



Airbridge gateway with TitaniumX software

Future Evolution of Marine
Communication

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AnyWi Technologies

Software development company

- Specialised in wireless networking
- Open source-based
- Main application areas: Mobility/Smart Cities
- Current focus on passenger ships

Broad European collaborations

- Based in Leiden, the Netherlands



Titanium X software

Enables robust internet connectivity

- Operating system for mobile gateways
- Increased internet availability on board

Wide usage on vessel

- Operations (email, VPNs, ops data)
- Passenger WiFi and infotainment
- Crew and staff for leisure use

Titanium X software

Gateway to connect ship to shore

- LTE (UMTS fallback)
- VSAT

Two components

- Gateway on ship
- Concentrator on shore

Main technical characteristics

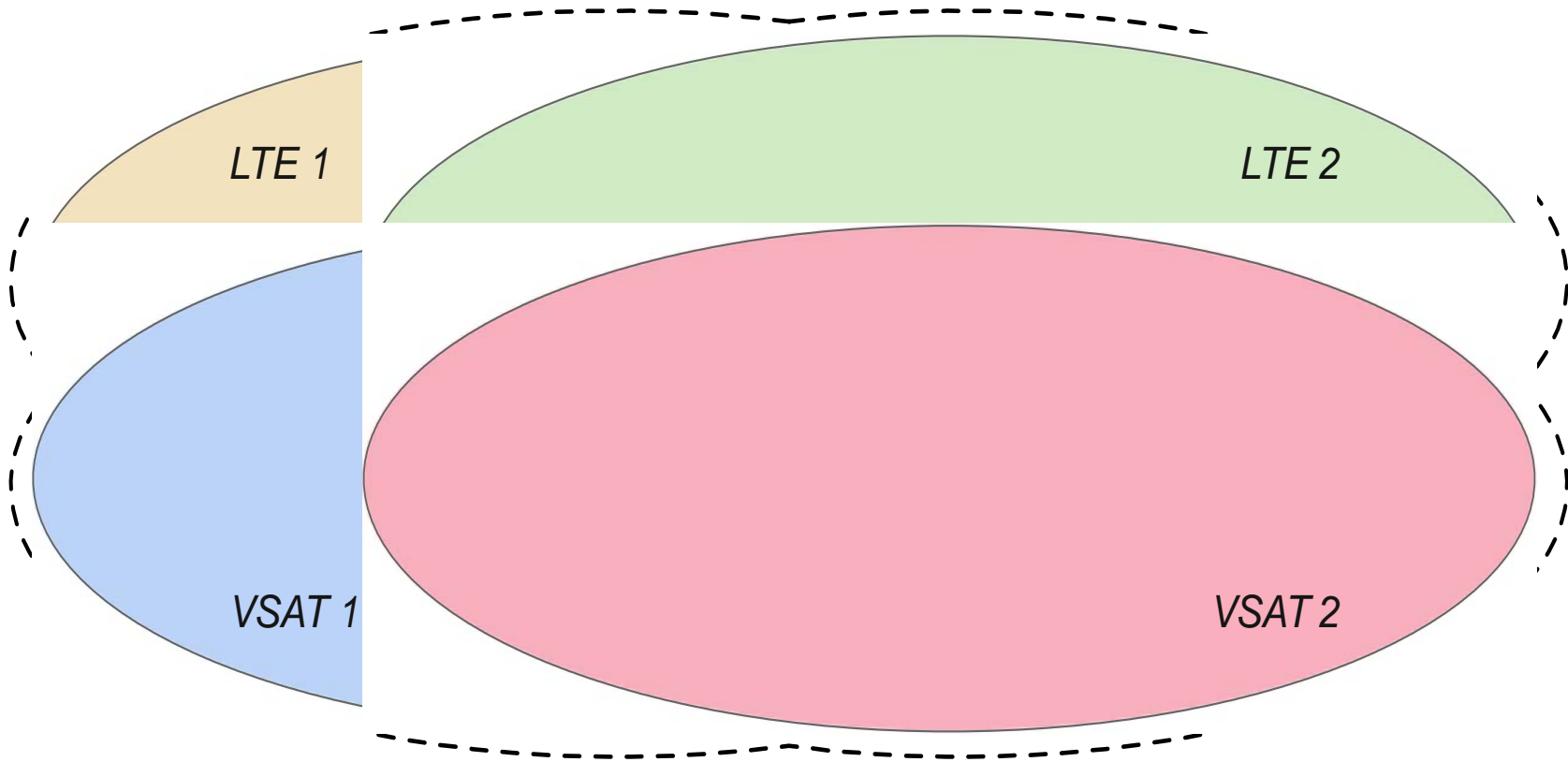
Bonding of multiple heterogeneous connections

- LTE (in-land waters, coast-near traffic and ports)
- VSAT (in-land and sea-going traffic)
- 802.11n uplinks (ports)

Single, fixed endpoint on shore

- Fixed IP addresses irrespective of ship's position
- Secure & manageable connections shore-to-ship

Unified Airbridge connectivity



Technologies employed

3G/LTE modules

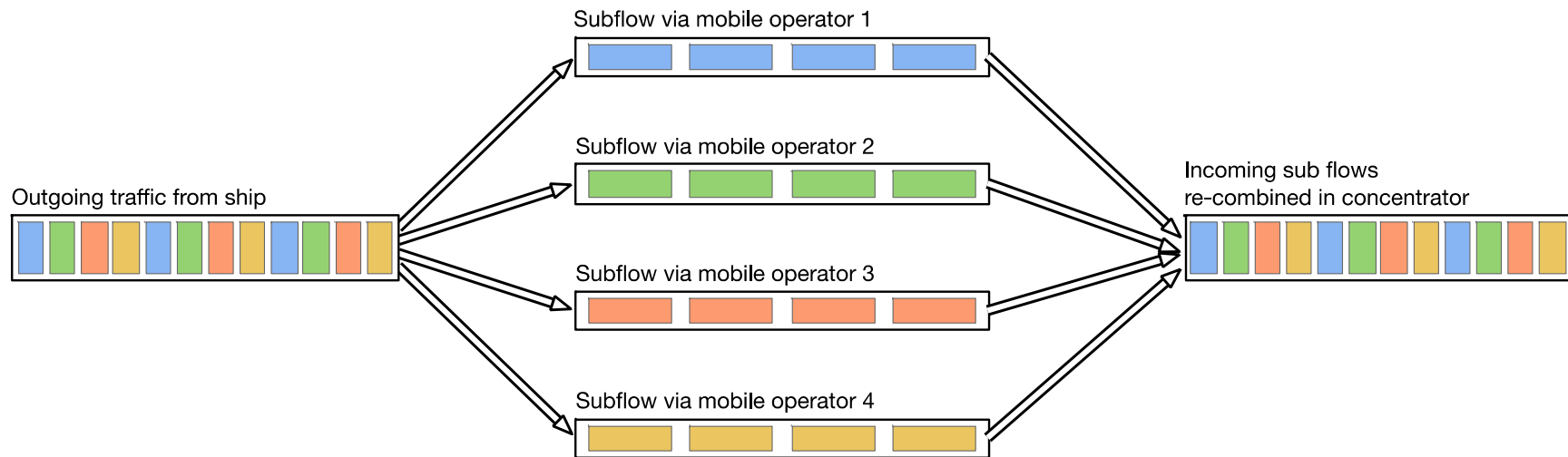
- Prepared for 5G

Multipath TCP for bonded connection to shore

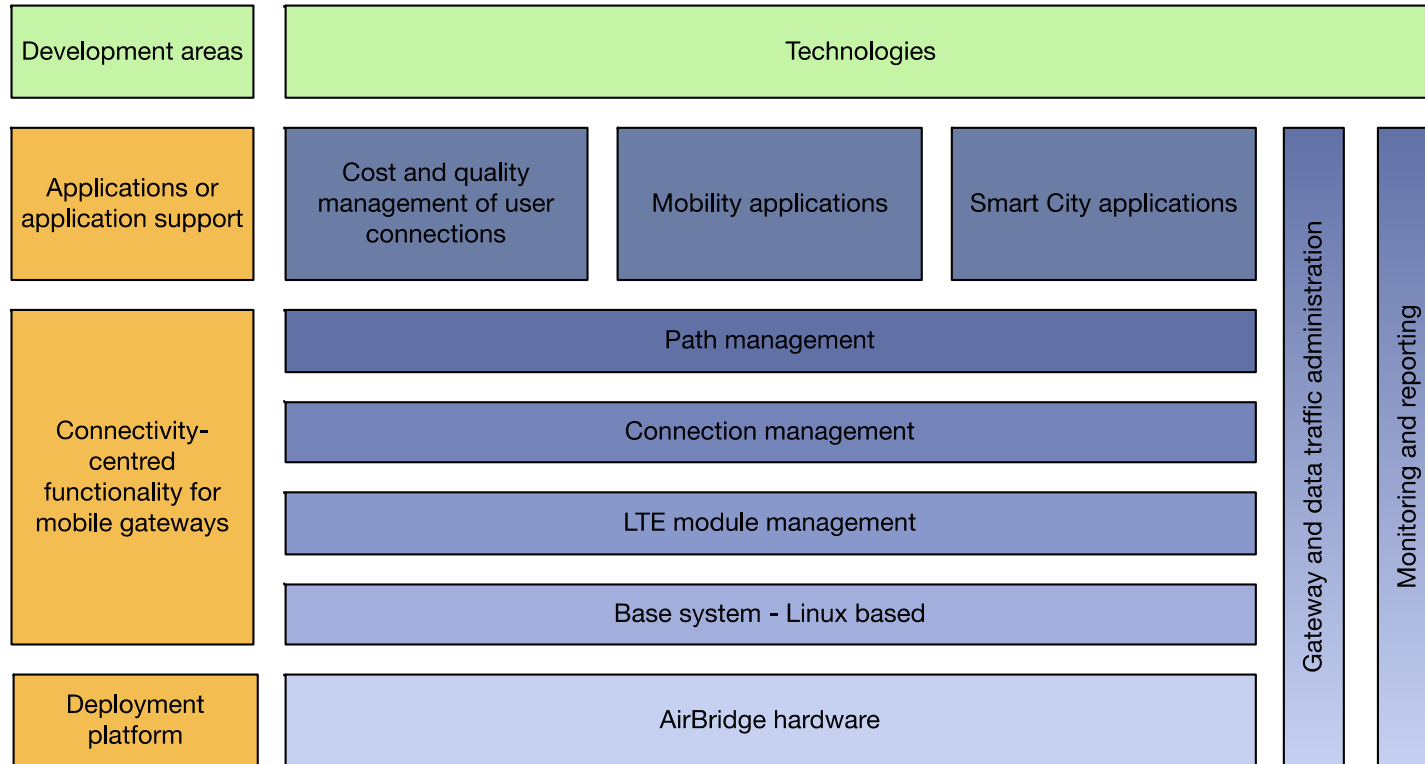
- Defined in RFC 6182

Linux-based gateway and concentrator

MPTCP bonding



Titanium X system architecture



Status

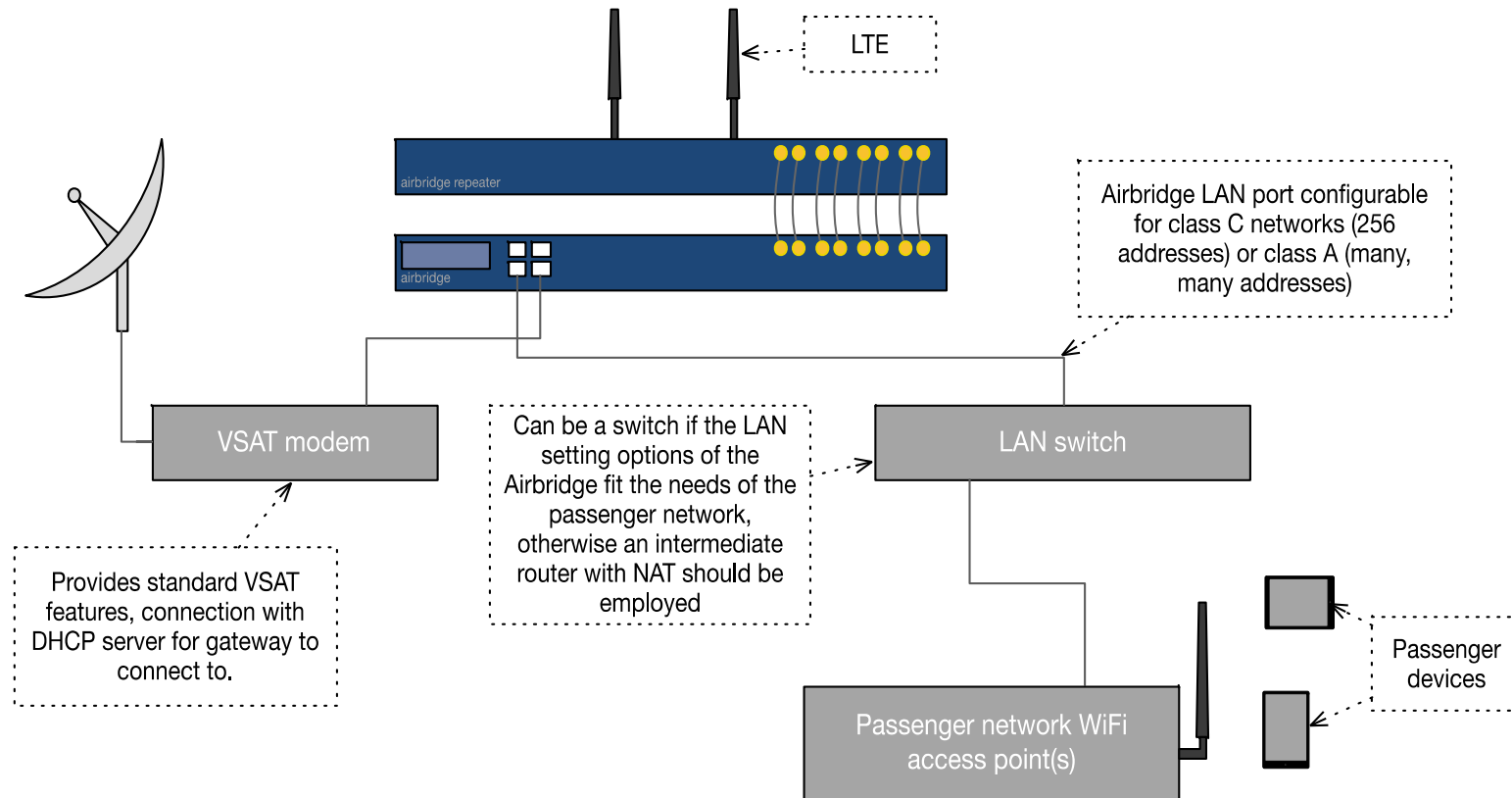
Test version of system (SW+HW) available

- Currently being tested with customers
- Sea-going and river traffic

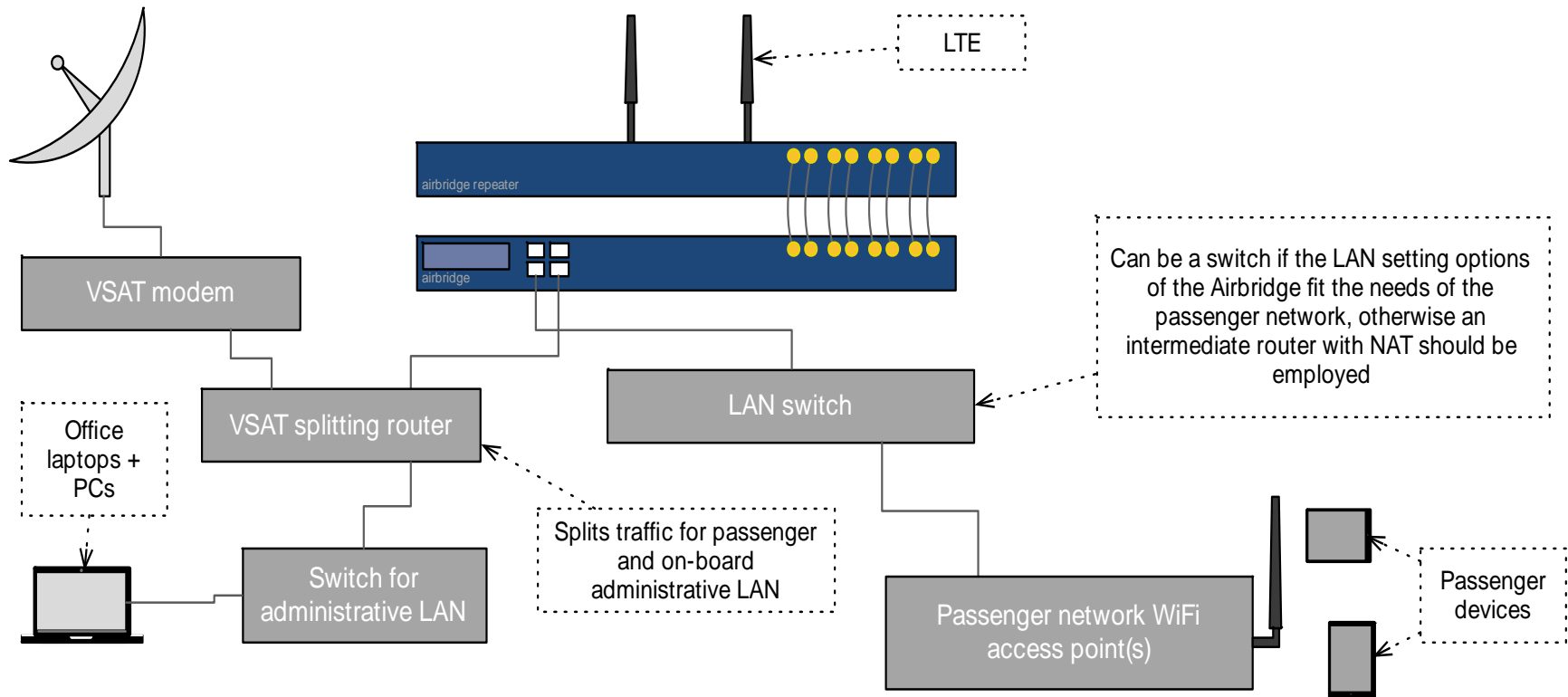
Next version (under development)

- Better meta information about LTE connections
- More active path management
- Cost control for passenger internet (WiFi) use

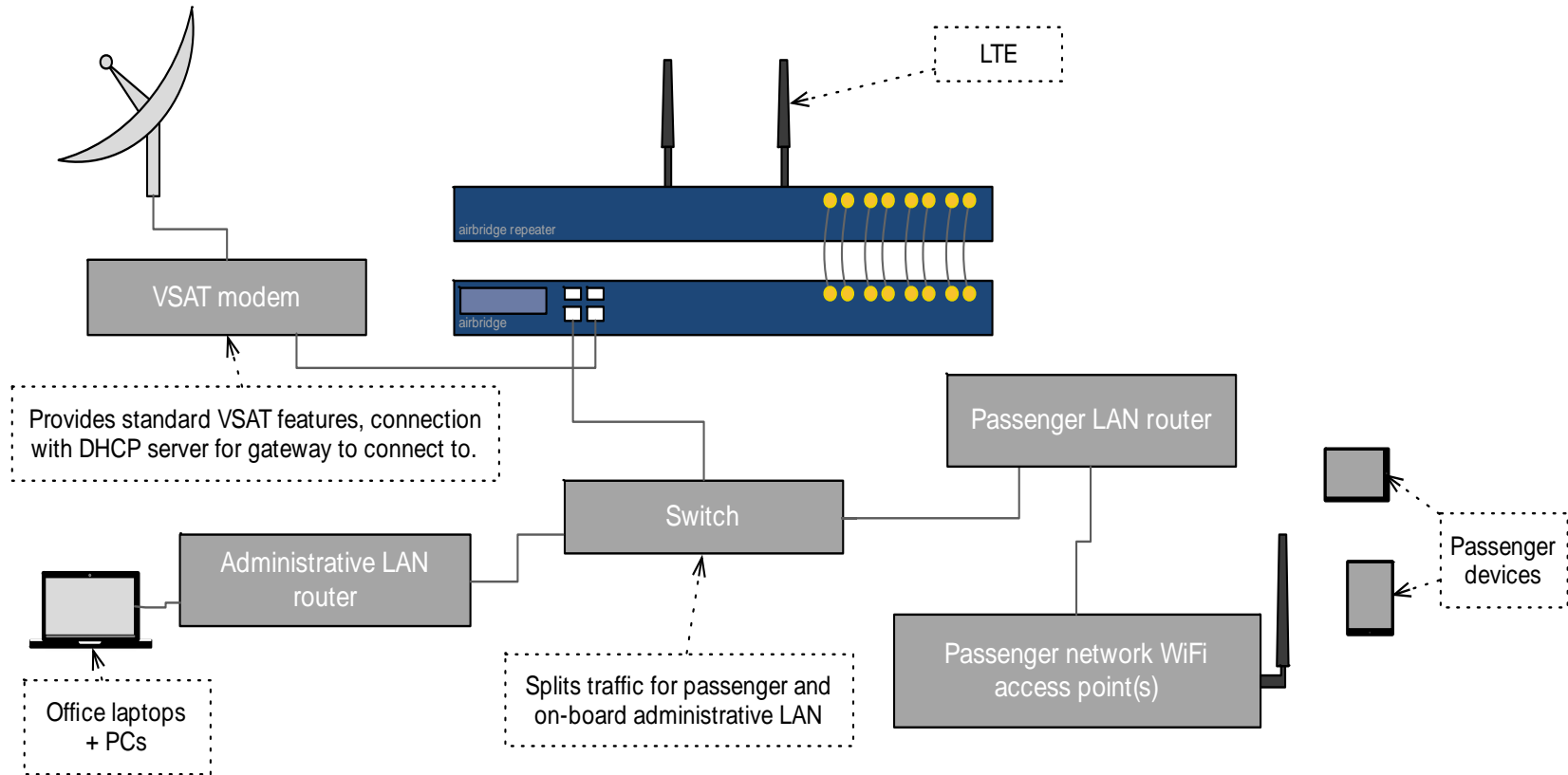
Example configuration: PAX-only



LTE+VSAT for PAX, VSAT for OPS



LTE+VSAT for passengers and ops



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