



NRDB

Emergency call positioning system

Interface specification for Telecom providers

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1.0	2007-01-13	KOB	Release 1
1.1	2007-01-15	EH/KOB	Textual corrections
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1 Introduction

The NRDB Emergency call positioning system is based on guidelines given by “Post og Teletilsynet” [1] and provides a location service to Emergency Response Centres in Norway:

- Provider location. Resolves the internet address of the actual telecommunication provider’s location service. Data is provided for telecommunication providers that are a member of the NRDB Emergency call positioning system.
- User location. Resolves the actual address from which the emergency call originates and possibly also the geographical position (for mobile networks).

For convenience the NRDB Emergency call positioning system is hereafter also referred to as “the NRDB Location Service”.

Two alternative interfacing methods are provided to the Telecom provider. This is described in detail in section 3.

1.1 Reference documentation

Doc #	Document name	Revision / Date
1	Veiledning for tilbyderes overføring av opprinnelsesmarkering i forbindelse med nødnummer 110, 112, 113, 1412 (Nødmeldesentraler)	1.0.0 / 2005-12-01

1.2 Abbreviations

Abbreviation	Description
FTP	File Transfer Protocol
HTTP	HyperText Transfer Protocol
IP	Internet Protocol
LIAG	Location Information Access Gateway
NRDB	National Reference DataBase (for ported numbers)
URL	Uniform Resource Locator
VPN	Virtual Private Network
WAN	Wide Area Network
XML	eXtended Markup Language

2 System description

An overview of the NRDB Emergency call positioning system is shown in Figure 1.

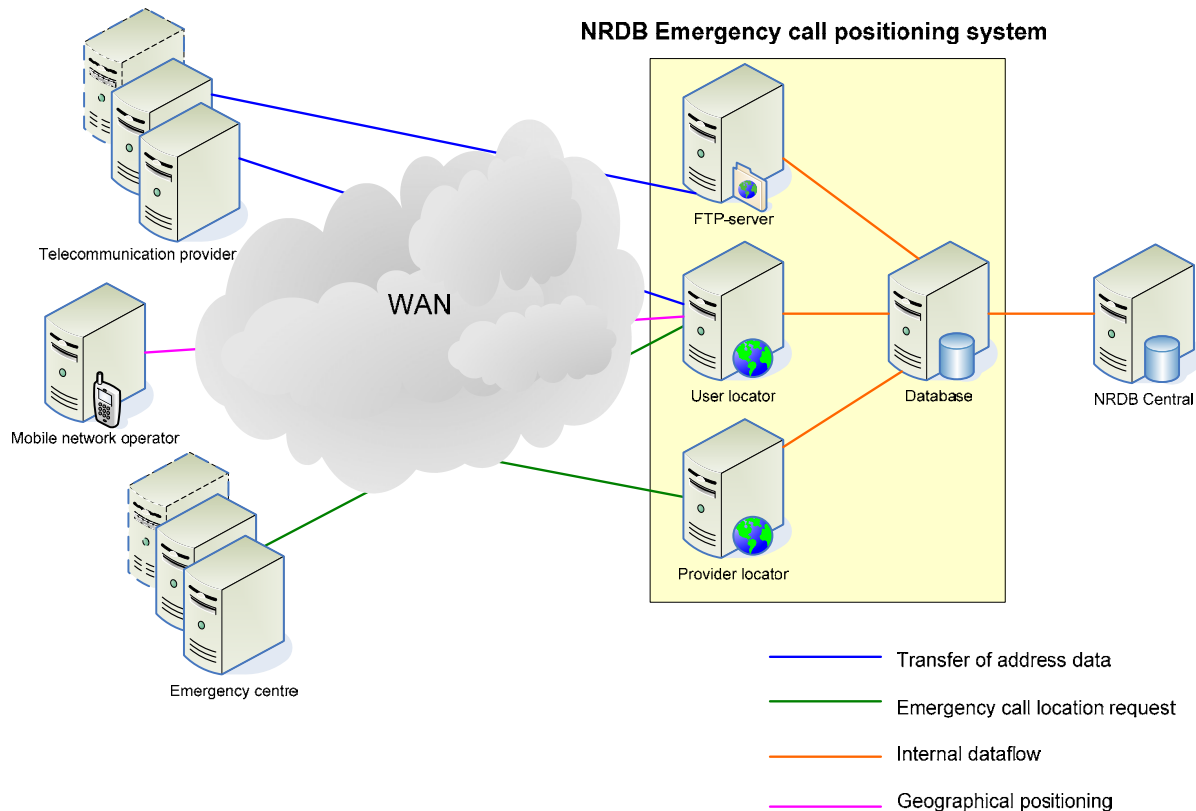


Figure 1 - System overview

The Emergency centre will normally connect to the NRDB Location Service via Internet. The Telecom provider will normally connect to the NRDB Location Service via the existing NRDB connection.

The telecommunication provider provides location data to the system which in turn presents such data to the emergency centre, - based on the A number for an incoming emergency call.

According to [1] the emergency call positioning will be resolved in two steps, - provider location and user location.

The Telecom provider will be involved in the second step only: user location. The NRDB Location Service will exclusively perform the provider location, - based on NRDB data.

2.1 Provider location

The NRDB Emergency call positioning system uses NRDB data for provider location. The current allocation of all phone number ranges in Norway can be found in the national numbering plan. This numbering plan is maintained by the NRDB Central in Norway and will be used to locate the telecommunications provider responsible for the network where the emergency call is originated. (The actual provider is not necessarily the terminating network operator). If the actual phone number (A number) is ported, the responsible telecommunication provider will be found in the porting table (also maintained by the NRDB Central) instead of the numbering plan.

The NRDB Provider locator will resolve the user location service for all telecommunication providers that are members of the NRDB Emergency call positioning system. The address of the user locator must be used to perform the next step of the location: User location.

2.2 User location

The position of an emergency call will typically be identified by the phone's installation address. The physical (geographical) position may also be resolved if such information is available (for example in the case where the call is originating in a mobile network).

The position (installation/billing address) can be resolved by sending a request to the server found by the Provider locator. The response will also determine if the actual physical position can be found by a second query. The emergency centre can then send another request to the User locator. This second lookup might experience some seconds of delay due to delays within the provider specific location service.

Address information will be resolved internally based on address data stored in the local database (for those telecommunications providers that export customer addresses to the NRDB system) or externally by mediating the request to the specific telecommunications provider's location service. The latter might lead to an additional (insignificant) service delay.

3 Interface specification

The NRDB Emergency call positioning system will serve as a single point for location requests for the Emergency centres. Location data maintained by telecom providers that are members of the NRDB Emergency call positioning system can be found by querying the system's interface for Emergency centres.

User location data will be found in two ways, depending on which interfacing alternative the actual Telecom provider chooses:

Alternative 1: Centralised database. The Telecom provider periodically exports addressing data to the Location Service. Location data will then be found in a local, centralised database.

Alternative 2: Distributed database. Location queries are mediated from the Location Service to the actual Telecom provider.

The process of getting the geographical position (for mobile numbers) will be handled by the NRDB Location Service for both alternatives.

3.1 Interface specification for the centralised solution

For the centralised solution all processing of location requests will be handled by the NRDB solution. The Telecom provider is not directly involved.

3.1.1 Requirements to Telecom provider

The Telecom provider is required to daily upload a file with new/changed addressing data according to the process described in section 3.1.3. File format is defined in section 3.1.2.

3.1.2 File format for location data

Location data must be compliant with the XML file contents defined in [1]. Some of the fields may be regarded as "for future use". Fields that are required are marked in the following table.

User address data (fields starting with "user-") can be provided if the subscriber is a company and if a specific user address is known for the individual phone numbers.

Field#	Name	Description	Required
1	network-id	Telecommunication network specific ID	√
2	phonenumber	Single number or number range (format <number-start>-<number-end>). If address for the individual phone numbers are known, a number range should be split into single numbers instead (also specifying the "user-" fields for each number)	√
3	service-attribute	Indicates the type of network. The following values are allowed (according to [1]): F1: Fixed Network, Customer of Network Operator F2: Fixed Network, Customer of Reseller M1: Mobile Network, Customer of Network Operator M2: Mobile Network, Customer of Reseller B1: VoIP, Fixed address, Customer of IP Network Operator (ISP) B2: VoIP, Fixed address, Customer of Reseller	√

		I1: VoIP, moveable subscription, Customer of Network Operator (ISP) I2: VoIP, moveable subscription, Customer of Reseller	
4	subscr-company-name		√ ¹
5	subscr-switchboard-number		
6	subscr-first-name		√
7	subscr-middle-name		
8	subscr-last-name		√
9	subscr-common-name		
10	subscr-municipality-number		√
11	subscr-street-name		
12	subscr-street-code		
13	subscr-house-number		
14	subscr-house-letter		
15	subscr-apartment-number		
16	subscr-city-section		
17	subscr-postal-code		√
18	subscr-city		√
19	subscr-room-name		
20	subscr-reg-address-code		
21	subscr-reg-property-number		
22	subscr-reg-lease-number		
23	subscr-reg-address-floor		
24	subscr-map-coordinate	Map coordinates for buildings where there is no street address (e.g. phone booths). Coordinates must be given according to the WGS84 system using geographical coordinates	
25	user-first-name		
26	user-middle-name		
27	user-last-name		
28	user-common-name		
29	user-municipality-number		
30	user-street-name		
31	user-street-code		
32	user-house-number		
33	user-house-letter		
34	user-apartment-number		
35	user-city-section		
36	user-postal-code		
37	user-city		
38	user-room-name		
39	user-reg-address-code		
40	user-reg-property-number		
41	user-reg-lease-number		
42	user-reg-address-floor		

The fields must be separated by semicolon.

A sample file containing two rows of data is shown in Figure 2.

¹ If subscr-company-name is not provided subscr-first-name and subscr-last-name must be provided, and vice versa.

```
101;98123456;M1;;;Ola;;Nordmann;;1718;Storhaugvn;;8;;;7120;Leksvik;;;;  
;;;;;;;;;;;;;;;;;;;;;;;;;  
101;98123457;M1;;;Kari;;Nordmann;;1718;Storhaugvn;;8;;;7120;Leksvik;;;;  
;;;;;;;;;;;;;;;;;;;;;;;;;
```

Figure 2 - Sample file 815_address_2007-01-02.csv

3.1.3 File upload process

A file must be sent on daily basis (Monday to Friday) containing customer address data for new phone numbers or address changes for existing phone numbers (changes since last upload). An empty file must be sent if there is no address additions or changes. The file must be uploaded between 00:00 and 03:00 Monday to Friday.

The file must be a semicolon-separated flat text file according to the definition in section 3.1.2. File name must be <provider-id>_address_<YYYY-MM-DD>.csv. This file must then be compressed using the zip format (which contains inherent integrity control).

The file must be uploaded to an FTP server. Server address, username and password will be provided when the Telecom provider first registers.

A complete file with address data for all active phone numbers must be uploaded as part of the service establishment procedure.

A full dump of address data must also be provided on request from NRDB, but not more often than once in a month and the request from NRDB must be sent at least one week in advance. This dump will be used for reconciliation purposes only.

3.2 Interface specification for the distributed solution

User location requests from Emergency Centres will be mediated to the actual Telecom provider if the distributed solution is used. That is: The NRDB Location Service receives the request and forwards the request to the actual Telecom provider. The response from the Telecom provider is updated and forwarded to the Emergency Centre. In this way the NRDB Location Service behaves as if all data was stored locally.

3.2.1 Requirements to Telecom provider

The Telecom specific location service must be based on the HTTP/secure (HTTPS) protocol and handle incoming http GET requests from the NRDB Location Service. Access to the service should involve screening on IP address.

The response must be an XML document corresponding to [1]. The XML format is described in detail later in this section.

User location service URL must be as follows:

<https://<srv-address>/position?cli=<phone number>&username=<username>&password=<password>>

Where <srv-address> is a valid DNS name or an IP address. <phone number> is the emergency call number (A number). <username> and <password> should be set by the NRDB solution and changed (on request from NRDB) at least once in a year.

Availability for the telecom location service must be at least 99.5%.

3.2.2 XML format

```

<?xml version="1.0" encoding="iso-8859-1"?>
<location-information version="1.0.0" version-date="2005-12-01">
  <network-id></network-id>
  <serviceprovider-id></serviceprovider-id>
  <calling-line-identity></calling-line-identity>
  <service-attribute></service-attribute>
  <postal-code></postal-code>
  <liag>
    <information-provider></information-provider>
    <position-provider></position-provider>
    <repeat-request></repeat-request>
  </liag>
  <requesting-party>
    <requesting-ip></requesting-ip>
    <requesting-entity></requesting-entity>
  </requesting-party>
  <request-date-time></request-date-time>
  <reply-sent-date-time></reply-sent-date-time>
  <subscriber-info>
    <company-name></company-name>
    <switchboard-number></switchboard-number>
    <first-name></first-name>
    <middle-name></middle-name>
    <last-name></last-name>
    <common-name></common-name>
    <address>
      <municipality-number></municipality-number>
      <street-name></street-name>
      <street-code></street-code>
      <house-number></house-number>
      <letter></letter>
      <apartment-number></apartment-number>
      <city-section></city-section>
      <postal-code></postal-code>
      <city></city>
      <room-name></room-name>
      <registered-address-code></registered-address-code>
      <registered-property-number></registered-property-number>
      <registered-lease-number></registered-lease-number>
      <registered-address-floor></registered-address-floor>
      <map-coordinate></map-coordinate>
    </address>
  </subscriber-info>
  <user-info>
    <first-name></first-name>
    <middle-name></middle-name>
    <last-name></last-name>
    <common-name></common-name>
    <address>
      <municipality-number></municipality-number>
      <street-name></street-name>
      <street-code></street-code>
      <house-number></house-number>
      <letter></letter>
      <apartment-number></apartment-number>
      <city-section></city-section>
      <postal-code></postal-code>
      <city></city>
      <room-name></room-name>
      <registered-address-code></registered-address-code>
      <registered-property-number></registered-property-number>
      <registered-lease-number></registered-lease-number>
      <registered-address-floor></registered-address-floor>
    </address>
  </user-info>
  <map-coordinate-radiobase></map-coordinate-radiobase>
  <map-coordinate-calculated-position></map-coordinate-calculated-position>
  <accuracy-of-calculated-position></accuracy-of-calculated-position>
</location-information>

```

Figure 3 - User location service response, XML format

The Telecom location service must return an XML document containing the location data. The location information response format is shown in Figure 3. This is the same as defined in [1]. Some fields will be filled out by NRDB and need not to be filled out by the Telecom provider.

The parameter definitions in the following table also define whether the actual parameter is mandatory (M), optional (O) or not applicable (N/A), based on the type of network where the emergency call is originating.

Parameter	Description	Fixed	Mobile
network-id	Identifies the network where the emergency call originates. The parameter is provided by the actual telecommunication provider	M	M
serviceprovider-id	This field will be set by NRDB	N/A	N/A
calling-line-identity	Incoming emergency call (A number). 8 digits (without country code)	M	M
service-attribute	Indicates the type of network. The following values are allowed (according to [1]): F1 : Fixed Network, Customer of Network Operator F2 : Fixed Network, Customer of Reseller M1 : Mobile Network, Customer of Network Operator M2 : Mobile Network, Customer of Reseller B1 : VoIP, Fixed address, Customer of IP Network Operator (ISP) B2 : VoIP, Fixed address, Customer of Reseller I1 : VoIP, moveable subscription, Customer of Network Operator (ISP) I2 : VoIP, moveable subscription, Customer of Reseller	M	M
postal-code	4-digit postal code for actual subscriber. This parameter is the same as the one supplied in the tag <user-info>.<postal-code> (or <subscriber-info>.<postal-code>), and is in conjunction with service-attribute necessary to better handle calls if there are technical problems with the location information	M	M
liag:			
information-provider	This field will be set by NRDB	N/A	N/A
position-provider	This field will be set by NRDB	N/A	N/A
repeat-request	This field will be set by NRDB	N/A	N/A
requesting-party:			
requesting-ip	This field will be set by NRDB	N/A	N/A
requesting-entity	This field will be set by NRDB	N/A	N/A
request-date-time	This field will be set by NRDB	N/A	N/A
reply-sent-date-time	This field will be set by NRDB	N/A	N/A
subscriber-info:			
	Subscriber info must always be provided. This section describes the company location if the subscriber is a company with an internal switchboard. This section will contain the same information as the user-info in case of a personal subscription		
company-name		O	N/A
switchboard-number	8 digits (without country code)	O	N/A

Parameter	Description	Fixed	Mobile
first-name		O	O
middle-name		O	O
last-name		O	O
common-name		O	O
subscriber-info.address:			
municipality-number	4 digits	M	M
street-name		O	O
street-code		O	O
house-number		O	O
letter		O	O
apartment-number		O	O
city-section		O	O
postal-code		M	M
city		M	M
room-name		O	O
registered-address-code		O	O
registered-property-number		O	O
registered-lease-number		O	O
registered-address-floor		O	O
map-coordinate	Map coordinates for buildings where there is no street address (e.g. phone booths). Coordinates are given according to the WGS84 system using geographical coordinates.	O	O
user-info:			
	User info will always be provided. If the subscriber is a company with an internal switchboard and if specific user (phone) location is impossible this section should contain the same information as the subscriber-info.		
first-name		O	O
middle-name		O	O
last-name	Same as company name (subscriber-info) if no user can be found	M	M
common-name		O	O
user-info.address:			
municipality-number	4 digits	M	M
street-name		O	O
street-code		O	O
house-number		O	O
letter		O	O
apartment-number		O	O
city-section		O	O
postal-code		M	M
city		M	M
room-name		O	O
registered-address-code		O	O
registered-property-number		O	O
registered-lease-number		O	O
registered-address-floor		O	O
map-coordinate-radiobase	This field will (eventually) be set by NRDB	N/A	N/A
map-coordinate-calculated-position	This field will (eventually) be set by NRDB	N/A	N/A
accuracy-of-calculated-position	This field will (eventually) be set by NRDB	N/A	N/A

The Telecom location service does not need to resolve the geographical position of the call for a mobile number. This process will be handled by the NRDB Location Service.

Sample response:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<location-information version="1.0.0" version-date="2005-12-01">
  <network-id>101-203</network-id>
  <serviceprovider-id></serviceprovider-id>
  <calling-line-identity>98123456</calling-line-identity>
  <service-attribute>M1</service-attribute>
  <postal-code>2045</postal-code>
  <liag>
    <information-provider></information-provider>
    <position-provider></position-provider>
    <repeat-request></repeat-request>
  </liag>
  <requesting-party>
    <requesting-ip></requesting-ip>
    <requesting-entity> </requesting-entity>
  </requesting-party>
  <request-date-time></request-date-time>
  <reply-sent-date-time></reply-sent-date-time>
  <subscriber-info>
    <company-name></company-name>
    <switchboard-number></switchboard-number>
    <first-name>Ola</first-name>
    <middle-name></middle-name>
    <last-name>Nordmann</last-name>
    <common-name></common-name>
    <address>
      <municipality-number>1313</municipality-number>
      <street-name>Storgata</street-name>
      <street-code></street-code>
      <house-number>18</house-number>
      <letter>A</letter>
      <apartment-number></apartment-number>
      <city-section></city-section>
      <postal-code>2045</postal-code>
      <city>Storby</city>
      <room-name></room-name>
      <registered-address-code></registered-address-code>
      <registered-property-number></registered-property-number>
      <registered-lease-number></registered-lease-number>
      <registered-address-floor></registered-address-floor>
      <map-coordinate></map-coordinate>
    </address>
  </subscriber-info>
  <user-info>
    <first-name>Ola</first-name>
    <middle-name></middle-name>
    <last-name>Nordmann</last-name>
    <common-name></common-name>
    <address>
      <municipality-number>1313</municipality-number>
      <street-name>Storgata</street-name>
      <street-code>18</street-code>
      <house-number></house-number>
      <letter>A</letter>
      <apartment-number></apartment-number>
      <city-section></city-section>
      <postal-code>2045</postal-code>
      <city>Storby</city>
      <room-name></room-name>
      <registered-address-code></registered-address-code>
      <registered-property-number></registered-property-number>
      <registered-lease-number></registered-lease-number>
      <registered-address-floor></registered-address-floor>
    </address>
  </user-info>
  <map-coordinate-radiobase></map-coordinate-radiobase>
  <map-coordinate-calculated-position></map-coordinate-calculated-position>
  <accuracy-of-calculated-position></accuracy-of-calculated-position>
</location-information>
```

3.3 Security

All address data will be used exclusively for location purposes and handled with the highest confidence. NRDB guarantees that no third party will get access to the data.

The Telecom provider will be connected to the NRDB Location Service via a secure connection, - VPN or Frame Relay. Typically, this will be the same connection as being used for the NRDB (porting) system.

3.4 Interface recommendations

The two interface alternatives are compared here as a help to select interfacing method.

Advantages with the centralised solution

- The total system availability will be better (and more predictable) as the Location Service will not have to rely on the availability of an external service.
- The centralised solution is easier and cheaper to implement for the Telecom provider (no specific location service is needed).
- A fully consistent solution will be assured as data generation and formatting is performed by one single entity.
- The official location interface (i.e. XML file format) will be abstracted away from the Telecom provider. Eventual changes or updates to the official location interface will not influence the Telecom provider as all interface changes will be applied to the centralised solution.

Advantages with the distributed solution

- The Telecom provider has "full control" with his location service
- The Telecom provider does not need to export addressing data

In general NRDB recommends the Telecom provider to use the centralised solution.