IALA e-NAV

International Association of Marine Aids to Navigation
and Lighthouse Authorities
Association Internationale de Signalisation Maritime

IALA is a non profit, non governmental international technical association. Established in 1957, it gathers marine aids to navigation authorities, manufacturers and consultants from all parts of the world and offers them the opportunity to compare their experiences and achievements. IALA's aim is to harmonize aids to navigation worldwide and to ensure that the movements of vessels are safe, expeditious, cost effective and harmless to the environment.

The e-navigation Concept

"e-navigation is the harmonised collection, integration, presentation and exchange of maritime information, onboard and ashore, by electronic means to enhance berth to berth navigation …security … and protection of the marine environment."

IALA's role

- All Aids to Navigation (AtoN) can be represented digitally
- Evaluation and manipulation of AtoN is a vital part of e-NAV
- IALA is responsible for AtoNs, incl.VTS
- IALA has a significant role to play in the development of the e-NAV concept

Committee responsibilities

- All Committees & Policy Advisory Panel (PAP) – concept, architecture, realisation
- e-NAV – interfaces, radio-navigation systems, AIS, networks, PLUS shore based e-NAV system architecture, e-NAV service architecture, radar service, "essential system level requirements"
- VTS (Vessel Traffic Services) – requirements for shore-based systems, i.e. "user interaction service", "value-added data processing service", "gateway service", VTS (+ allied services) operations/business processes, "essential system level requirements"
- EEP (Engineering, Environmental and Preservation) – requirements for visual AtoNs, physical infrastructure
- ANM (Aids to Navigation Management) – requirements for e-NAV shore-based navigation, management & operational aspects

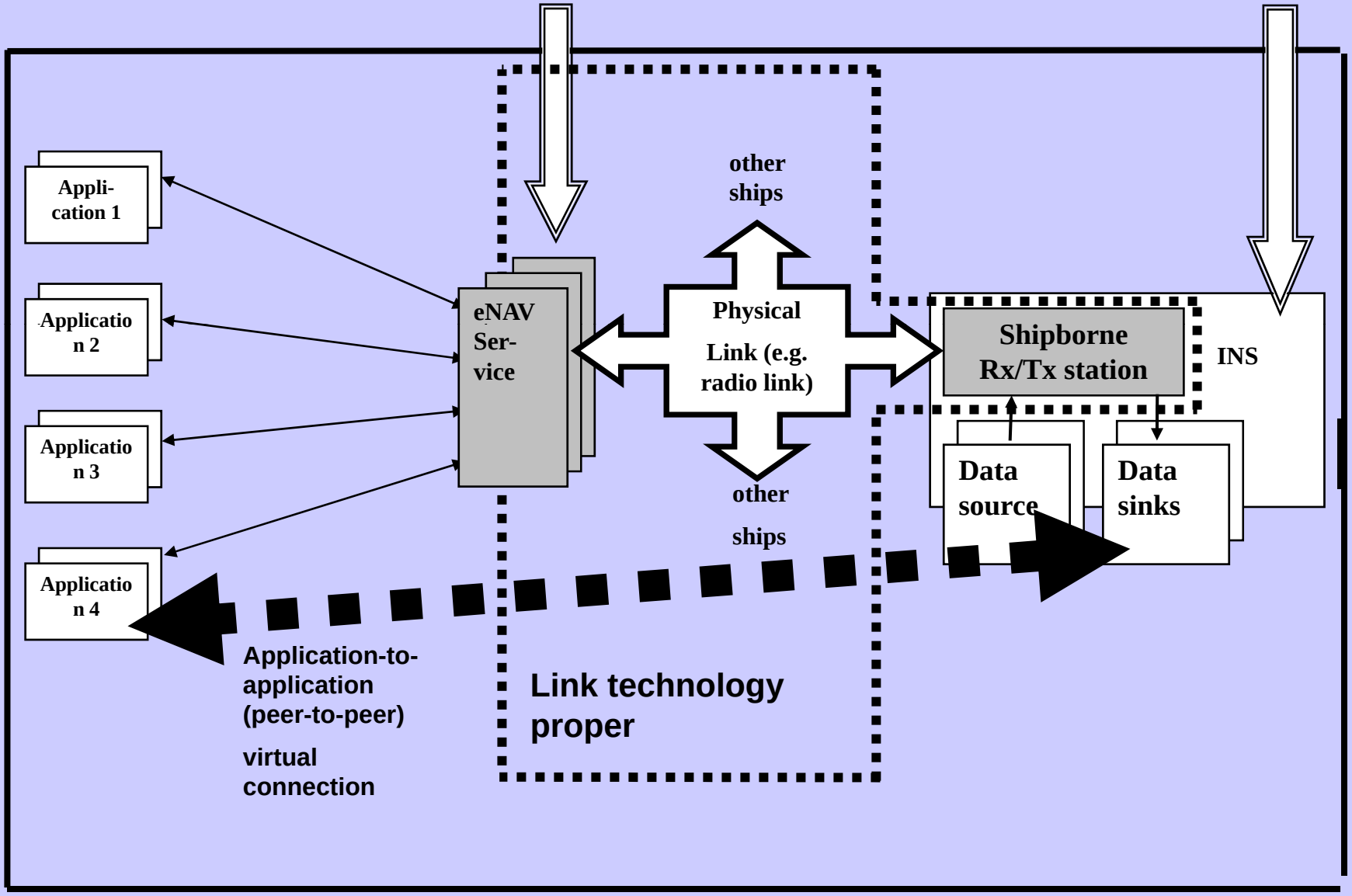
Drivers for e-NAV

- Safety/environment/security
- Improving information processing
- Increasing demand for communication
- Digital information technologies
- Globalisation / international standards / open architecture
- Reduction in staffing
- Cost/benefit

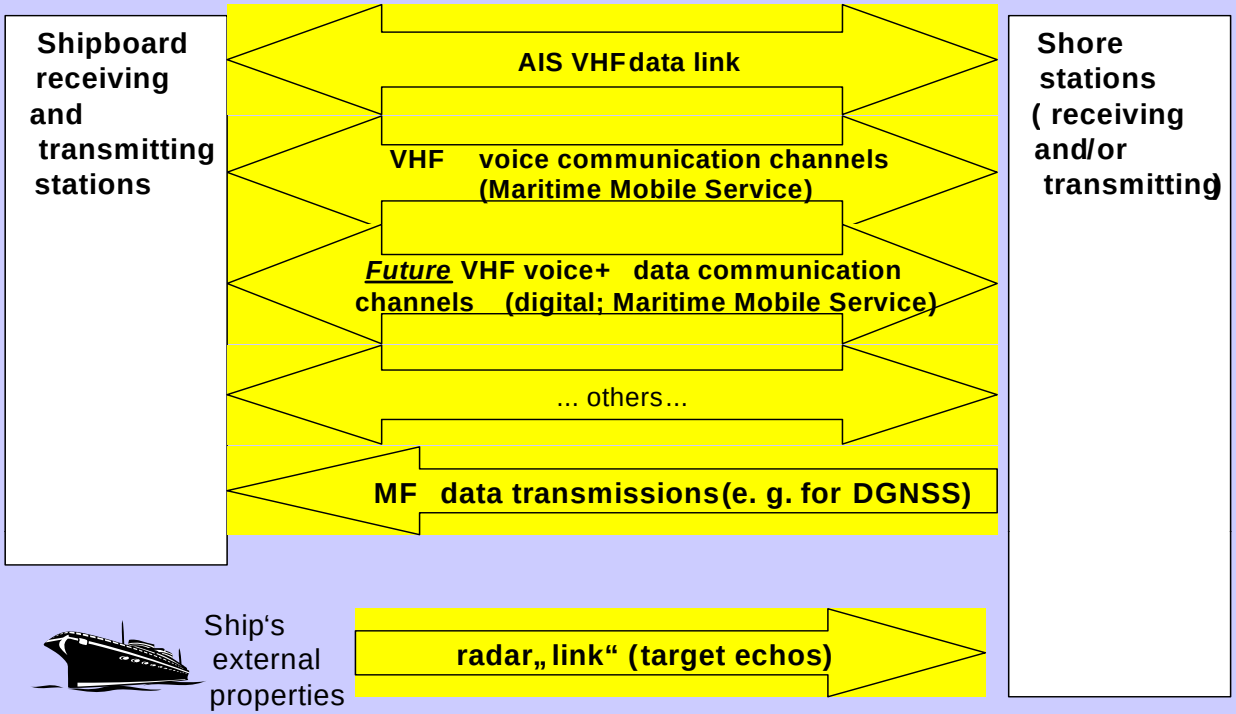
e-NAV architecture

- shipboard integration of information/data processing devices
- application-to-application [information/data] exchange in a peer-to-peer fashion
- shore-based e-NAV system architecture that integrates a variety of shore-based technologies and information/data processing devices

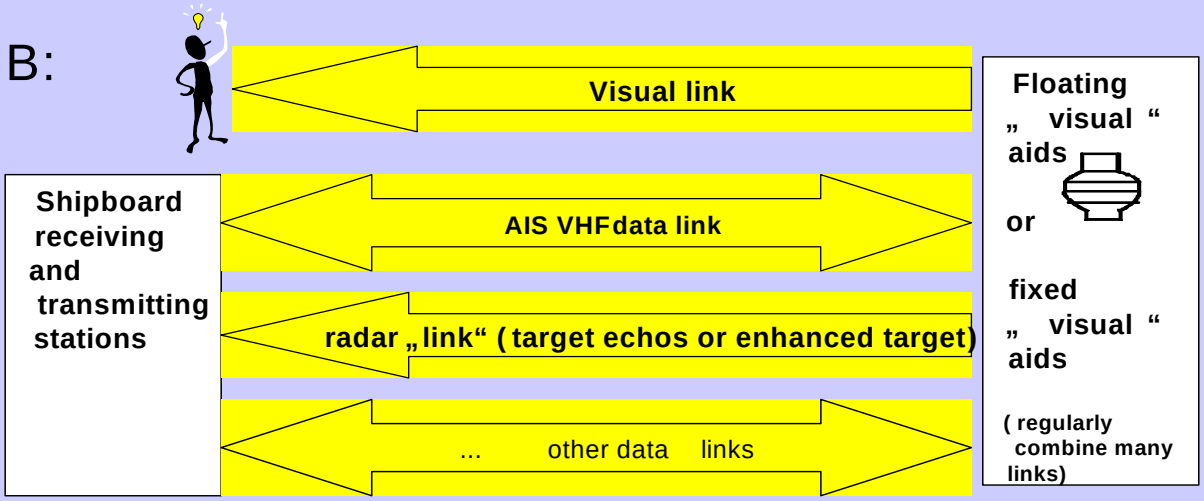
Scope of e-NAV concept



A:


Shipboard receiving and transmitting stations
AIS VHF data link
VHF voice communication channels (Maritime Mobile Service)
Future VHF voice+ data communication channels (digital; Maritime Mobile Service)
... others...
MF data transmissions (e. g. for DGNSS)
Shore stations (receiving and/or transmitting)
Ship's external properties
radar „link" (target echos)

B:


Visual link
Shipboard receiving and transmitting stations
AIS VHF data link
radar „link" (target echos or enhanced target)
... other data links
Floating „ visual " aids
or
fixed „ visual " aids
(regularly combine many links)

Quality Goals for e-NAV

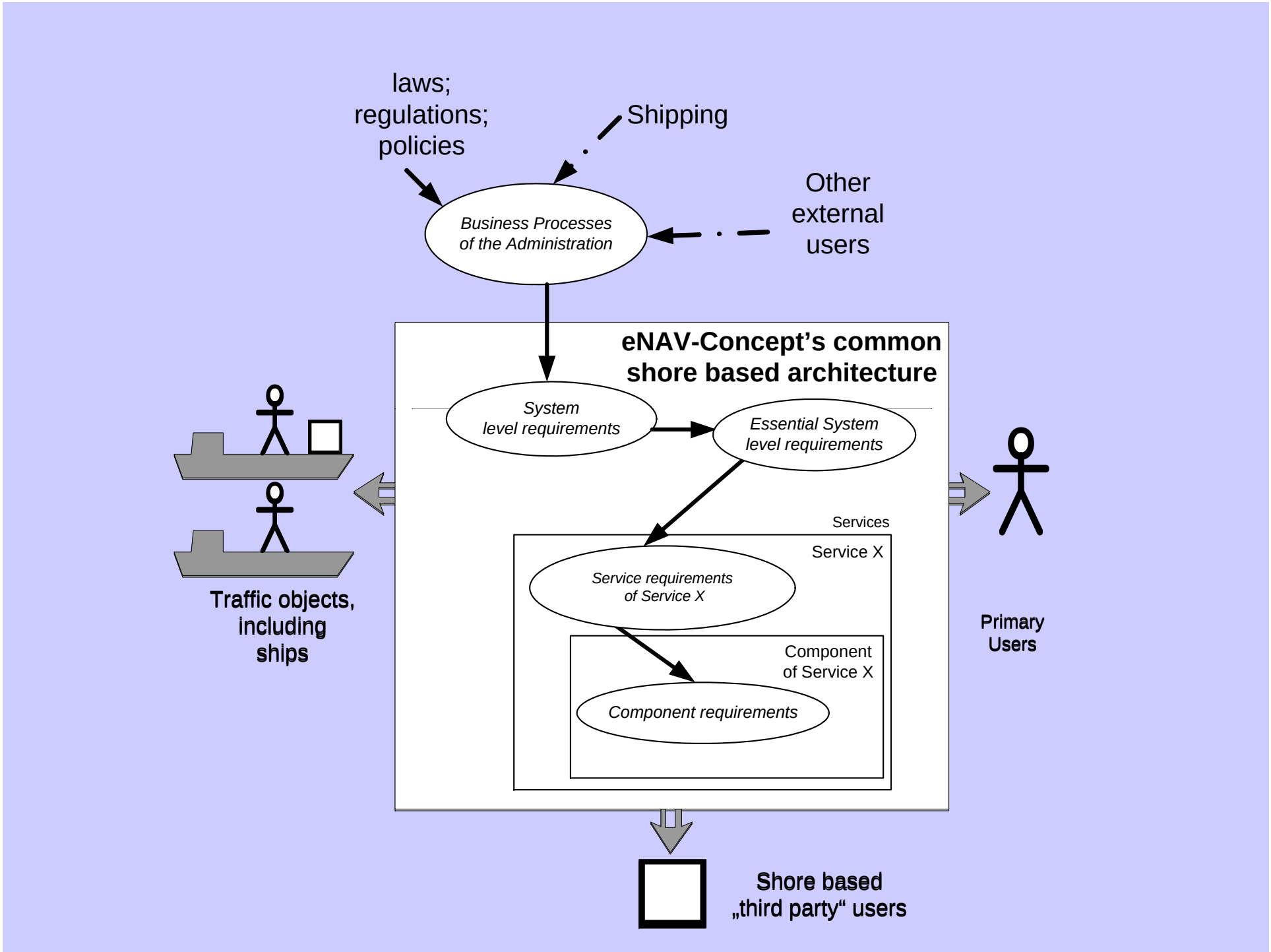
- providing the *required* functionality (accuracy, integrity, reliability, continuity)
- applying objective criteria for each technical service provided
- same level of service for different users with similar requirements
- use of applicable international technical standards
- minimize response time for fulfilment of new user requirements

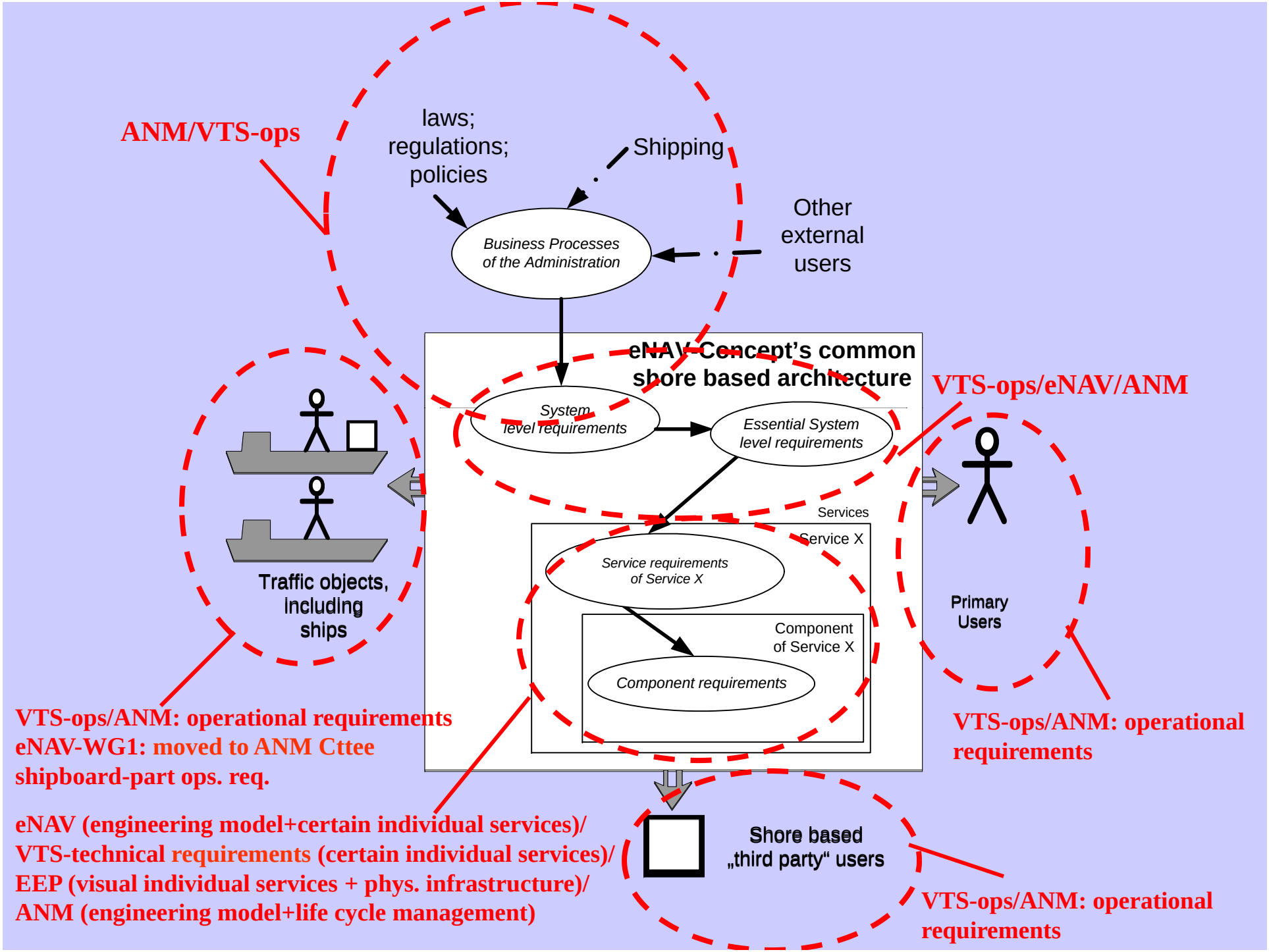
Cost related goals

- Full life-cycle cost evaluation
- Minimize costs for planning and development by standardization
- Minimize costs for implementing new systems due to (rapid) change of technology
- Cut investment costs
- Cut running costs over full life cycle

Dependencies

- Dependency on GNSS for position and time
  - vulnerability of e-NAV applications, dynamic position information required
  - mitigation methods essential
- Dependency on infrastructure
  - supporting devices, application software (computers, peripherals, operation systems, local area network components, etc)
  - protection against harmful interference, tampering, unauthorized access, environmental conditions


laws;
regulations;
policies
Shipping
Other
external
users
Business Processes
of the Administration
eNAV-Concept's common
shore based architecture
System
level requirements
Essential System
level requirements
Services
Service X
Service requirements
of Service X
Component
of Service X
Component requirements
Traffic objects,
including
ships
Primary
Users
Shore based
„third party" users


ANM/VTS-ops
laws;
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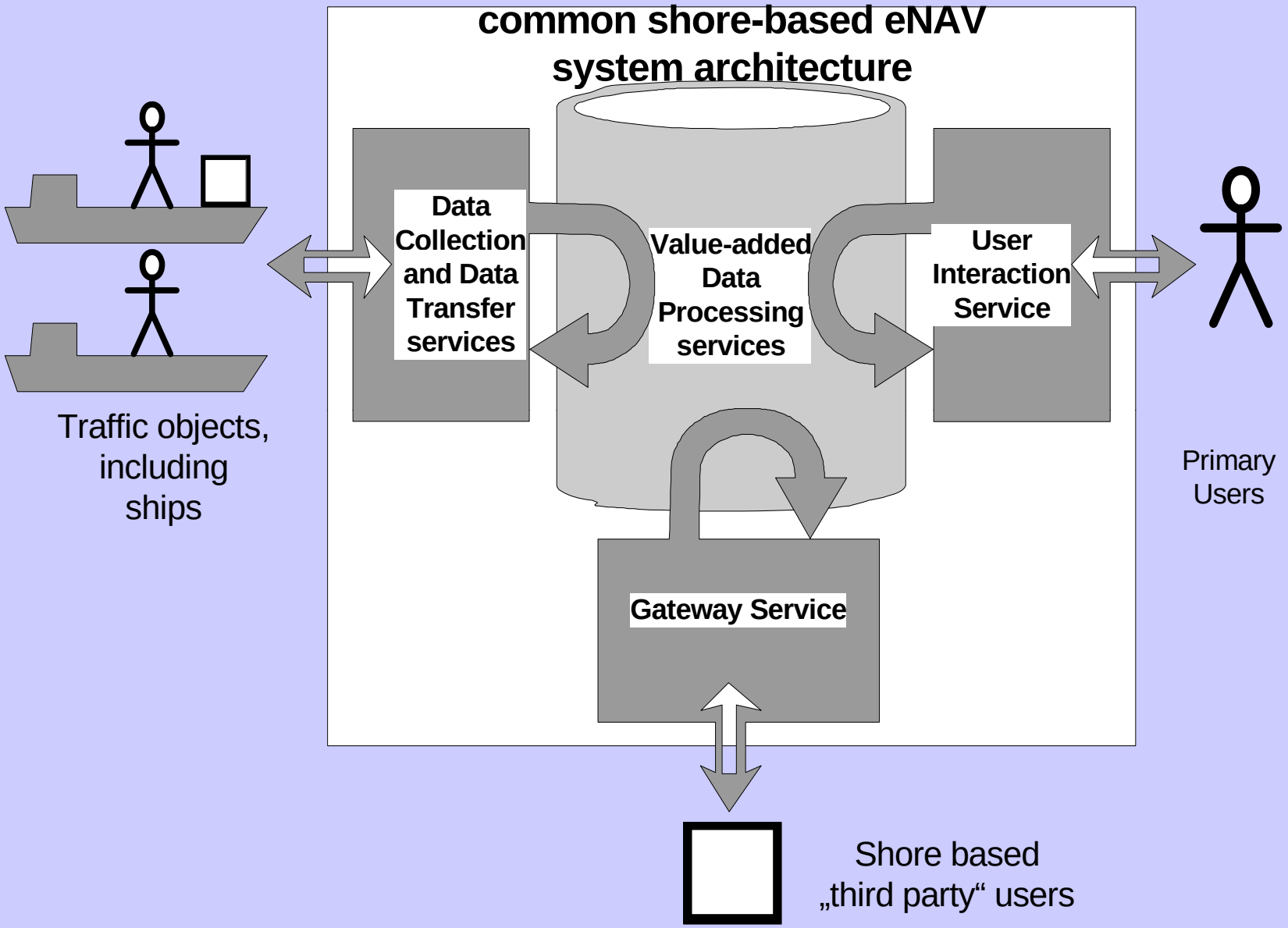
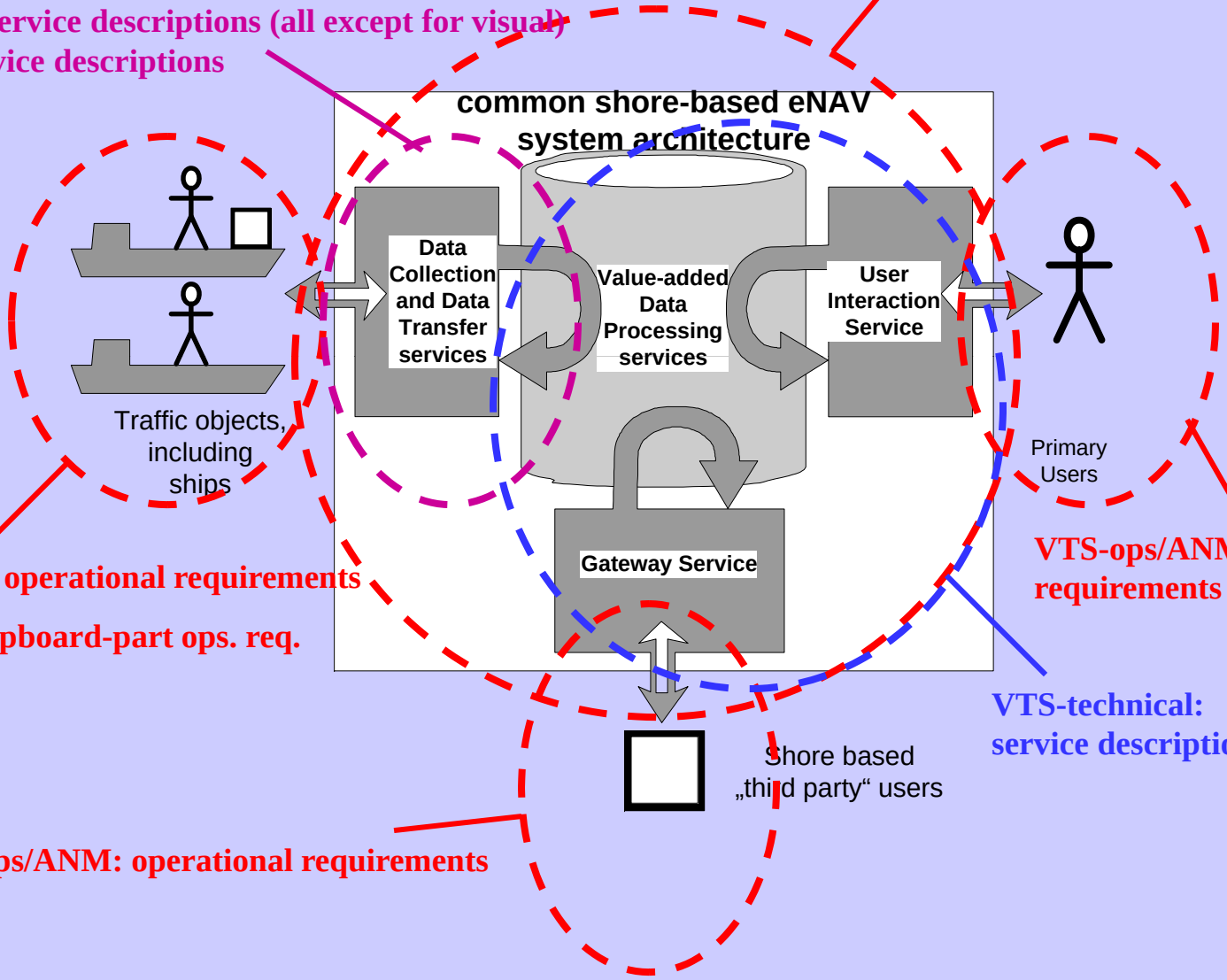
VTS-ops/eNAV/ANM
Primary
Users
VTS-ops/ANM: operational
requirements
VTS-ops/ANM: operational
requirements
eNAV-WG1: moved to ANM Cttee
shipboard-part ops. req.
eNAV (engineering model+certain individual services)/
VTS-technical requirements (certain individual services)/
EEP (visual individual services + phys. infrastructure)/
ANM (engineering model+life cycle management)
Shore based
„third party" users
VTS-ops/ANM: operational
requirements


common shore-based eNAV system architecture
Data Collection and Data Transfer services
Value-added Data Processing services
User Interaction Service
Gateway Service
Traffic objects, including ships
Primary Users
Shore based „third party“ users

ANM/VTS: operational + management aspects
eNAV-WG4(new): shore-based system architecture / eng. models / essential req. analysis (template + engineer-like documentation)

ANM: management aspects
eNAV-WG2/3: service descriptions (all except for visual)
EEP: visual service descriptions



VTS-ops/ANM: operational requirements

eNAV-WG1: shipboard-part ops. req.

VTS-ops/ANM: operational requirements

VTS-technical: service descriptions

VTS-ops/ANM: operational requirements

e-NAV Concept[1]

common shore-based e-NAV system architecture

e-NAV System Requirement Analysis

e-NAV services (engineering model)

AIS Service as an e-NAV service	**Radar Service as an e-NAV service**	**“Visual” AtoN Service as an e-NAV service**	**VTS as e-NAV services (V-128)**	**... other individual e-NAV Services ...**

This framework Recommendation lays out the generic engineering model of an eNAV service based on the definitions and statements given in the other framework Recommendations. It provides the guidelines to fit any relevant technology into the common shore-based eNAV system architecture as an individual eNAV service.

e-NAV Concept
(PAP with eNAV advice)

common shore-based e-NAV system architecture
(e-NAV/VTS/ANM)

e-NAV System Requirement Analysis
(e-NAV /ANM/VTS)

e-NAV services (engineering model)
(e-NAV/ANM/EEP/VTS)

AIS Service as an e-NAV service (e-NAV - from VTS)	**Radar Service as an e-NAV service** (e-NAV - from VTS)	**"Visual" AtoN Service as an e-NAV service** requirement (EEP/ANM)	**User interaction Service / Value-added Data Processing Service/ Gateway Service (VTS/ANM)**	**other individual Data Collection and Data transfer Services + physical infrastructure** (eNAV – from EEP/ANM)

Underlined = committee has the lead within IALA

Summary

- IALA's role
- Committee responsibilities
- Drivers
- Common Architecture
- Goals: Quality & Cost-related
- Dependencies & collaborative efforts
- e-NAV concept to reality

Credits: Bill Cairns, Dr. Nick Ward, Jan- Hendrick Oltmann