

SA NREN Connectivity SANReN + TENET

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Outline

SA NREN Overview
International Connectivity
International R&E Exchange Points
Africa Continental Interconnects
South African Connectivity
SANReN Services

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The South African National Research and Education Network (SA NREN)

Structure

- Roles and responsibilities of the de facto South African NREN are distributed between SANReN and TENET

Functions

- SANReN
 - Builds the Network (network reach and capacity)
 - Develops Advanced Services
- TENET
 - Operates the SANReN Network under terms of collaboration agreement with CSIR
 - Build onto the network
 - Host Services
 - Represents South African NREN at UbuntuNet Alliance (founding member) – Regional REN for South East Africa
 - SABEN – entity for the connection of TVET colleges



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TENET, <https://www.tenet.ac.za/> | SANReN, <https://www.sanren.ac.za/>

International capacity

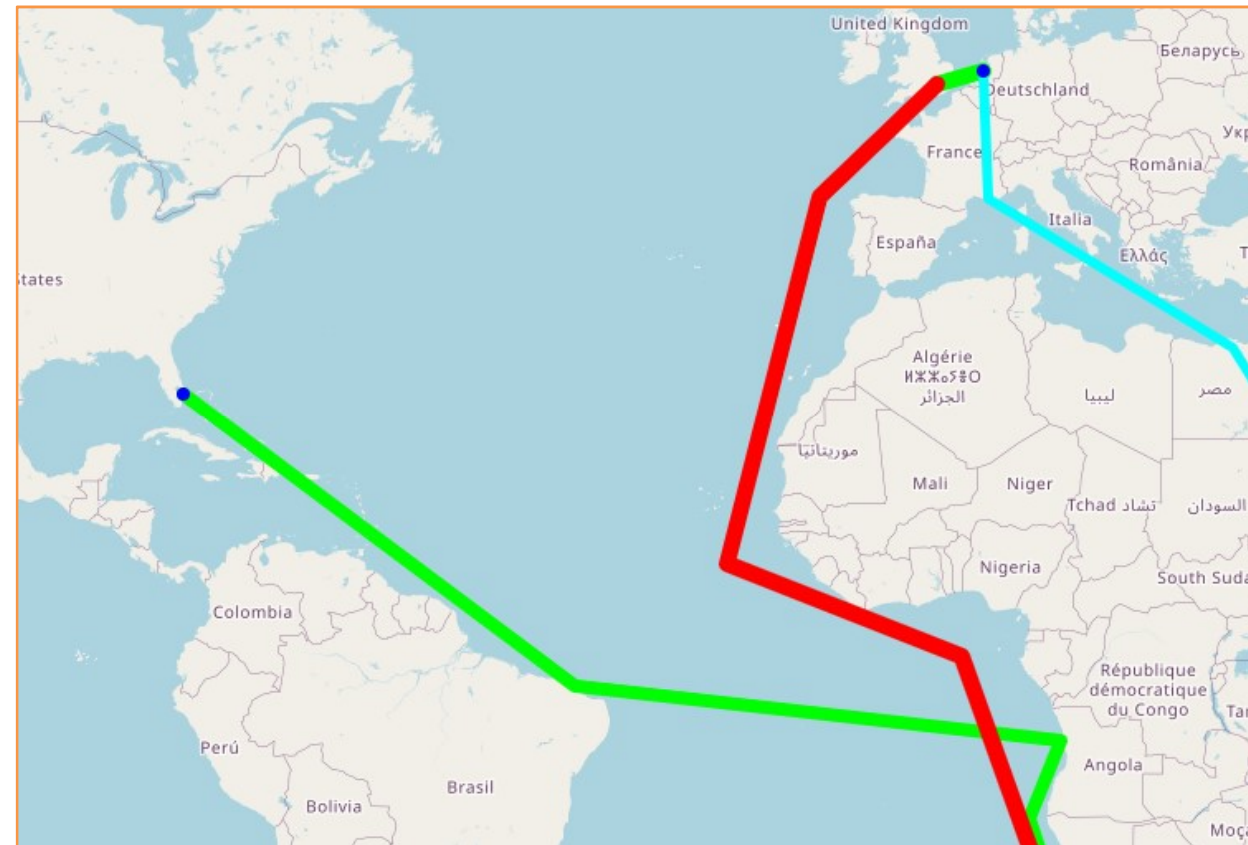
West African Cable System (WACS)

South Atlantic 3 (SAT-3)

Eastern Africa Submarine System (EASSy)

SEACOM

South Atlantic Cable System (SACS)



International capacity (bps)

West African Cable System (WACS)

- 160 Gbps

South Atlantic 3 (SAT-3)

- 20 Gbps

Eastern Africa Submarine System (EASSy)

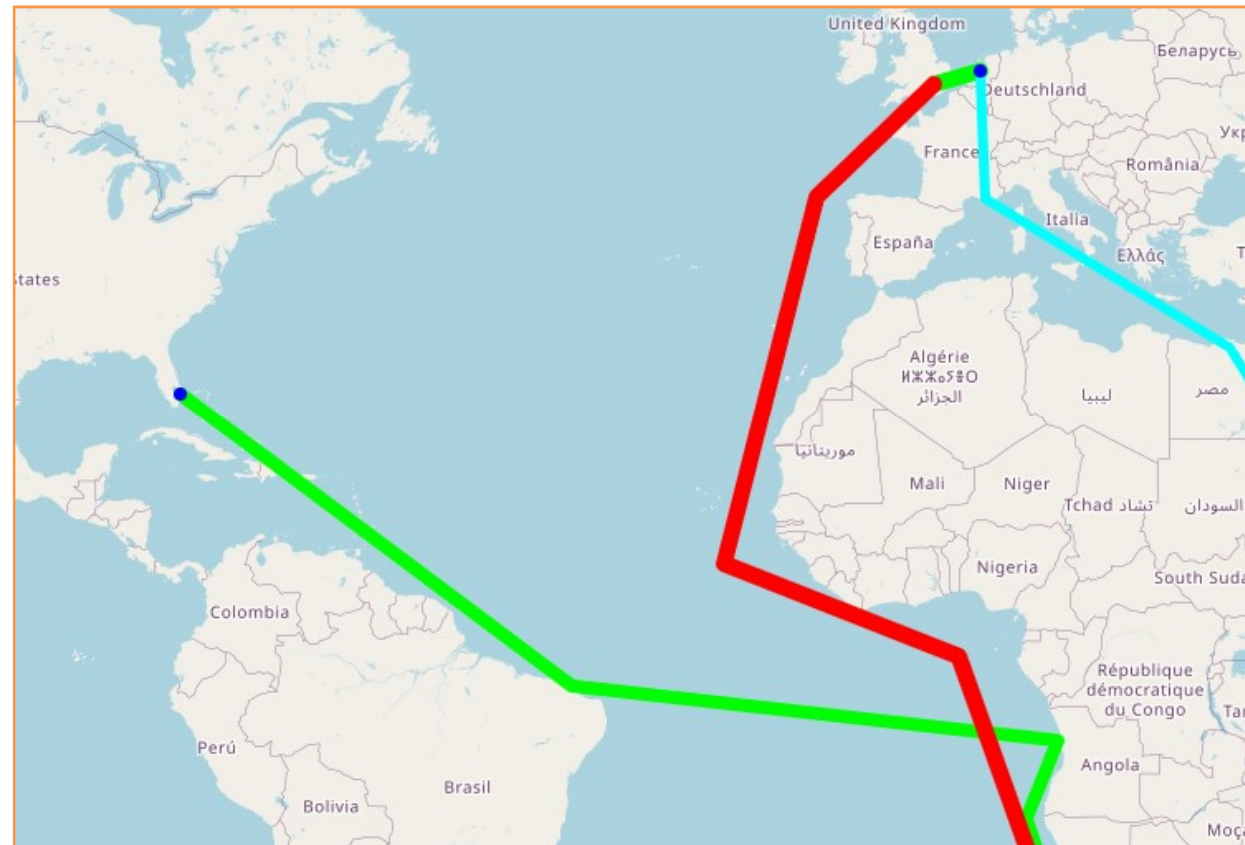
- 20 Gbps

SEACOM

- 60 Gbps

South Atlantic Cable System (SACS)

- 100Gbps



International R&E Exchange Points



ZAOXI

Cape Town



Miami

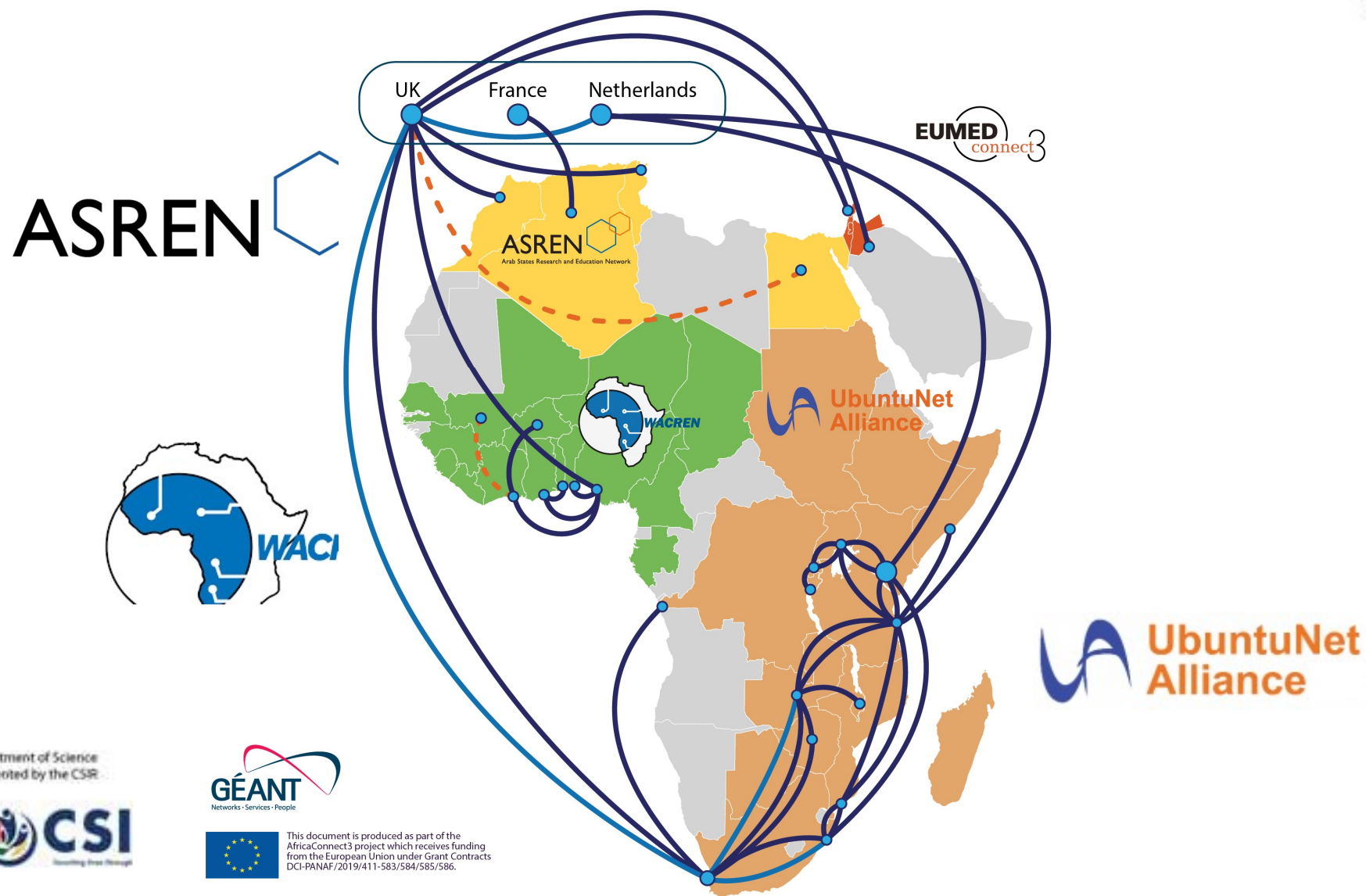


London

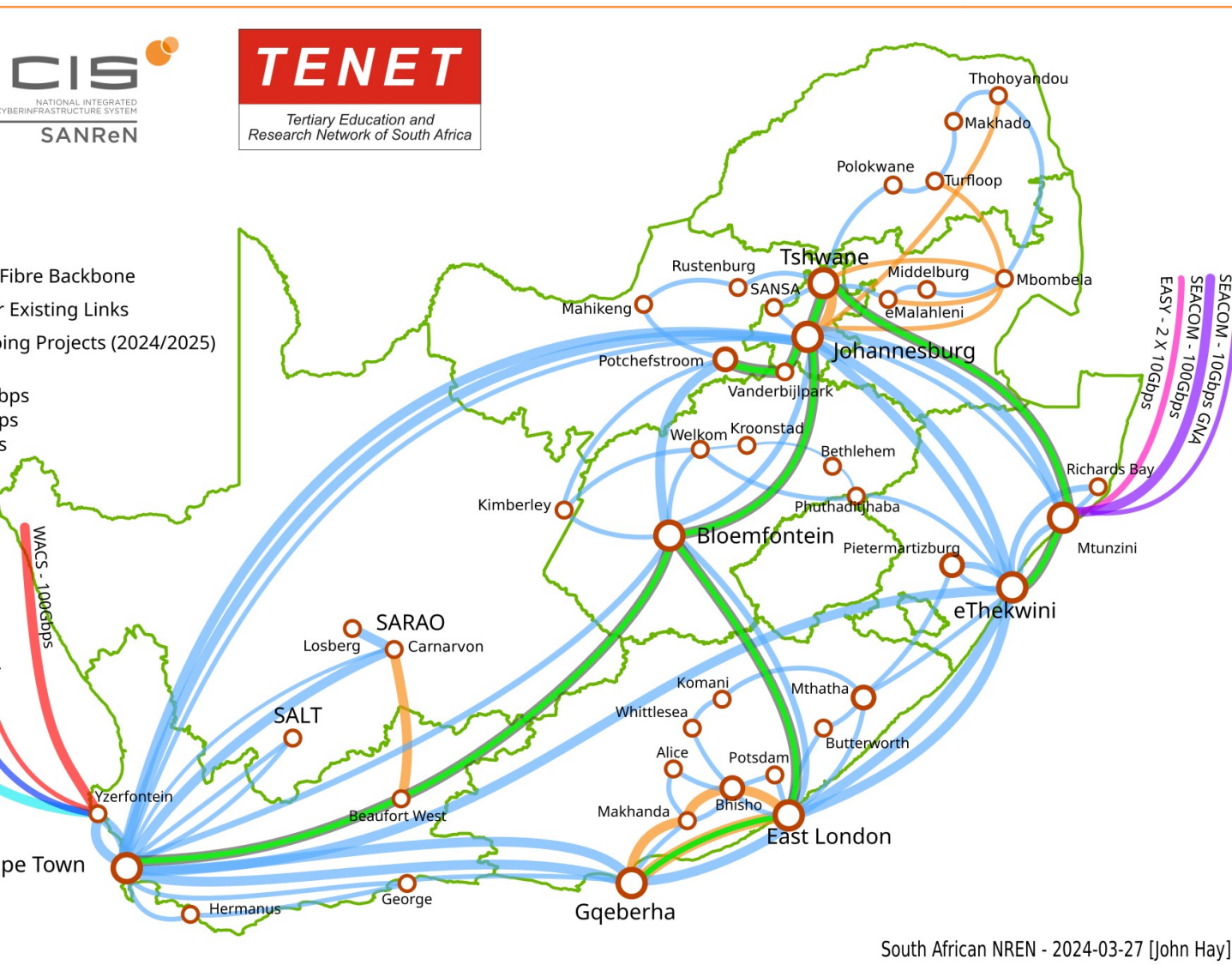


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Africa Continental Interconnects



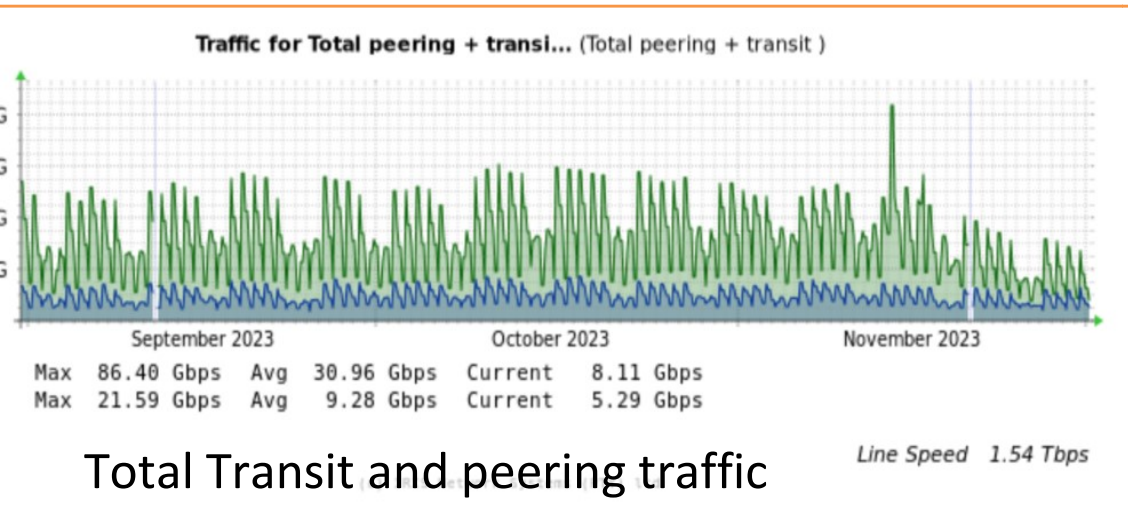
South African Connectivity



- Infrastructure:

- a core national dark fibre backbone with several managed bandwidth backlinks at 100Gbps to mesh the backbone
- backbone extensions (regional links) – typically at 10Gbps
- back-hauling from the submarine cable landing stations at Yzerfontein and Mtunzini
- several metropolitan area networks

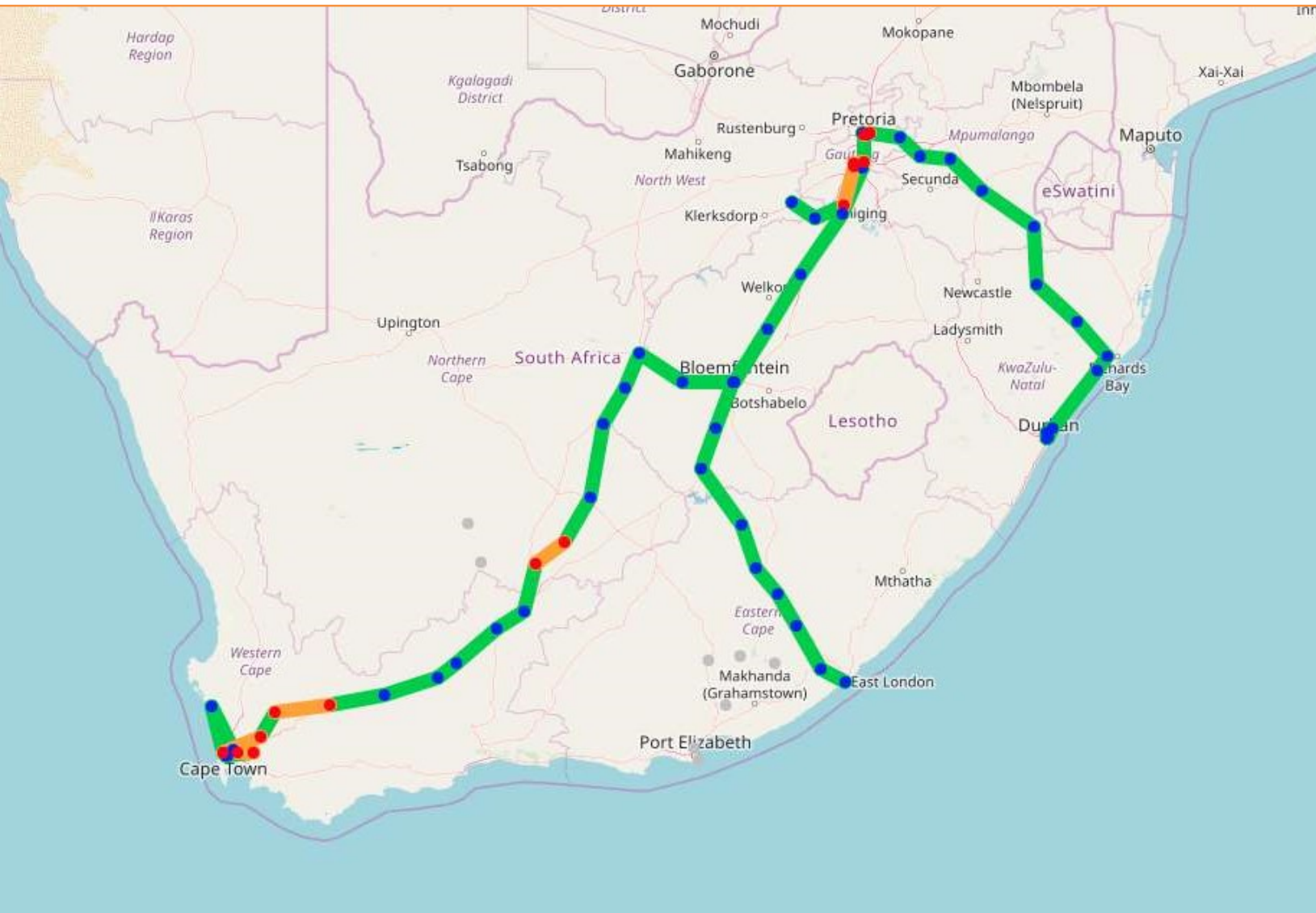
ome stats...



- Number of users: 1.3 million (estimated)
- Number of sites connected by SANReN and TENET: 400+
- Multiple 100Gbps backbone links between major cities
- International bandwidth: 360 Gbps
- Capacity on 5 undersea cables

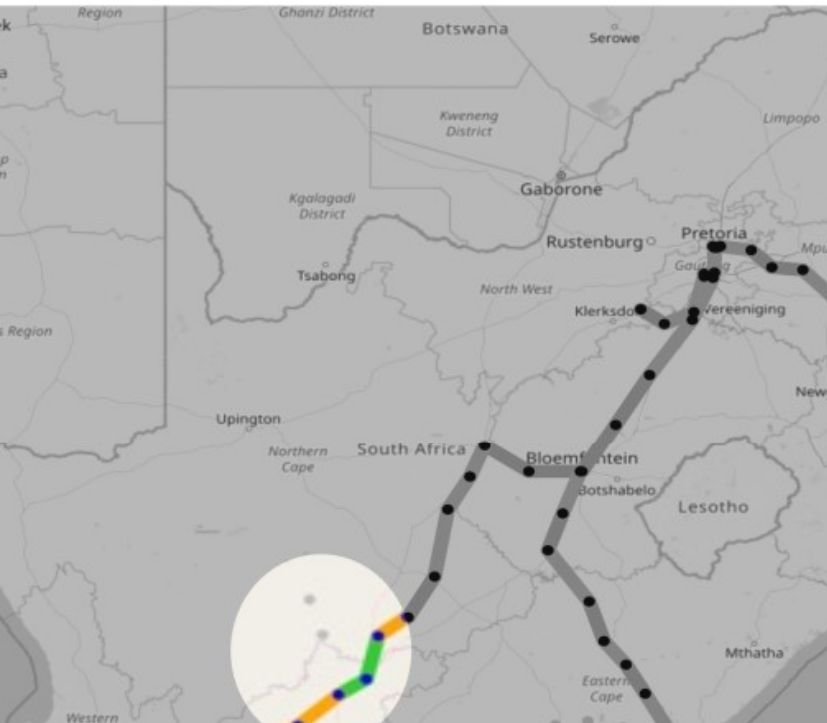
Organisation	Number of links as at 25 March 2024	Organisation	Number of Devices as at 25 March 2024	Total Available Broadband Capacity (Tbps) as at 31 March 2024
SANReN	307	SANReN	311	8592.48 Gbps
TENET	396	TENET	255	
SABEN	14	SABEN	317	
Misconfigured	37	Misconfigured	3	
Total	754	Total	886	

ANReN Dark Fibre Backbone

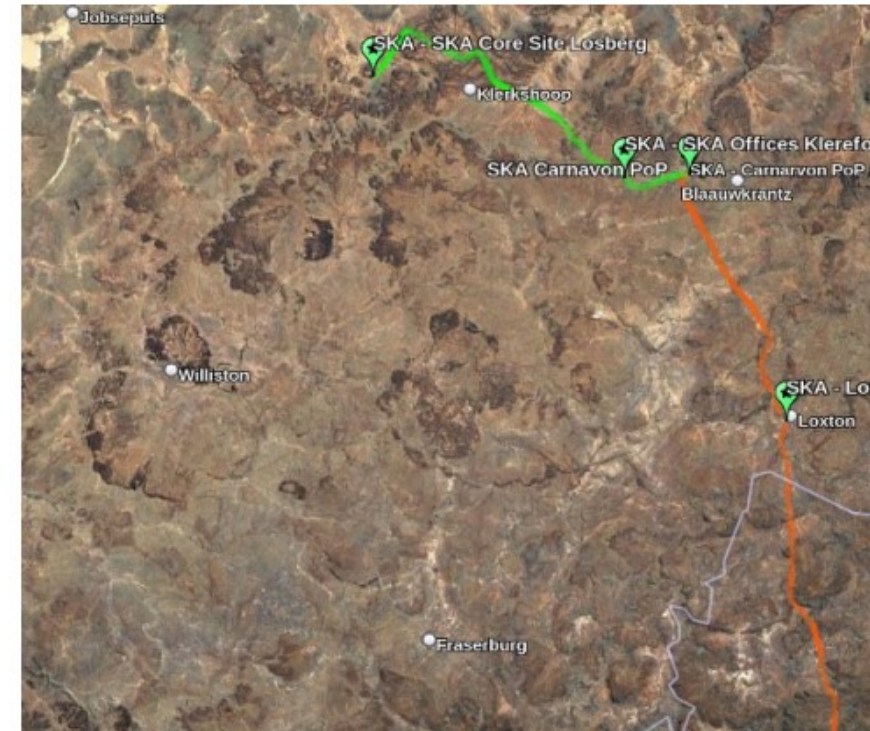


- 5 dark fibre links
- 96 Channel
- 100Gbps DWDM
- Commissioning of Blaney to Gqehe (PE) segment in process

New Fibre-DWDM Backbone–SARAO/SKA



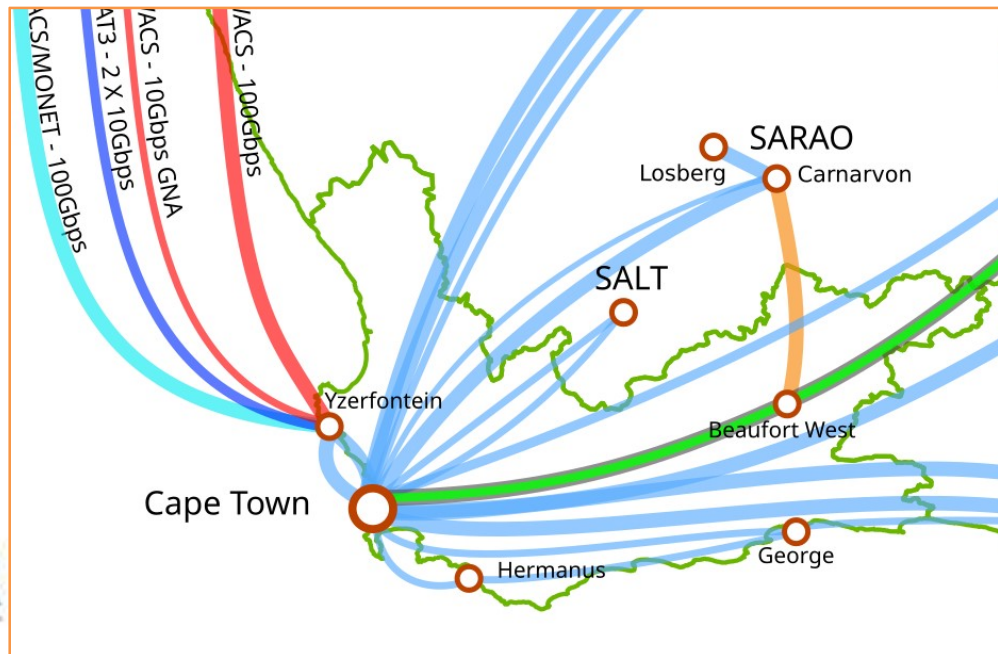
- Green\Blue:
 - Existing Fibre
- Orange:
 - New Fibre
 - 174 km



ANReN Projects: Infrastructure

Major Projects that have been completed (March 2024)

- Procurement of a 10Gbps managed bandwidth link for South African Astronomical Observatory (SAAO) site in Sutherland (SALT)
- Procurement of a 100Gbps managed bandwidth link for South African Radio Astronomy Observatory (SARAO) site from Cape Town to Carnarvon
- 100 GBps on darkfibre Carnarvon to Losberg (Meerkat + future SKA)

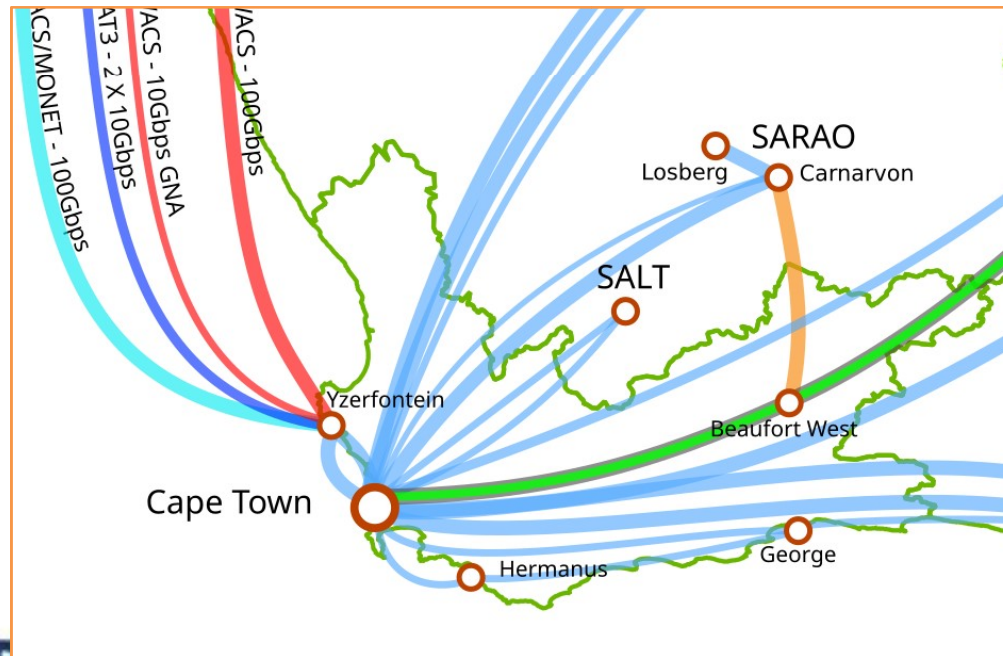


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ANReN Projects: Infrastructure

Major Projects in progress, cont.

- Dark fibre build from Carnarvon to Beaufort West, with repeater site in Loxton
- Procurement of 2 diverse 10Gbps managed bandwidth links for the South African National Space Agency. (SANSA) site at Matjiesfontein



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ANReN Services



PERT (Performance Enhancement Response Team)

- A team at SANReN that assists with resolving network throughput issues e.g. slow data transfers
- PERT team (pert@sanren.ac.za)
- Primarily uses perfSONAR to interrogate network performance issues



perfSONAR (Performance-oriented Service-Oriented Network Monitoring Architecture)



- Network measurement and monitoring framework designed to provide detailed insights into the performance of network connections
- One 100G node and twenty 10G nodes deployed in the network
- Upgrade of the perfSONAR to 100G nodes in process
- perfSONAR software and DTNs implemented on the same hardware for 100G nodes

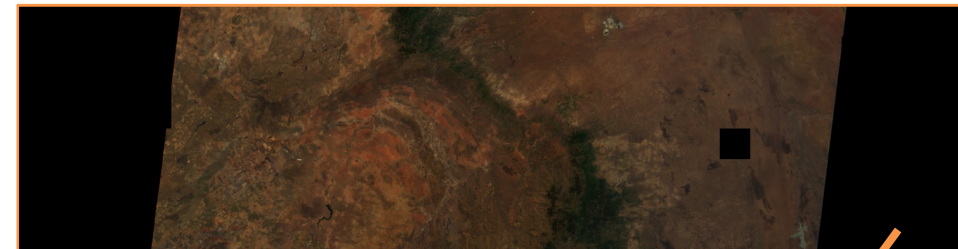
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Examples: Data Transfer

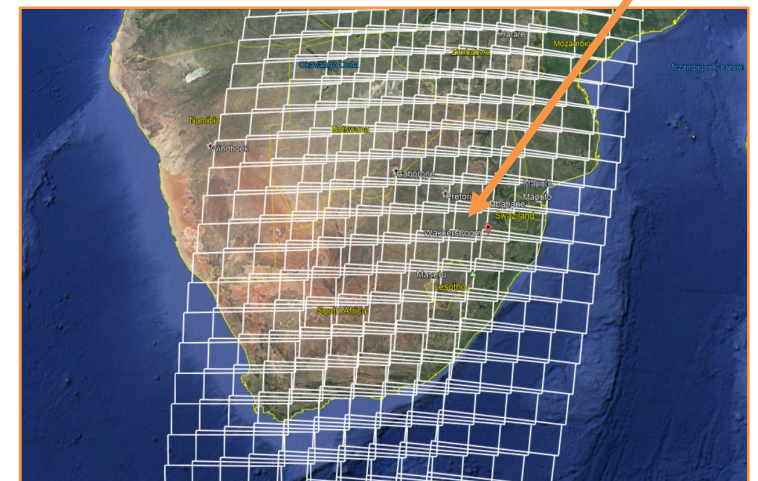
Case 1: Global Change Institute

Data retrieval from NASA to WITS

- Modified and custom scripts created to automate parallel data downloads to the WITS DTN
- Worked closely with the researcher to enable the retrieval of the data
- During the SANReN DTN pilot tests, GCI have managed to retrieve up to 3 Terabytes of MISR datasets
 - ~1 terabyte for orbits from Feb 2000 to Dec 2018
 - Greatly reduced download time



eg. A single MISR satellite scene (Path 169, Block 110)



MISR Orbital paths covering Southern Africa

SANReN Services, cont.



SANReN Computer Security Incident Response Team (CSIRT), established March 2016

- Focus on proactive services to mitigate information security incidents as well as provide support to institutions responding to information security incidents (denial-of-service, ransomware, etc.)
 - SANReN pro-active focus
 - TENET re-active focus
- The CSIRT was accredited by Trusted Introducer in 2018
- Accepted as full members of the Forum for Incident Response and Security Teams (FIRST) on 6 February 2020.
- Hosts the annual SANReN Cyber Security Challenge (ethical hacking contest)



CSIRT Services (csirt@sanren.ac.za)

- Vulnerability assessments
 - Multiple scanners, aggregating results and presenting findings in an actionable report
 - Encapsulates a process to identify, classify, report on, and provide remediation advice for the security weaknesses of a constituent's IT infrastructure
 - Entails a scan to uncover exploitable weaknesses in network devices, servers, and systems
 - Results are manually verified and then compiled into an easy-to-read, actionable report



= RSA Academic Sector CSIRT

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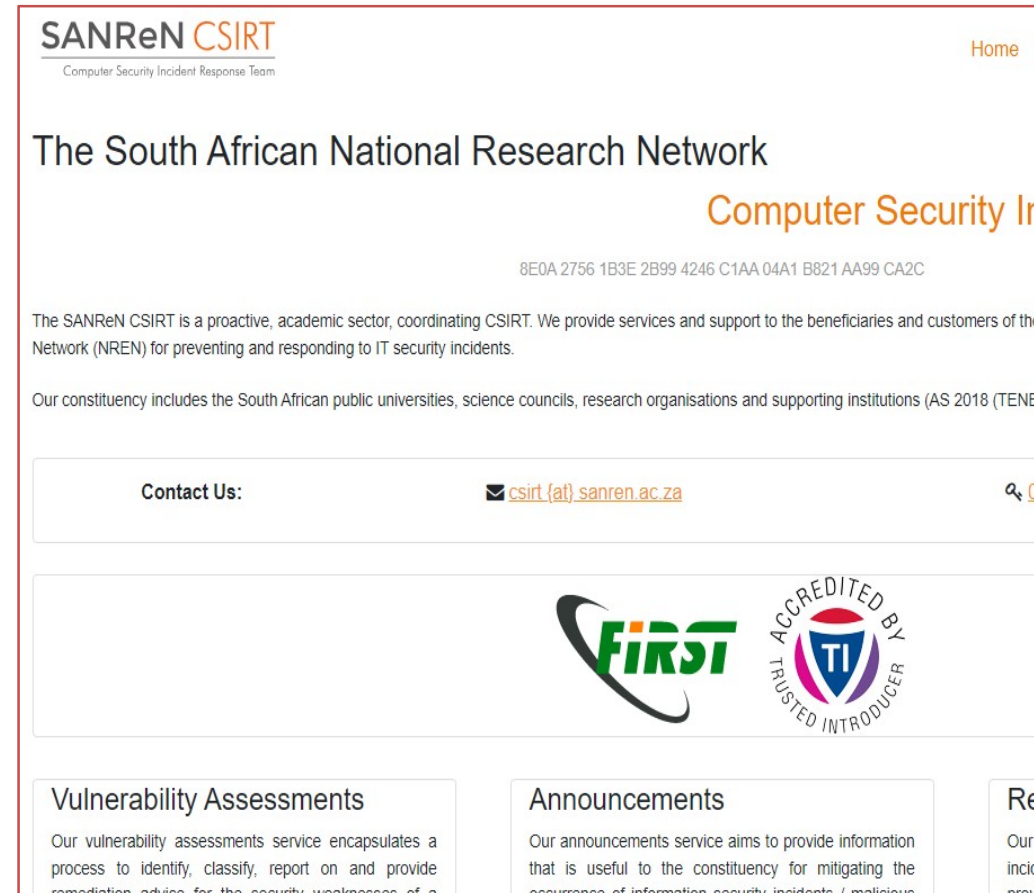


<https://csirt.sanren.ac.za>

SANReN Services, cont.

CSIRT Services (csirt@sanren.ac.za)

- Alerts
 - Correlation of numerous threat intelligence feeds with filtered reports sent to subscribed institutions
 - Announcements
 - Interesting and relevant news articles published weekly
 - Awareness and Training
 - How to respond to incidents → Playbooks
 - Incident response support and coordination
- SANReN CSIRT offers one free vulnerability assessment for each beneficiary per year
- Can involve both internal and external scans

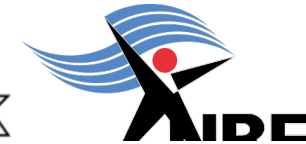


The screenshot shows the SANReN CSIRT website. At the top, there is a header with the SANReN CSIRT logo and the text 'Computer Security Incident Response Team'. Below this, the main heading reads 'The South African National Research Network Computer Security Incident Response Team'. A unique identifier '8E0A 2756 1B3E 2B99 4246 C1AA 04A1 B821 AA99 CA2C' is displayed. The text describes the CSIRT as a proactive, academic sector coordinating CSIRTs and providing services to the NREN for preventing and responding to IT security incidents. It also mentions the constituency includes South African public universities, science councils, research organisations, and supporting institutions. A 'Contact Us' section provides the email csirt@sanren.ac.za. Below this, there are logos for 'FIRST' and 'ACCREDITED BY TI TRUSTED INTRODUCER'. At the bottom, there are three columns: 'Vulnerability Assessments' (describing a process to identify, classify, report on, and provide remediation advice), 'Announcements' (describing a service to provide information for mitigating information security incidents), and a partially visible 'Re...' column.

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Questions ?



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