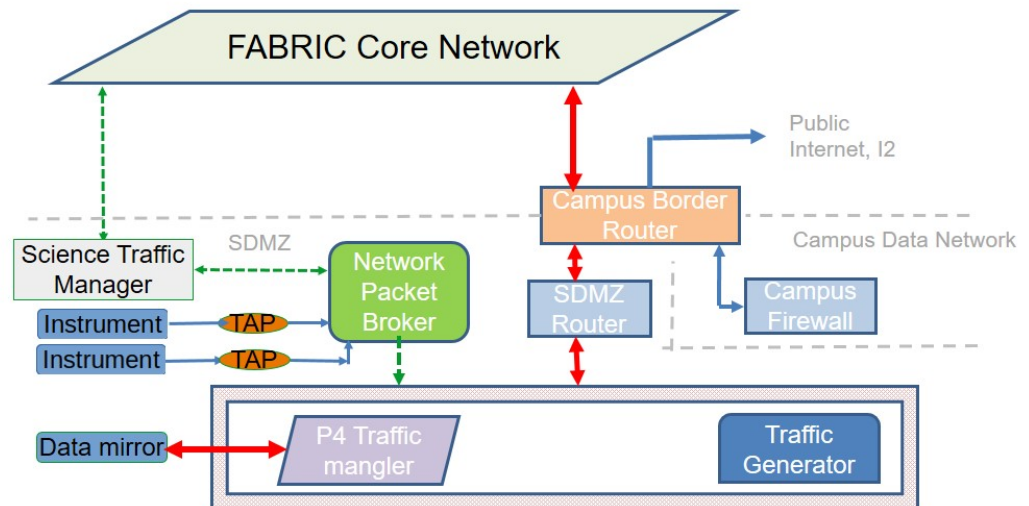
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# Motivation and Objective

- Create a decentralized, system-wide traffic generation service for experimenters
  - Deploy prototype on Cornell-Princeton network testbed over NYSERnet
  - Primarily an end system service; FABRIC must permit on-demand injection of traffic into slice
- *Critical gap* addressed is realistic foreground/background network traffic for experimenters
- *Transformative* because it treats traffic as a first tier system service; all connected institutions offload traffic generation burden from experimenter
- *Objective*: Build a working scalable prototype edge system



# Workplan

- *Short-term plans*: Equipment acquisition, deployment and testing on Princeton campus
- *Long-term plans*: Deploy two campus prototype
- What are the experimental data and *artifact sharing* methodology you plan to follow?  
SW & system template - GitHub
- *Risks* and plans to mitigate them: Cornell-Princeton initial pilot (start now)
  - Convincing data traffic owners to permit mirroring their traffic
  - Convincing other campuses to participate in traffic sourcing
  - Maintaining traffic stream integrity over WAN

Task Area	Year 1 (10/1/20)				Year 2 (10/1/21)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Element 1 – Hardware	D	I		I	S	I2		
Element 2 – Open Source SW			D	I, REU	S		P	S,G
Element 3 – Software Dev.		D	I	I	S	I2		
Element 4- Policy/Security	D	D	I	I		P		
Broader Impacts			O	REU			O	O

D: Design

O: Outreach/evangelization

I: Implementation (NPI Testbed)

I2: Implementation (FABRIC prep & port)

S: Demonstration

REU

G: Github

P: Playbook &  
Experimenter  
Guides

# Evaluation plan

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- Key Milestones
  - Local use by P4campus project experimenters
  - First mirrored flow over WAN
  - STAAS node build kit - system template, hw, sw instructions
- Key midterm/final exam – work with representative experimenter(s) to evaluate service value add, ease-of-use, etc

Task Area	Metric	Value
Element 1 – Hardware	STAAS target FABRIC/hank site min. entry cost	\$20,000.00
	Equipment Identification & acquisition completed	April, 2021
	Min. WAN simultaneous tapped flows (tunneled)	5
Element 2 – Open Source SW	Traffic Generation max. bit rate (local area)	100Gbps
	Traffic Generation max. bit rate (NYSERnet)	10 Gbps
	WAN traffic integrity characterization completed	October, 2021
Element 3 – Software Dev.	P4 traffic mangler initial app prototype	June, 2021
	Min. WAN simultaneous tapped flows (mangled)	2 (Oct. 2021), 4 (Oct. 2022)
	Target packet drop rate/flow (10 Gbps)	0.01%
Element 4- Policy/Security	FABRIC consultation meetings	4 (Month 6, 12, 18, 24)
	Participating Scientific instrument flows (PU)	4 (2/year)
	Participating DTNs (Cornell, Princeton)	2

# Requirements

- FABRIC hardware and software needs
  - Coordination of FABRIC & STAAS management planes; attachment of STAAS egress to FABRIC slice
- What level of support will you require from FABRIC developers?
  - Y1- none; Y2 - minimal;
- Do you have any suggestions to FABRIC developers?
  - Participating campus costs lower if STAAS components can be offloaded to HANK equipment

