NSC3 System Description

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Security Technologies

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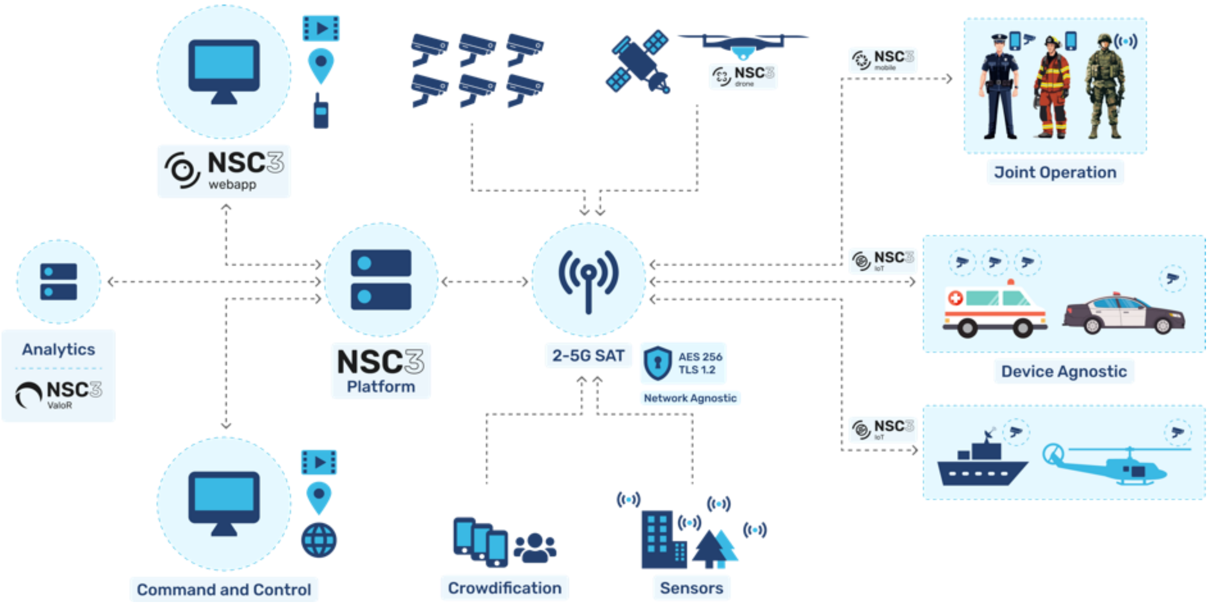
1 NSC3 System overview



NSC3 System picture 1: NSC3 system - dataflow

The NSC3 platform is a real-time media broadcasting and management solution for situational awareness. The system is mainly developed for authority use. The system consists of a web browser based NSC WebApp™ application and NSC Mobile™ / client applications that work on mobile devices, drones and IoT devices. All data (video, images, audio, messages) broadcasted between NSC3 applications and server is fully encrypted and secured (AES-256, TLS 1.3). Camera devices that have built-in support for commonly used IP camera protocols can also be connected as camera sources to the NSC3 system directly or via nscIoTClient.

NSC3 offers all basic features for group communication, like video streaming, chat messaging, push-to-talk audio channels, and map tracking options. Valor AI as an add-on enhances situational awareness.

The system is task-based. Task related events and data are stored in the centralized NSC3 system. NSC3 software offers comprehensive toolsets for task management and follow-up. NSC3 applications do not store media data locally.

2 NSC3 application overview

2.1 NSC WebApp™

This section provides a rough level overview of the NSC3 Web application by covering basic elements of NSC3 web apps: Live, Playback, Management Livelink, Settings. NSC3 Controller level user interface as an example.

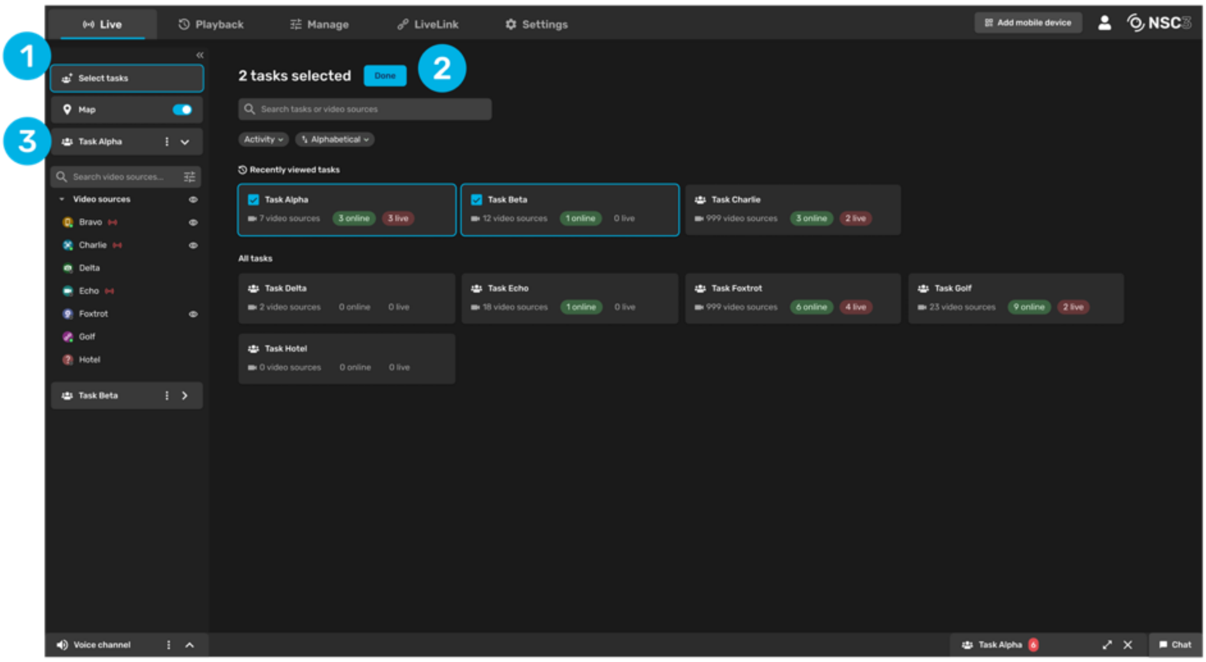
Detailed user guides are included as part of NSC3 applications.

2.1.1 Live view

Live view is used to view live data in tasks; video streams, chat, push-to-talk, and map options. The Live view is accessible to all user levels.

Task selection example:

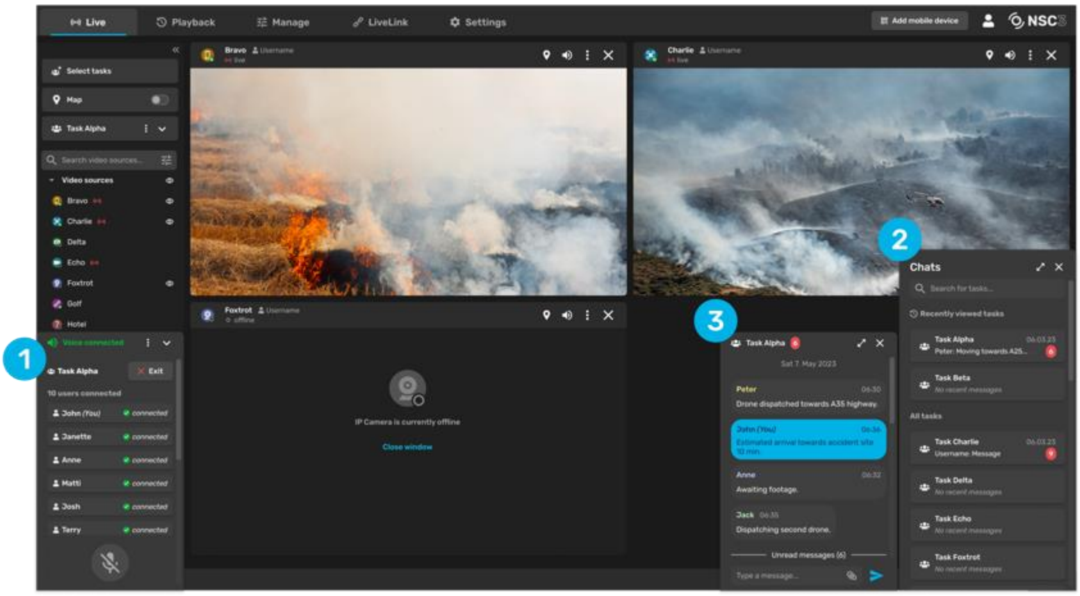
1. Task selection
2. Status view of tasks
3. List of devices with status



NSC3 WebApp picture 1: Live view - Task selection

Task chat communication example

1. List of connected devices
2. Messaging activities per task
3. Read and write in the chat messages.



Sat 7. May 2023

Peter 06:30
Drone dispatched towards A35 highway.

John (You) 06:34
Estimated arrival towards accident site 10 min.

Anne 06:32
Awaiting footage.

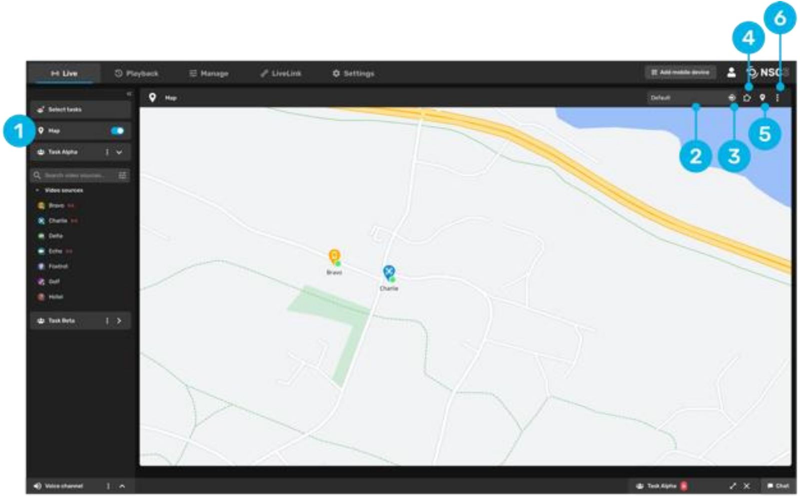
Jack 06:35
Dispatching second drone.

Unread messages (6)

NSC3 WebApp picture 2: Live view - Chat communication

Map view example

- Map layers are selectable per users (1-2)
- Tracking devices on Map (3)
- Adding point of interest markers and areas for a selected task (4-6)

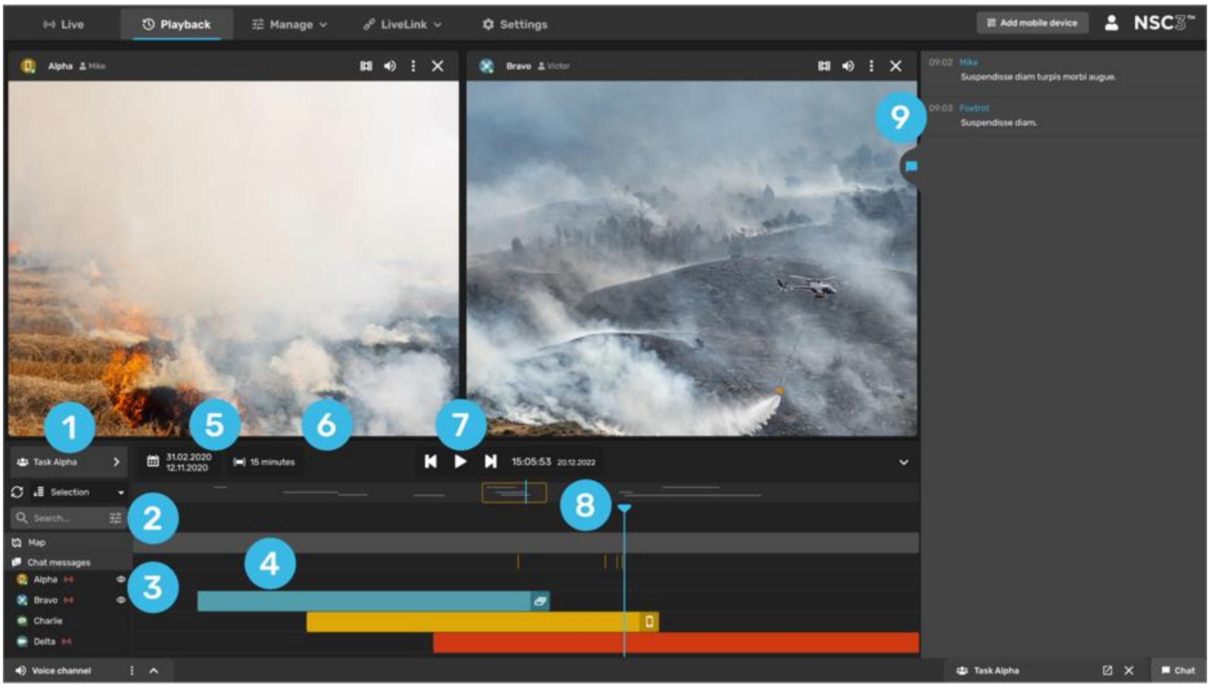


NSC3 WebApp picture 3: Live view - Map

2.1.2 Playback view

General overview

1. Task selection
2. Optionally sort, filter video sources or search
3. Video source selection
4. Video source broadcasts that are available for review
5. Timeline selection (Day level)
6. Timeframe selection (Hour level)
7. Play the recorded item
8. Timeline selector to get the point of time selector
9. Chat playback



09:02 Mike
Suspendisse diam turpis morbi augue.

09:03 Foxtrot
Suspendisse diam.

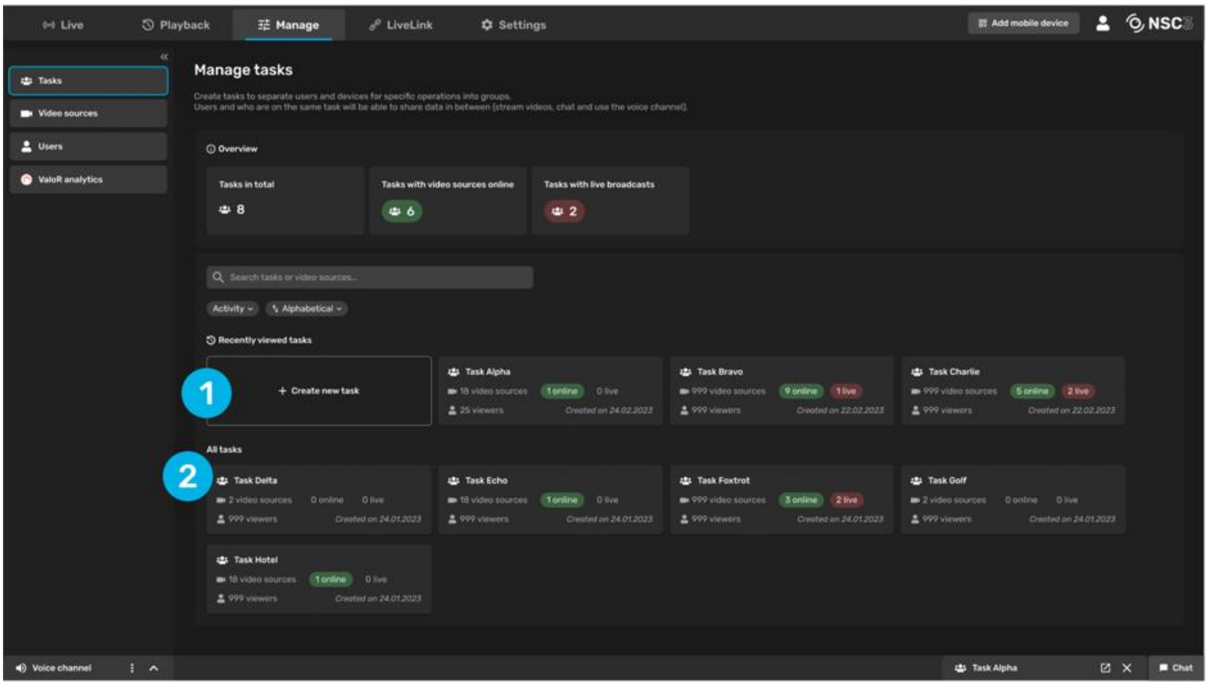
NSC3 WebApp picture 4: Playback view

2.1.3 Management view

The purpose of creating tasks in an organization is to separate users and video sources for specific operations into groups. Users who are on the same task will be able to share data in between (stream videos, chat and use the voice channel). For example, one task can represent a specific area of a city, and therefore only users from there will be assigned to this task.

Tasks can be created on the Tasks page of the Manage tab.

1. New task creation.
2. The task created will show up in the list of tasks. From this list, you can also access task management and see more info about it.



Manage tasks

Create tasks to separate users and devices for specific operations into groups.
Users and who are on the same task will be able to share data in between (stream videos, chat and use the voice channel).

Overview

Tasks in total: 8
Tasks with video sources online: 6
Tasks with live broadcasts: 2

Search tasks or video sources...

Activity · Alphabetical

Recently viewed tasks

+ Create new task

Task Alpha — 18 video sources, 1 online, 0 live — 25 viewers — Created on 24.02.2023
Task Bravo — 999 video sources, 9 online, 1 live — 999 viewers — Created on 22.02.2023
Task Charlie — 999 video sources, 5 online, 2 live — 999 viewers — Created on 22.02.2023

All tasks

Task Delta — 2 video sources, 0 online, 0 live — 999 viewers — Created on 24.01.2023
Task Echo — 18 video sources, 1 online, 0 live — 999 viewers — Created on 24.01.2023
Task Foxtrot — 999 video sources, 3 online, 2 live — 999 viewers — Created on 24.01.2023
Task Golf — 2 video sources, 0 online, 0 live — 999 viewers — Created on 24.01.2023
Task Hotel — 18 video sources, 1 online, 0 live — 999 viewers — Created on 24.01.2023

Task Alpha

NSC3 WebApp picture 5: Management view

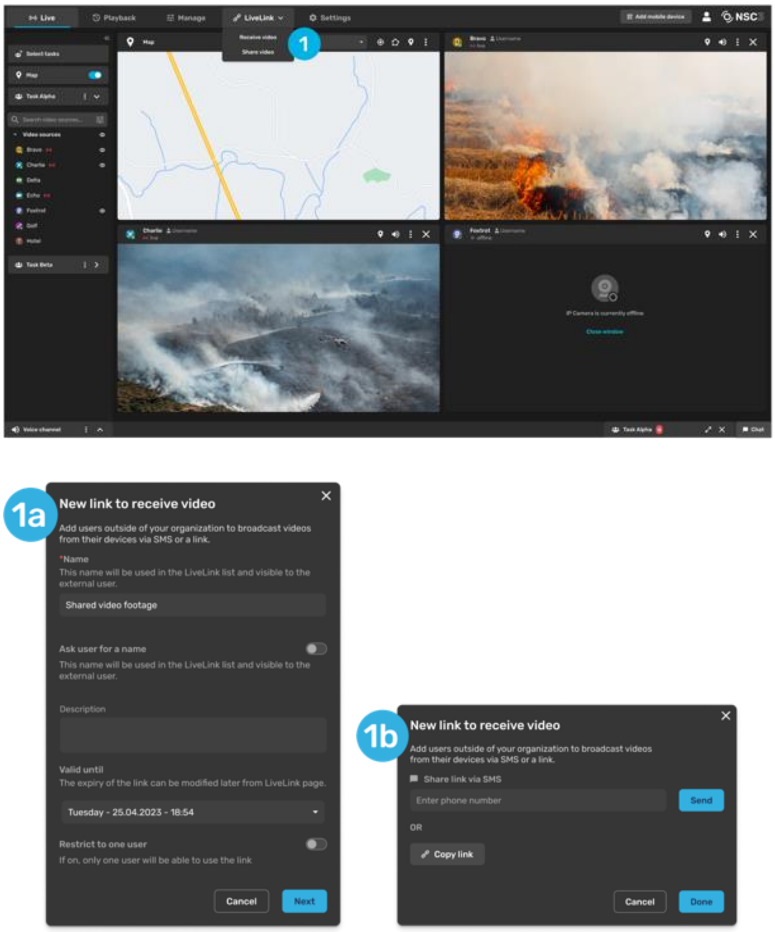
2.1.4 Livelink view

With the NSC3 LiveLink™ feature, invite external users to broadcast videos to your organization or share videos with an external user. Share a link with the user, and they can either broadcast or observe videos without downloading any apps.

Livelink - receive video

An external user can broadcast video to your organization using their browsers via SMS (feature or a link, which can be delivered by email, WhatsApp, or other means to the external user. When the user clicks on the link (or pastes the link URL to the browser), they will get a broadcasting interface. The videos will be visible straight away once the external user starts broadcasting.

1. Create a new link, LiveLink > Receive video



New link to receive video

Add users outside of your organization to broadcast videos from their devices via SMS or a link.

*Name
This name will be used in the LiveLink list and visible to the external user.

Shared video footage

Ask user for a name
This name will be used in the LiveLink list and visible to the external user.

Description

Valid until
The expiry of the link can be modified later from LiveLink page.

Tuesday - 25.04.2023 - 18:54

Restrict to one user
If on, only one user will be able to use the link

Cancel Next

New link to receive video

Add users outside of your organization to broadcast videos from their devices via SMS or a link.

Share link via SMS

Enter phone number Send

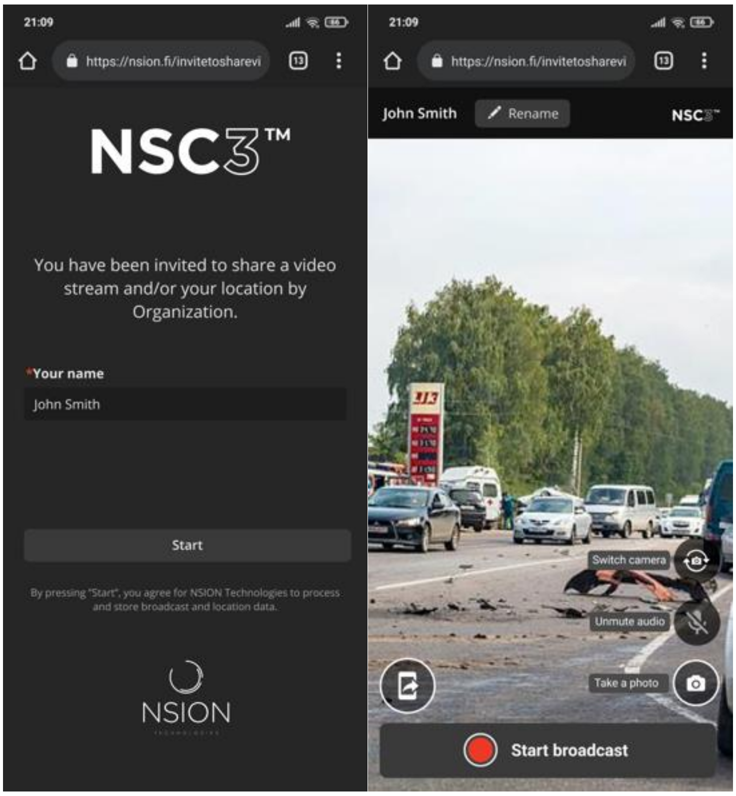
OR

Copy link

Cancel Done

NSC3 WebApp picture 6: Livelink view – create link

Once the external user opens the link, they can fill out their name (if the option was enabled) and start broadcasting by clicking the “start broadcast” button



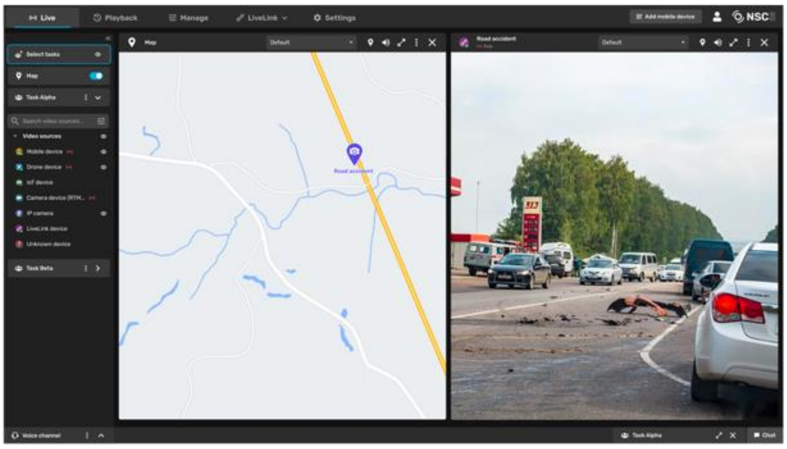
You have been invited to share a video stream and/or your location by Organization.

*Your name: John Smith

By pressing "Start", you agree for NSION Technologies to process and store broadcast and location data.

NSC3 WebApp picture 7: Livelink view – broadcast

The broadcast is visible on the Live page, inside the newly created task.

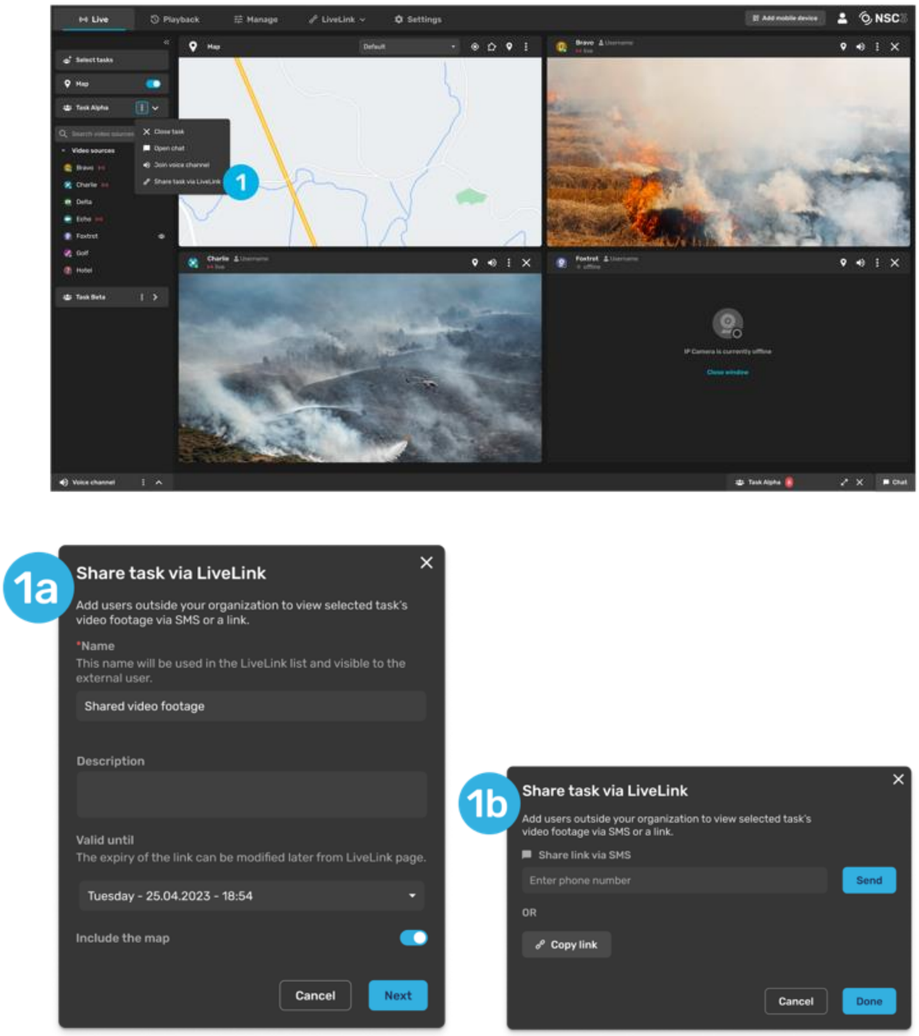


NSC3 WebApp picture 8: Livelink view – receiving broadcast

Livelink - share video

An external user can view videos from a task of your organization via a link, which will open their browser with shared videos visible.

1. Share task via LiveLink from the task's options menu in Live view.



Share task via LiveLink

Add users outside your organization to view selected task's video footage via SMS or a link.

*Name
This name will be used in the LiveLink list and visible to the external user.

Shared video footage

Description

Valid until
The expiry of the link can be modified later from LiveLink page.

Tuesday - 25.04.2023 - 18:54

Include the map

Cancel Next

Share task via LiveLink

Add users outside your organization to view selected task's video footage via SMS or a link.

Share link via SMS

Enter phone number Send

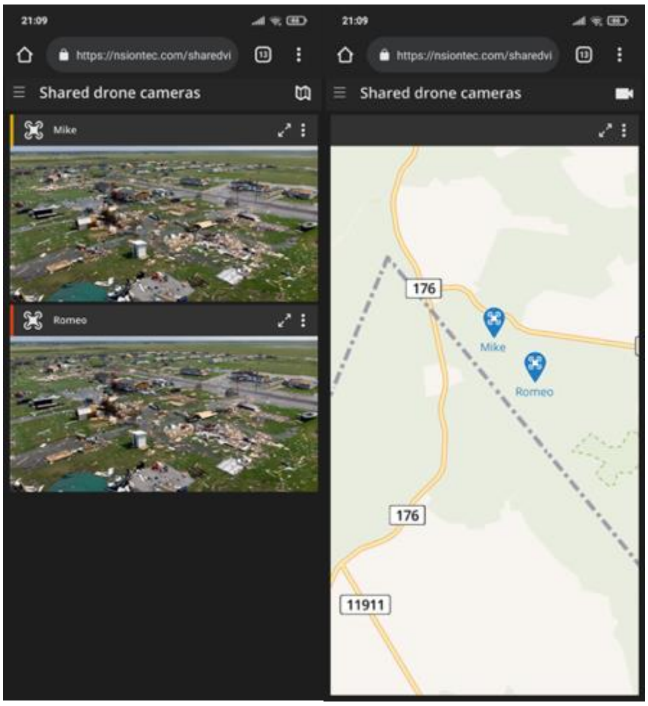
OR

Copy link

Cancel Done

NSC3 WebApp picture 10: Livelink view – share link creation

Once the external user opens the link, the video source broadcasts, and the map (if enabled previously) will be visible in their browser.



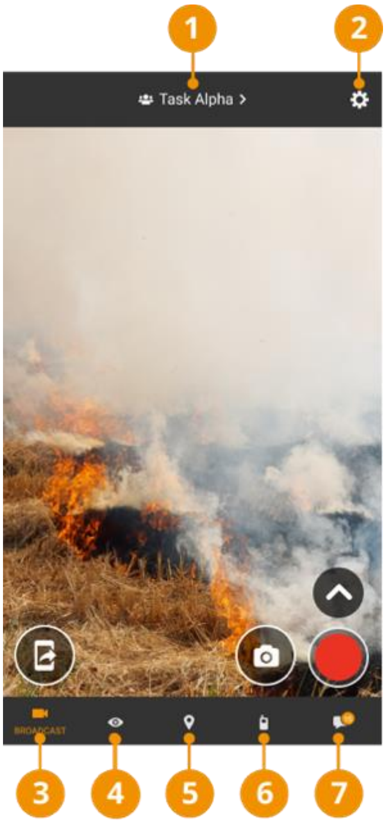
NSC3 WebApp picture 10: Livelink view – receiving broadcast from shared task link

2.2 NSC Mobile™

This section provides a rough level overview of the NSC3 Mobile application by covering basic elements of NSC3 Mobile apps: Live, Playback, Management Livelink, Settings

Detailed user guides are included as part of NSC3 applications.

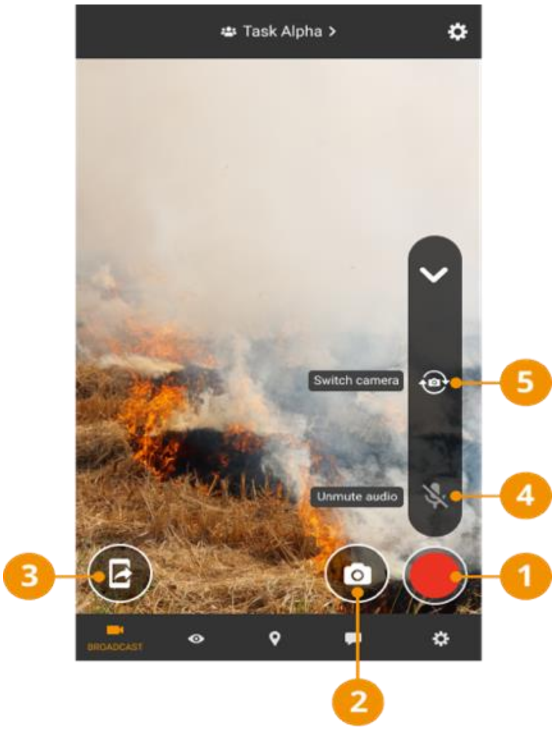
2.2.1 NSC3 Mobile, features overview



1. Task selection and name of the active task
2. Settings
3. Broadcast: broadcast video, audio, and/or talk with push-to-talk button
4. Observe: see video streams from other devices on the task
5. Map: see devices on the task on the map
6. Push-to-talk: communicate with task members through voice channel
7. Messaging

NSC3 Mobile picture 1: Features overview

2.2.2 NSC3 Mobile, Broadcast view

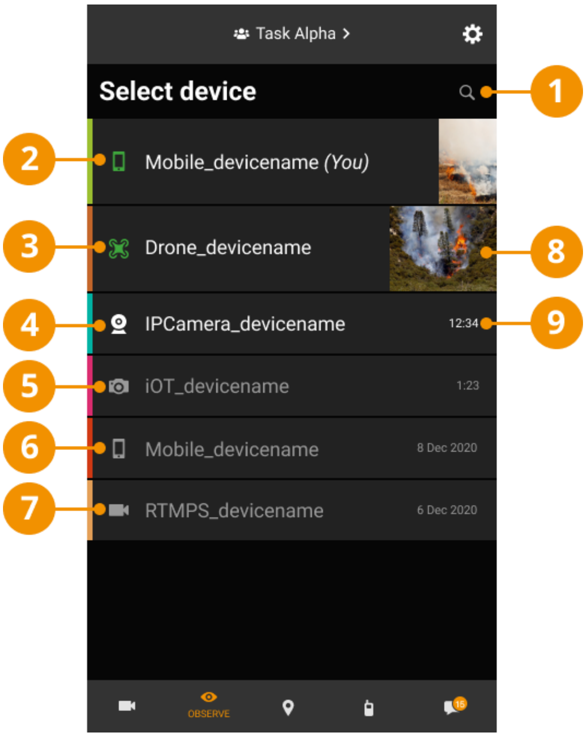


1. Start/stop video broadcast
2. Capture and share still image
3. Start/stop screen sharing (this shares your mobile screen with your task members as a video footage)
4. Mute/unmute audio
5. Switch camera (front/rear)

NSC3 Mobile picture 2: Broadcast view

2.2.3 NSC3 Mobile, Observe view

All the devices that are in the current task, are listed here. The live broadcasts will be visible in this list view.



Task Alpha >

Select device

Mobile_devicename *(You)*

Drone_devicename

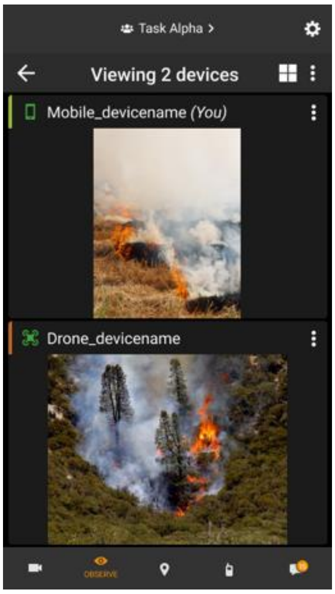
IPCamera_devicename 12:34

iOT_devicename 1:23

Mobile_devicename 8 Dec 2020

RTMPS_devicename 6 Dec 2020

1. Search for devices
2. Your mobile device
3. Drone device (broadcasting)
4. IP Camera device
5. IoT device
6. Mobile device (offline)
7. RTMPS device (offline)
8. Broadcast preview image
9. Latest broadcast time



Task Alpha >

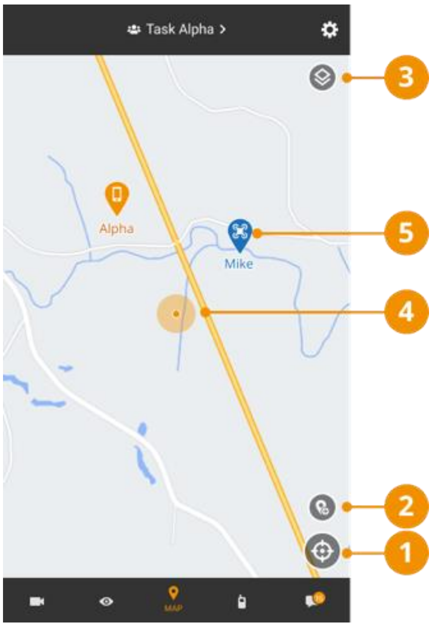
Viewing 2 devices

Mobile_devicename *(You)*

Drone_devicename

NSC3 Mobile picture 3: Observe view

2.2.4 NSC3 Mobile, Map view

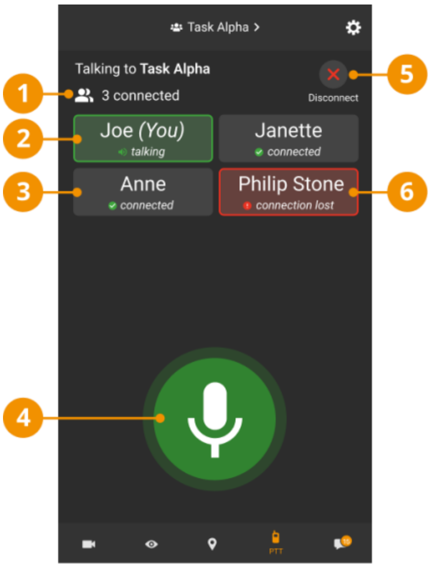


1. Find your current location on the map
2. Add a map marker (visible also to the task members)
3. Switch between map types (available only if your organization has added Esri base maps)
4. Your current location
5. Other devices' location (in the selected task)

NSC3 Mobile picture 4: Map view

2.2.5 NSC3 Mobile, Push-to-Talk view

In PTT (Push-to-talk) view you can communicate through a voice channel with your task members.

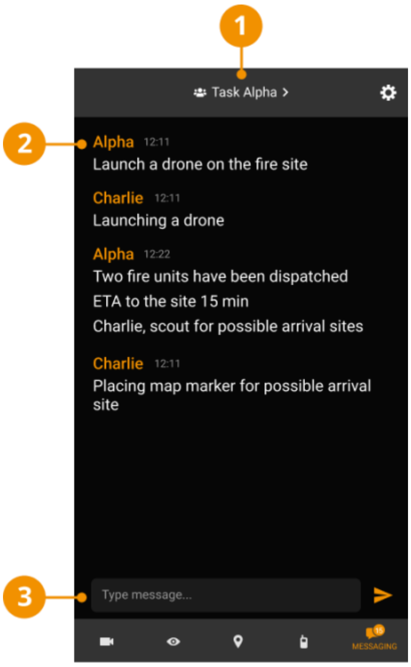


1. Number of task members connected to PTT
2. Your activity in PTT and status
3. Task members connected to the voice channel
4. Press to broadcast audio to the voice channel. The button is green when broadcasting audio
5. Disconnect from PTT
6. "Connection lost" status

NSC3 Mobile picture 5: Push-to-Talk view

2.2.6 NSC3 Mobile, Chat messaging

Messages in the selected task are displayed in Messaging view. You can see all the chat messages and activities from the tasks that you are participating in. However, you only receive push notifications from the currently active task.



Alpha 12:11
Launch a drone on the fire site

Charlie 12:11
Launching a drone

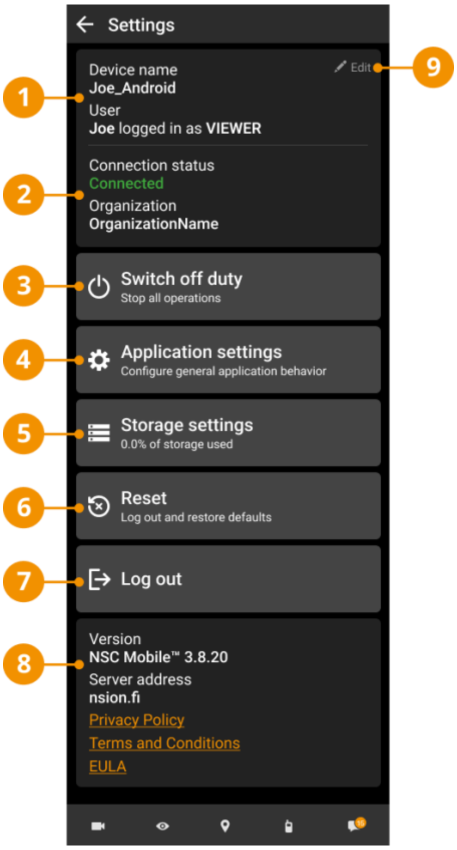
Alpha 12:22
Two fire units have been dispatched
ETA to the site 15 min
Charlie, scout for possible arrival sites

Charlie 12:11
Placing map marker for possible arrival site

1. Currently active task. Tap to switch to another task.
2. Messages in the task
3. Send a message to the task members

NSC3 Mobile picture 6: Chat view

2.2.7 NSC3 Mobile, Settings



Settings

Device name
Joe_Android
Edit
User
Joe logged in as VIEWER

Connection status
Connected
Organization
OrganizationName

Switch off duty
Stop all operations

Application settings
Configure general application behavior

Storage settings
0.0% of storage used

Reset
Log out and restore defaults

Log out

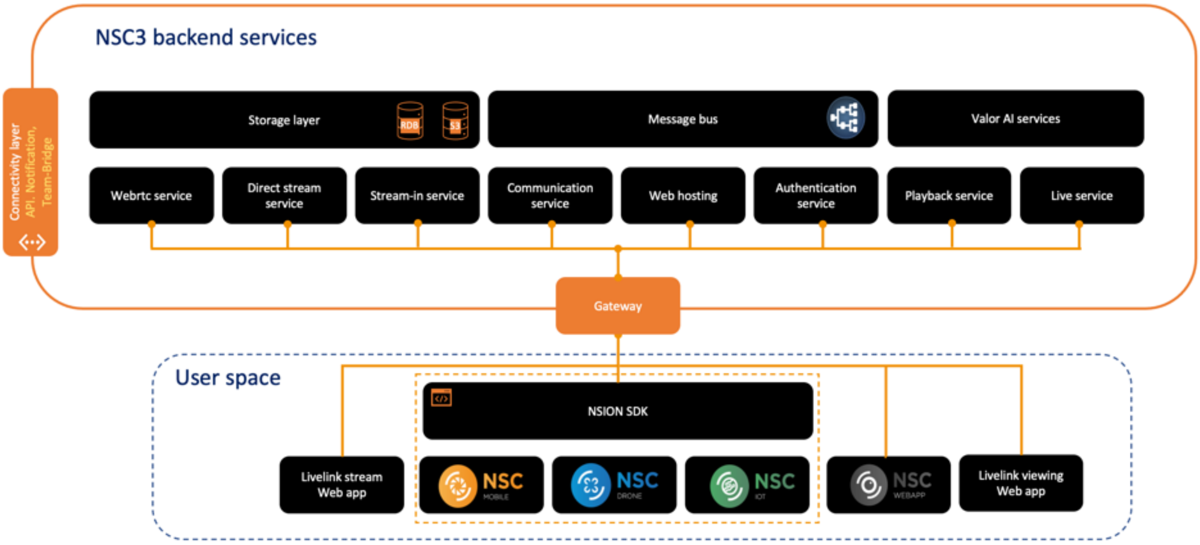
Version
NSC Mobile™ 3.8.20
Server address
nsion.fi
Privacy Policy
Terms and Conditions
EULA

1. Your device and user details
2. Connection information and organization name
3. Toggle between On/Off duty
4. Navigate to application settings
5. See storage usage and clear unsent data
6. Reset the app to its defaults
7. Log out/Log in
8. Information about the app and legal information links

NSC3 Mobile picture 7: Settings

3 NSC3 Core™ architecture

The NSC3 backend software consists of several microservices and platform type of services like a database, message bus and object storage. All services are run in containers. Below architectural view is describing how the services are connected to each other and how the data traffic from client applications are connected to the background software.



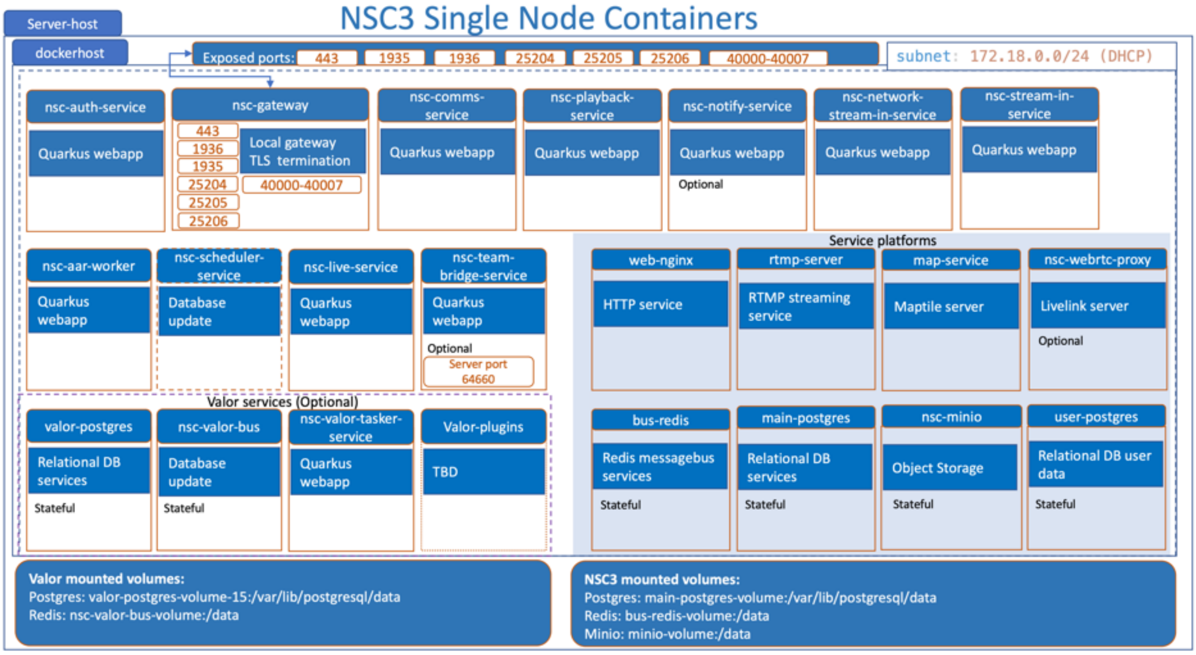
NSC3-Core picture 2: Service architecture

NSC3 backend basic services

- Stream-in-service
  - The service handles receiving other data traffic to the server. Videos, images, messages and audio from mobile and drone applications and IoT clients.
- Communications-service
  - The service handles the internal and external communication of the system's services.
- Web hosting-service
  - The service handles web hosting so that the system is accessible via a web browser.
- Authentication-service
  - The service handles the authentication of devices connected to the system (mobile devices, drones and IOT clients) and users.
- Playback-service

  - The service handles the delivery of video and audio to the after-action review worker service.
- Live-service
  - The service takes care of connecting the playback application to this service, so that the playback application can receive live material from the server in real time (video and audio).
- Valo AI service: After action review worker – service (optional)
  - The service manages the rendering of video clips exported from the system into mp4 format and the saving to the storage system (object storage).
- Valo AI service: Analytics worker -service (optional)
  - The service handles the analysis of the video stream, where, for example, desired objects are detected without anyone having to manually monitor the videos.
- Direct stream-service (optional)
  - The service handles the reception of RTMPS, ONVIF and RTSP data streams from several sources.
- Team-Bridge-service (optional)
  - Team-Bridge enables live-stream pipe between NSC3 Servers
- WebRTC-service (optional)
  - The service takes care of handling livelink video broadcasting services between Web client and NSC3 backend.

3.1 NSC3 container architecture (Single node)



NSC3-Core picture 3: Container architecture

3.2 Container description

Container name	Description	Type
main-postgres	PostgresSQL relational database server	Stateful
user-postgres	Postgres client server	Stateless
bus-redis	Redis message bus server	Stateful
nsc-scheduler-service	Database updater, running only while installation phase	Stateless
nsc-auth-service	NSC3 authentication service	Stateless
nsc-stream-in-service	NSC3 Inbound Video stream service (NSC3 clients)	Stateless
nsc-live-service	NSC3 live video presentation service	Stateless

nsc-comms-service	NSC3 communication service	Stateless
nsc-playback-service	NSC3 playback presentation service	Stateless
nsc-notify-service	NSC3 notification service	Stateless
nsc-aar-worker	NSC3 video clip publish service	Stateless
web-nginx	NGINX web server	Stateless
map-service	Mapbox map server	Stateless
nsc-gateway	NSC3 gateway service	Stateless
nsc-minio	min.io object database server	Stateful
rtmp-server	NSC3 RTMPS Inbound video stream service (optional)	Stateless
nsc-network-stream-in-service	NSC3 Inbound rtsp video streaming service (optional)	Stateless
nsc-webrtc-proxy	NSC3 Inbound webrtc video streaming service (optional)	Stateless
nsc-team-bridge-service	NSC3 Team-Bridge communication service (optional)	Stateless
valor-postgress	PostgresSQL relational database server for Valor (optional)	Stateful
nsc-valor-bus	Redis message bus server for Valor (optional)	Stateful
nsc-valor-tasker-service	Valor AI module tasker service (optional)	Stateless

3.3 Exposed server-side ports

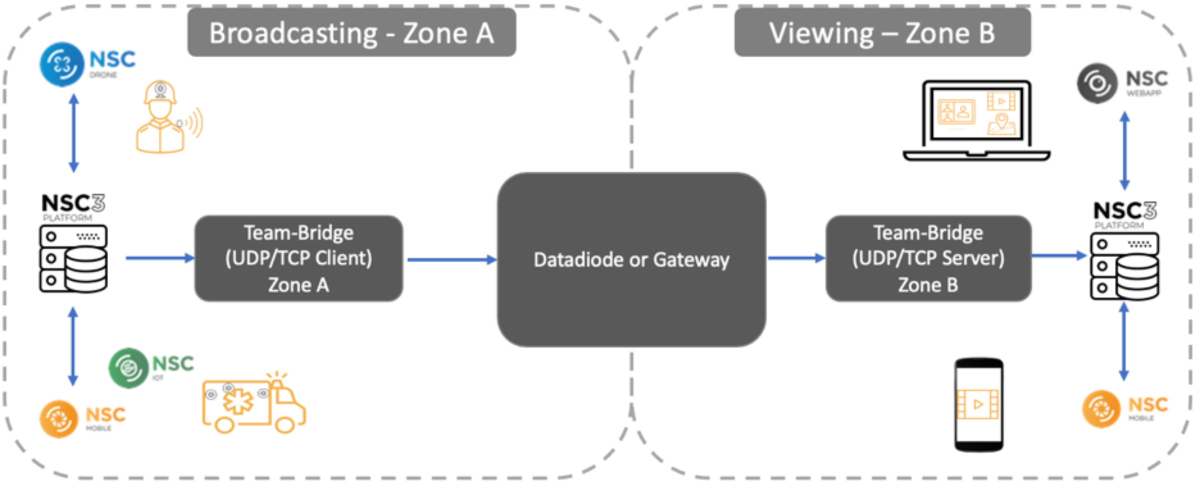
Port	**Protocol**	**Purpose**
443	TCP	HTTPS communication web-sockets
25204	TCP	NSC3 Device Metadata web-sockets
25205	TCP	NSC3 Video stream inbound web-sockets
25206	TCP	NSC3 Audio stream inbound web-sockets
1935	TCP	RTMPS Video stream inbound web-sockets
1936	TCP	RTMP Video stream inbound web-sockets
40000-40007	TCP	Web-RTC specific stream-in web-sockets
64660	TCP or UDP	NSC3 Team-Bridge Service at server side. Protocol configurable

4 NSC3 Interoperability feature

4.1 NSC3 Team-Bridge

Team-bridge service handles real-time data transfer services between independent NSC3 servers. UDP or TCP as data transfer protocol.

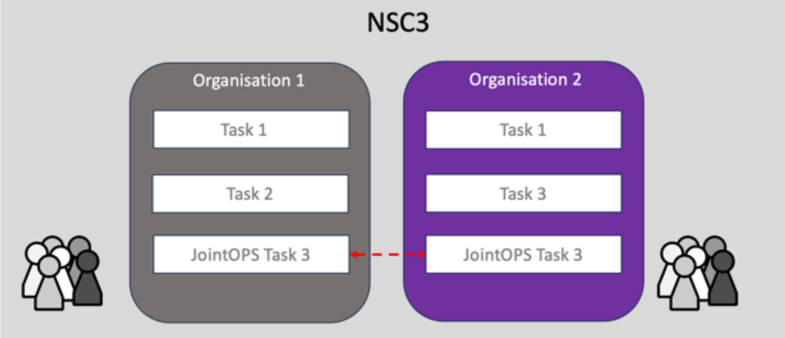
NSC3 and the data traffic it uses are designed to work also via data diodes or other gateway solutions. A data diode or other gateway solution is needed, for example, in a situation where confidential data must be displayed or exported safely to an environment with a different security level. The NSC3 Team-bridge service has been designed for this, which manages the data traffic control used by NSC3 at both ends of the gateway, so that the backend software, web application, mobile and vehicle applications work the same as in a normal communication environment.



NSC3-Interoperability picture 1: Team-Bridge

4.2 NSC3 Joint-Operation tasks

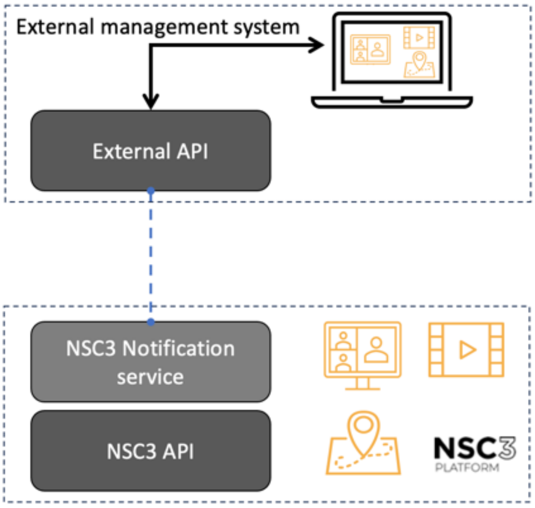
Joint operations feature makes it possible to share data between different organizations that are located on the same NSC3 service. It allows to create shared tasks between organizations and view each other's video streams, chat messages and other data.



NSC3-Interoperability picture 2: Joint operation tasks

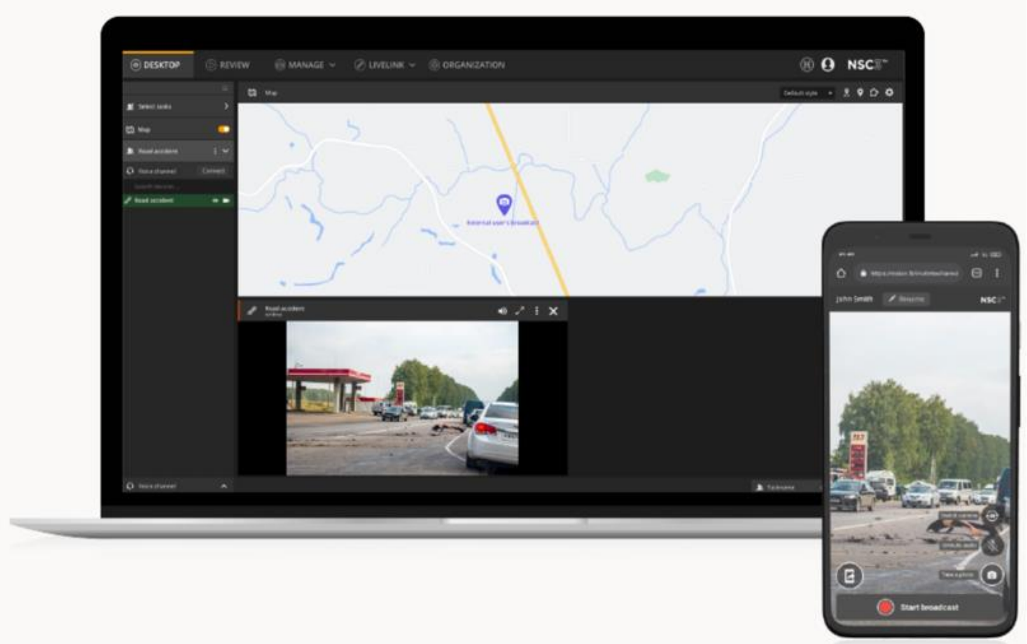
4.3 NSC3 Notification services

The NSC3 notification service enables the connectivity with external management systems via API service interfaces. Including authentication mechanisms and configuration-related management panels



NSC3-Interoperability picture 3: Notification services

4.4 NSC3 Livelink services

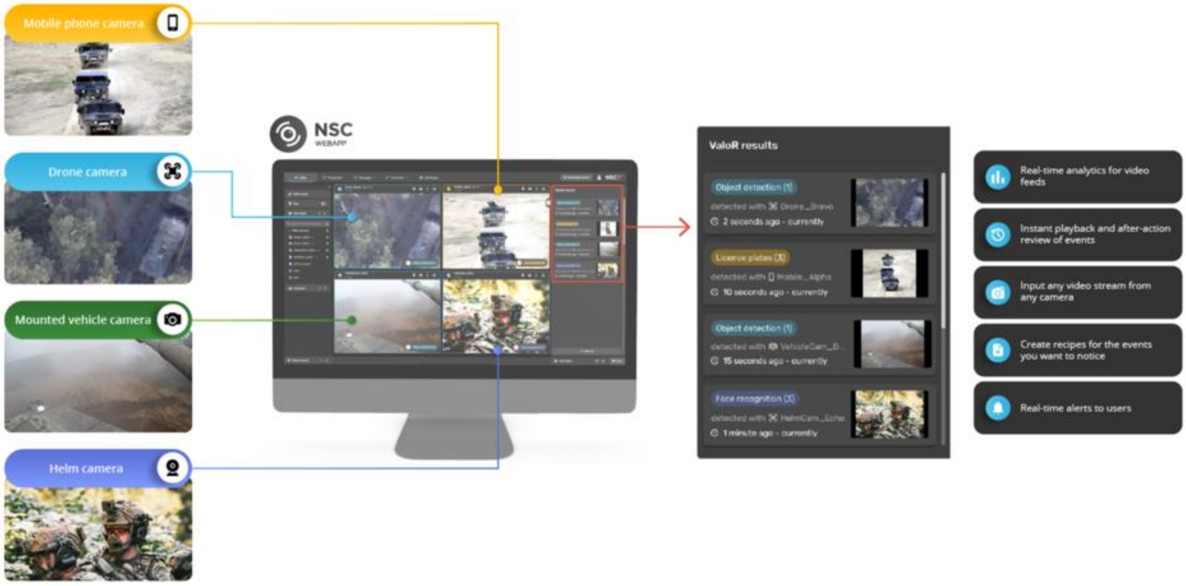


NSC3 Livelink offers a quick and easy way to extend situation awareness. Livelink offers tools for sending and receiving live stream. The service does not require authentication or extra applications to work. It is enough that the device has a Web browser. Getting started is effortlessly fast. Designed for use by the authorities' alarm center.

5 Valor AI analytics

Enhanced Situational Awareness

Valor Real-time AI analytics provide organizations with a comprehensive view of their operational environment. By analyzing data from multiple sources, such as sensors, devices, and systems, we deliver timely and accurate information that enhances situational awareness. This enables organizations to respond rapidly to changing conditions and make proactive decisions.


Mobile phone camera
Drone camera
Mounted vehicle camera
Helm camera
NSC
WEBAPP
ValoR results
Object detection (1)
detected with Drone_Bravo
2 seconds ago - currently
License plates (3)
detected with Mobile_Alpha
10 seconds ago - currently
Object detection (1)
detected with VehicleCam_D...
15 seconds ago - currently
Face recognition (3)
detected with HelmCam_Echo
1 minute ago - currently
Real-time analytics for video feeds
Instant playback and after-action review of events
Input any video stream from any camera
Create recipes for the events you want to notice
Real-time alerts to users

6 System requirements

The architecture of the NSC3 system is based on the so-called to Cloud Native technology. The web applications and services of the NSC3 server are based on microservices architecture. Program-free delivery takes place via containers. The NSC3 system is independent of data center virtualization technology. The system can be run with or without virtualization (bare-metal). The system can be delivered to an independent server (Single Node) or to a Kubernetes-compatible clustered cloud server. Modirum has ability to deliver NSC3 systems to Azure's AKS cloud server, the customer's own Azure tenant or an existing cluster.

6.1 Single node production reference server setup

Component	Requirement (Minimum)
Network	1GB/1GB, Ports: 443, 25204, 25205, 25206 Optional ports: RTMP:1936, RTMPS:1935, Web-RTC: 40000-40007, Team-Bridge server: 64660
CPU	8vCPU
RAM	16GB
Disk	10TB for content + 1TB SSD allocated for OS
Operating system	Ubuntu LTS latest
Other platform requirements	Docker, docker.io version
Installation	Installation scripts
Capacity estimation	~100-200 video sources

6.2 Kubernetes cluster reference configuration

Component	Requirements (minimum)
Network	10GB/10GB, Portit: 443, 1935, 25204, 25205, 25206, Optional ports: RTMP:1936, RTMPS:1935, Web-RTC: 40000-40007, Team-Bridge server: 64660
CPU	Node pool 3 x 8vCPU (scalable)
RAM	16GB per node
Disk	30TB StorageClass (Scalable)
Other system requirements	Kubernetes, Helm, Container registry,
Installation	Helm Chart
Capacity estimation	~400-500 video sources + 200 per added extra node

6.3 NSC3 client application requirements

Application	Requirements
NSC3 Mobile/Drone (Android)	Android OS version 6.0 or newer
NSC3 Mobile (iOS)	iOS 13 or newer
NSC IoTClient	Windows 10 or Docker platform (amd64/arm64). HW: 4 CPU / 8GB RAM / 64GB Disk
Web Browser	Chrome, Chromium, EDGE, Firefox, Safari 14.0 ->

6.4 NSC3 Network operating Expenses

- Leveraging our patented data packaging technology, the NSC3 system offers unparalleled efficiency in video streaming for tactical operations. With a configuration set at suggested **1 Frame per Second and a data rate of 0.04Mbit/s (Standard Definition),** we achieve a **bandwidth consumption of just 0.15GB per hour** for each video streaming device, leading to a significantly lower operational costs.

- To put it into perspective, a deployment involving two special forces teams, **20 simultaneous video streaming devices** results in a combined consumption of only **3.GB**. This blend of optimization and cost-effectiveness underscores our commitment to delivering superior value without compromising on performance.

Fps	Client Data rate (resolution)	Number of clients	Hourly Bandwidth
10	0.8Mbit/s (HD)	1	2.9GB
10	0.4Mbit/s (SD)	1	1.5GB
5	0.4Mbit/s (HD)	1	1.5GB
5	0.2Mbit/s (SD)	1	0.75GB
1	0.08Mbit/s (HD)	1	0.3GB
1	0.04Mbit/s (SD)	1	0.15GB

7 NSC3 software deployment

7.1 Deployment methods NSC3 server

7.1.1 On-premise server (No access to internet)

- SW delivered by file package from NSC3 SW repository to customer premise.
- Supported technologies: Ansible, Docker, Docker-compose

7.1.2 Customer hosted server (access to internet)

- Cloud or on-prem server
- SW delivered via NSC3 container registry (Azure)
- Supported technologies: Ansible, Docker, Docker-compose, Kubernetes, Helm

7.1.3 Cloud server, Modirum hosted (public)

- SW deployment and maintenance by using Modirum internal toolsets

7.2 NSC3 software repositories

Software	Source
NSC3 Mobile/Drone (Android)	Google Play (NSC Mobile)
NSC3 Mobile (iOS)	Apple Store (NSC3 Mobile)
NSC IoTClient (Windows)	NSC3 SW artifactory
NSC IoTClient (Docker)	Dockerhub, Installation guidance NSC3 github
NSC3 backend	NSC3 container registry *, Installation guidance NSC3 github

8 Security

User has full control of all data which is transmitted or handled in platform. Content is accessible only to user and Modirum has no access to it. Chain of custody of data and content is always in user control. All communication between NSC3 SDKs and NSC3 backend is encrypted. Broadcasting devices form sockets between terminals and backend. Firstly, communication inside socket is secured on application level using AES-256 encryption. TLS / HTTPS connections are terminated on backend gateway, making certificate change an easy operation. Headers specified in detail at Stream-In TCP Sockets.

8.1 Connecting and communicating inside TCP socket

Headers specified in detail at Stream-In TCP Sockets. The actual unwrapped messages are strings consisting of the message code number, hash character (#) and parameters separated by commas. NSC3 Stream-In Service accepts TCP socket connections at following default ports:

- 25204: Data
- 25205: Images
- 25206: Audio

All messages must be wrapped inside a specific kind of packet to be sent to either direction. This will make it possible to require a new initialization vector (IV) in each packet. All messages will go inside a block stream cipher with a symmetric encryption key. GCM encrypts the message using the block cipher in counter mode and computes the authentication tag using a polynomial over GF(2128). AES-256 in CBC mode with a 256-bit (32 bytes) encryption key expects a 16-byte IV as it uses 128-bit block size. PKCS5 Padding will ensure that the last encrypted block will have same block size as others (16 bytes with AES-256). Since NSC3 release 2.9 clients are using AES-GMC mode.

8.2 Connecting and communication inside Web Socket

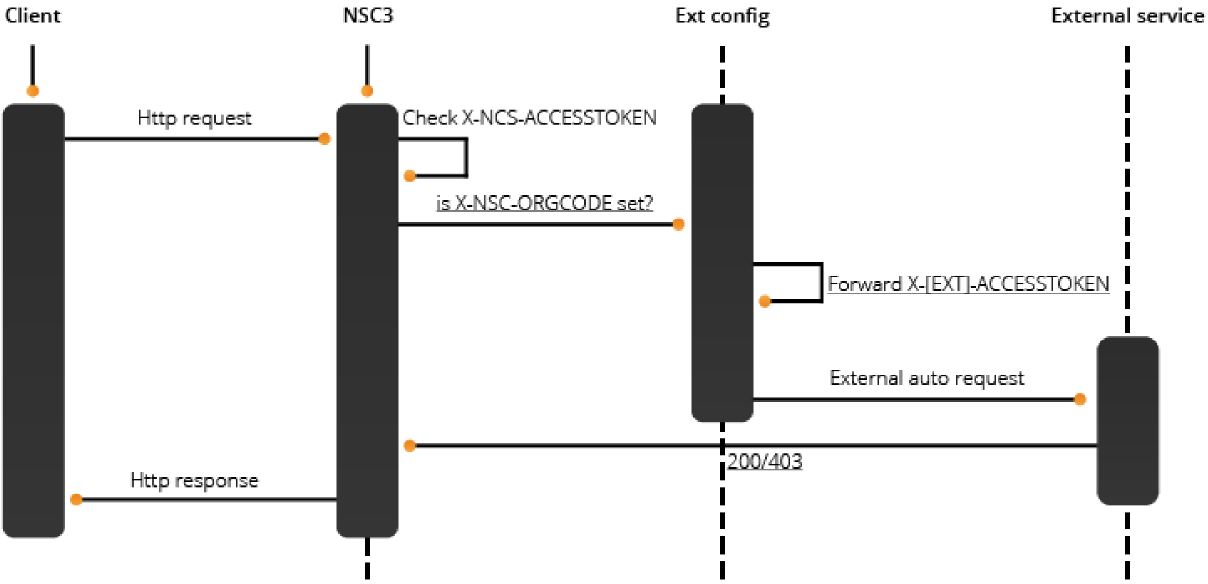
According to device TLS compliance, communication inside websocket is secured using TLS1.2 or TLS1.3 / HTTPS. For terminal to open websocket, one must have proper access token from NSC Auth Service. Access is checked with each request inside socket against provided access token. Connections with invalid access token are terminated.

8.3 Communication over REST APIs

Http requests are transferred over TLS1.2 or TLS1.3 / HTTPS. Each request must have valid access token from NSC Auth Service. Platform gateway forwards requests to appropriate services, denying all requests to undetermined locations.

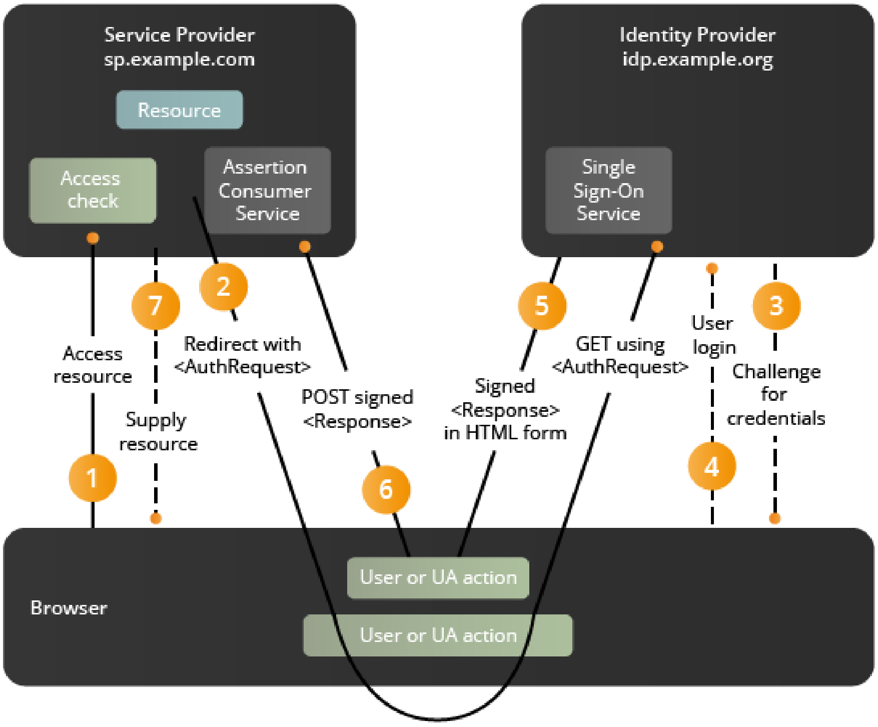
8.4 Identification management

The admin user of the NSC3 system can define the addresses of the external access management service to the organization, through which clients are allowed access to the information of the desired tasks only. One or more external access management services can be assigned to the organization. Below is a diagram of how access control works.



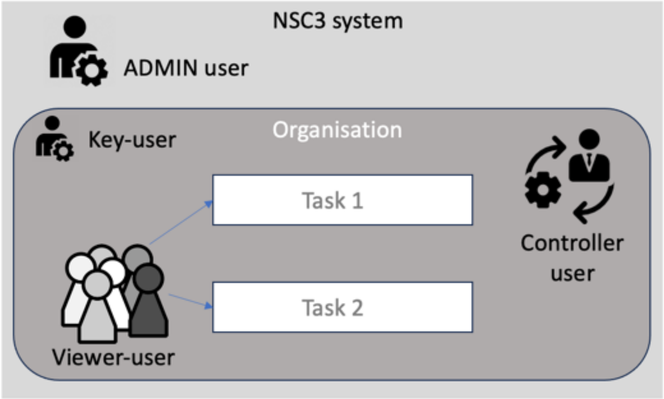
NSC3 Core picture 4: NSC3- User access management

NSC3 admin users can also define access to applications using third-party access management services (identity provider). Supported protocols are SAML and OAuth.



NSC3 Core picture 5: User access management process

8.5 NSC3 user profiles



NSC3 Core picture 6: User profiles

8.5.1 NSC3 System level user

The main user group of the NSC3 system is **admin**. There can be several admin users. The admin user manages the system organization, users, access adjustments and system-level settings. There is no visibility into the content of the organizations from the admin control panel. Admin can create new admin users, key-users and Controller users.

8.5.2 NSC3 Organization level users

The main user group of NSC3 organizations is **key-user**. There can be several key-users. The key-user manages the organization's users, access rights, and organization-level settings. There is no visibility into the content of the organizations from the key-user control panel. Key-user can create new Controller users and viewer users for dedicated organization.

The user group for operational management of NSC3 organizations is **Controller**. There can be several controller users. The controller user manages the organization's tasks, devices and user adjustments. The controller has full access rights to all content. Controller user can create new Viewer users for dedicated organization.

In the NSC3 organization, the non-management user group is **Viewer** by owning the rights to assigned tasks only.

9 Supported technologies.

9.1 Software development framework

The backend systems of the service run in images built in software containers based on nginx and Quarkus. The main development language is java/kotlin. The web applications are developed on top of the react-framework with javascript/typescript. REST architectural style and allows for interaction with RESTful web services

Mobile applications are developed with native solutions on top of Android and iOS libraries. In development, the only strictly required environment is Xcode for iOS development.

9.2 Supported video protocols.

Video protocols supported at the NSC3 applications

- RTMPs (Real-Time Messaging Protocol with (encrypted over SSL)
- RTSP (Real-Time Streaming Protocol)
- WebRTC (Web Real-Time Communications)
- MPEG-TS
- motion-JPEG
- ONVIF

9.3 Supported map technologies

Internal maps and map types integrated into the service

- The service supports vector and raster maps. The integrated Mapbox map engine enables the use of several different map templates, for example road map, terrain map, satellite image, nautical chart, topographic maps.

Integration interfaces to other existing map systems

- Mapbox-style map tiles and online map services.
- ESRI Online maps

9.4 Supported languages

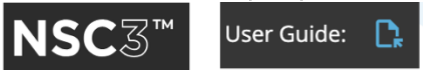
User interface languages. Configurable per organisation via key-user panel.

- English
- Arabic
- Swedish
- Finnish

9.5 NSC3 user guides

Access to user guide via NSC3 Web app:

- *NSC3 Web UI – Top right corner*



Access to user guide via NSC3 Mobile app:

- *NSC Mobile apps -> Settings -> Mobile user guide*

User guides are written in English only.

9.6 Online training modules

9.6.1 Getting started with Android app:

https://nsc3.beaconsim.com/users/sign_up?code=c263d2

9.6.2 Getting started with Web app:

https://nsc3.beaconsim.com/users/sign_up?code=6bcd34