



F&T Studie: Referenzumgebung Dienste (RuDi)

OpenGIS/Lage (Open-GeoInformationSystem/Lage)





OpenGIS/Lage Übersicht

- **Ziel / Vision**
- **Architekturübersicht**
- **Extrakt der Fähigkeiten**
 - **Routenplaner (GPX Layer)**
 - **NATO Vector Graphic (NVG) Layer**
 - **TDL / NFFI Tracking Layer**
 - **Satelliten & Karten Layer**
 - **Photo Darstellung**
 - **Operational Message Service**
- **OpenGIS/Lage Live**
- **Multilevel und –layer Sicherheitsfähigkeit**
 - **Architektur basierend auf OASIS WS*-Security**
 - **Realisierung / Beispiel OASIS WS*-Security**
 - **Erweiterung NATO Labeling**
 - **Realisierung / Beispiel Labeling**



Offenes GeoInformationSystem/Lage

Ziel/Vision - Definition



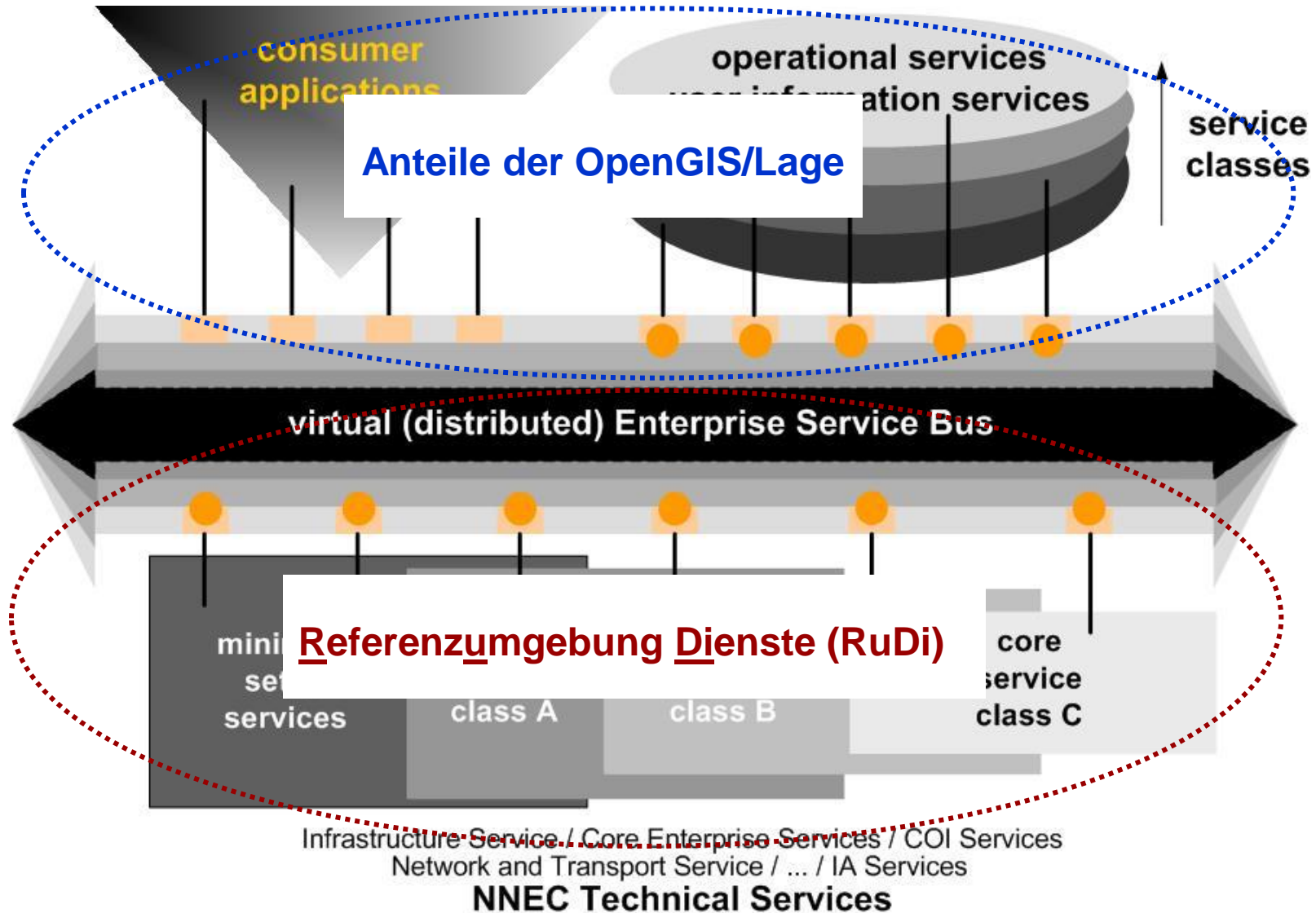
Die Grundideen eines offenen Geoinformationssystems inklusive einer Multilayer & -level IT-Sicherheit bilden neben den **aktuellen Techniken des Internets, (offene) Standards** und der **Serviceorientierten Architektur (SOA)** der **OpenSource** Gedanke.

Hierzu wird die Referenzumgebung Dienste (RuDi) Ergebnis einer F&T-Studie vom IT-AmtBw A5 genutzt.

RuDi: Referenzumgebung Dienste stellt auf die Anforderungen des militärischen Umfeldes Anwendungen, Anwendungsdienste (Service) und eine auf Standards und OpenSource Produkte basierende Referenzumgebung bereit.

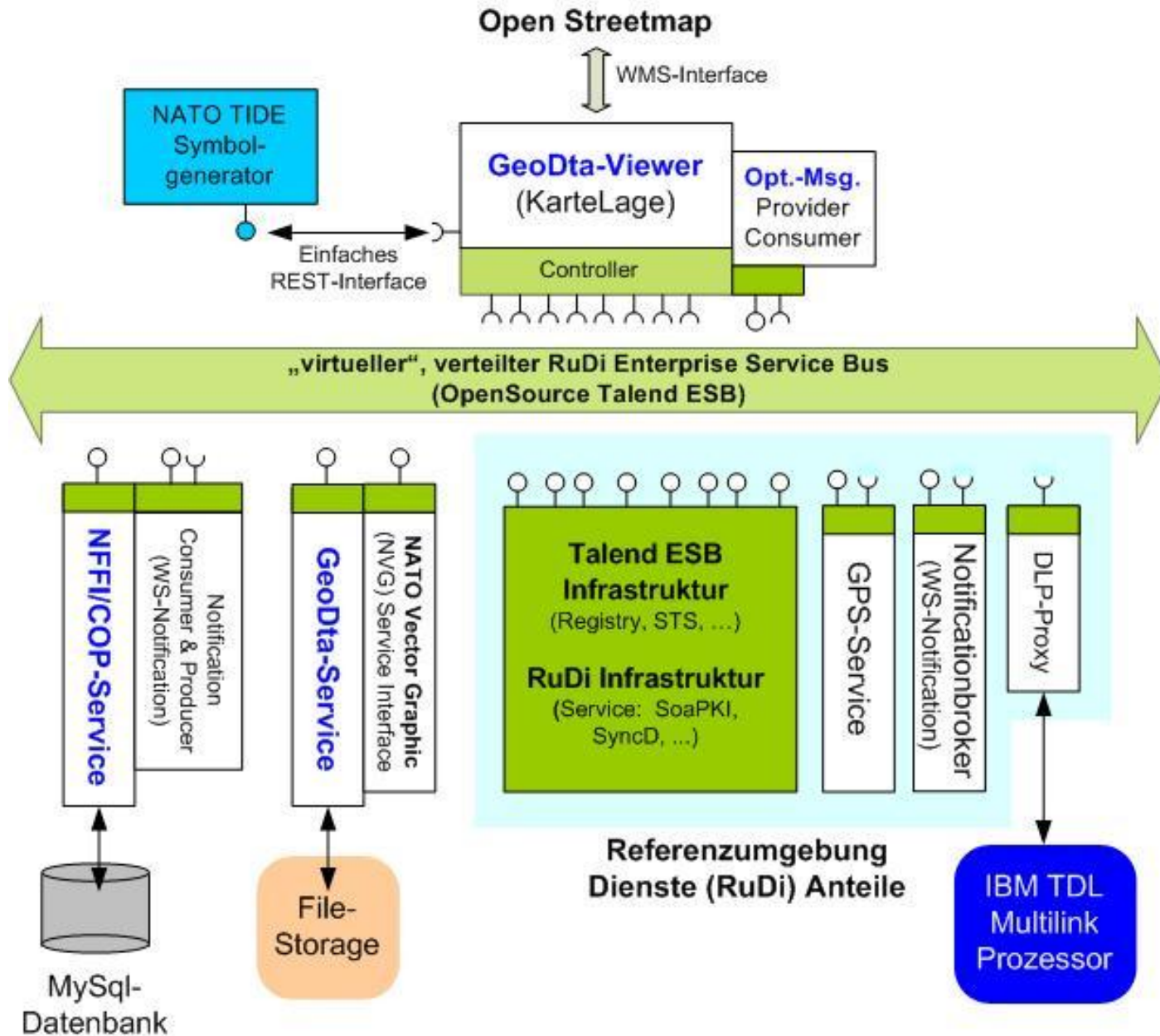


RuDi & OpenGIS/Lage: Architekturübersicht





OpenGIS/Lage: Architekturübersicht



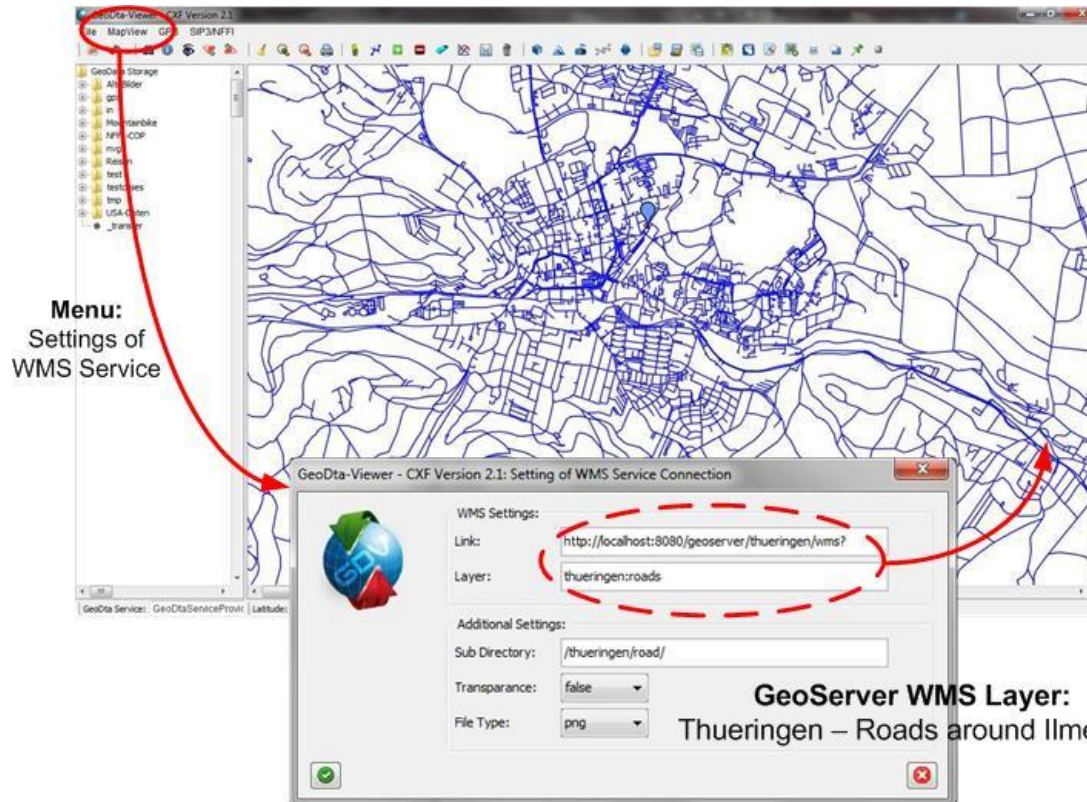


RuDi & OpenGIS/Lage: Architektur

Einbinden beliebiger WMS-Server (Grundlage der Kartendarstellung)

OpenGIS/Lage basiert auf **Java: JXMapKit** und unterstützt frei definierbare WMS-Server als Kartengrundlage – Beispiele:

- **OpenStreetMap (inklusive lokalen Cash)**
- **Bayern TK50**
- **GoeServer 2.1.2 (freie Installation)**





OpenGIS/Lage

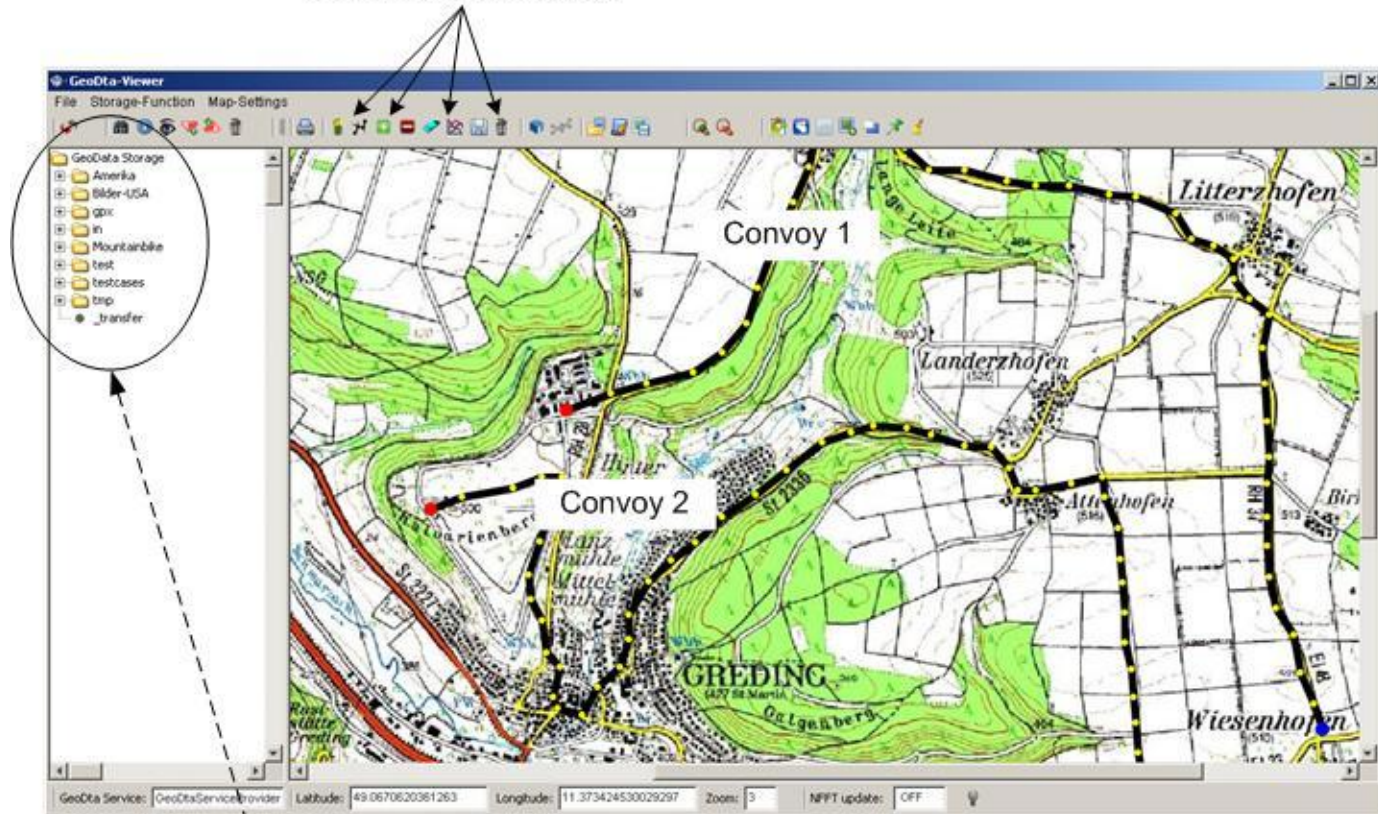
Fähigkeiten (Extrakt)



RuDi & OpenGIS/Lage: Anwendungsbeispiele

Beispiel: Routenplaner

Tools for route planning



GeoDta-Service



- Storage for:
- pictures (jpg);
 - small videos;
 - GPX (GPS routes);
 - (- pdf files);



RuDi & OpenGIS/Lage: Anwendungsbeispiele

Beispiel: Blue Force Tracking (NFFI: NATO Friendly Force Information)

The screenshot displays the GeoData-Viewer - CXF Version 2.1 interface. The main window shows a map of a region with several force units tracked as colored lines (yellow and green) and points (car202, car203). A dialog box titled "GeoData-Viewer - CXF Version 01: Display of a NFFI entry" is open, showing the following data:

Unit Identification Data:
Shortname: GM222-1
Symbol: SFG-UCAT--MOGM-

Unit Positional Data:
Country: Germany
System: Intelligence Longitude: 11.658124923706055
Subsystem: Iltis Latitude: 48.0771614158644
TransponderID: car02 Altitude: 0.0
Date: 2012-03-17T12:06:20.745+01:00

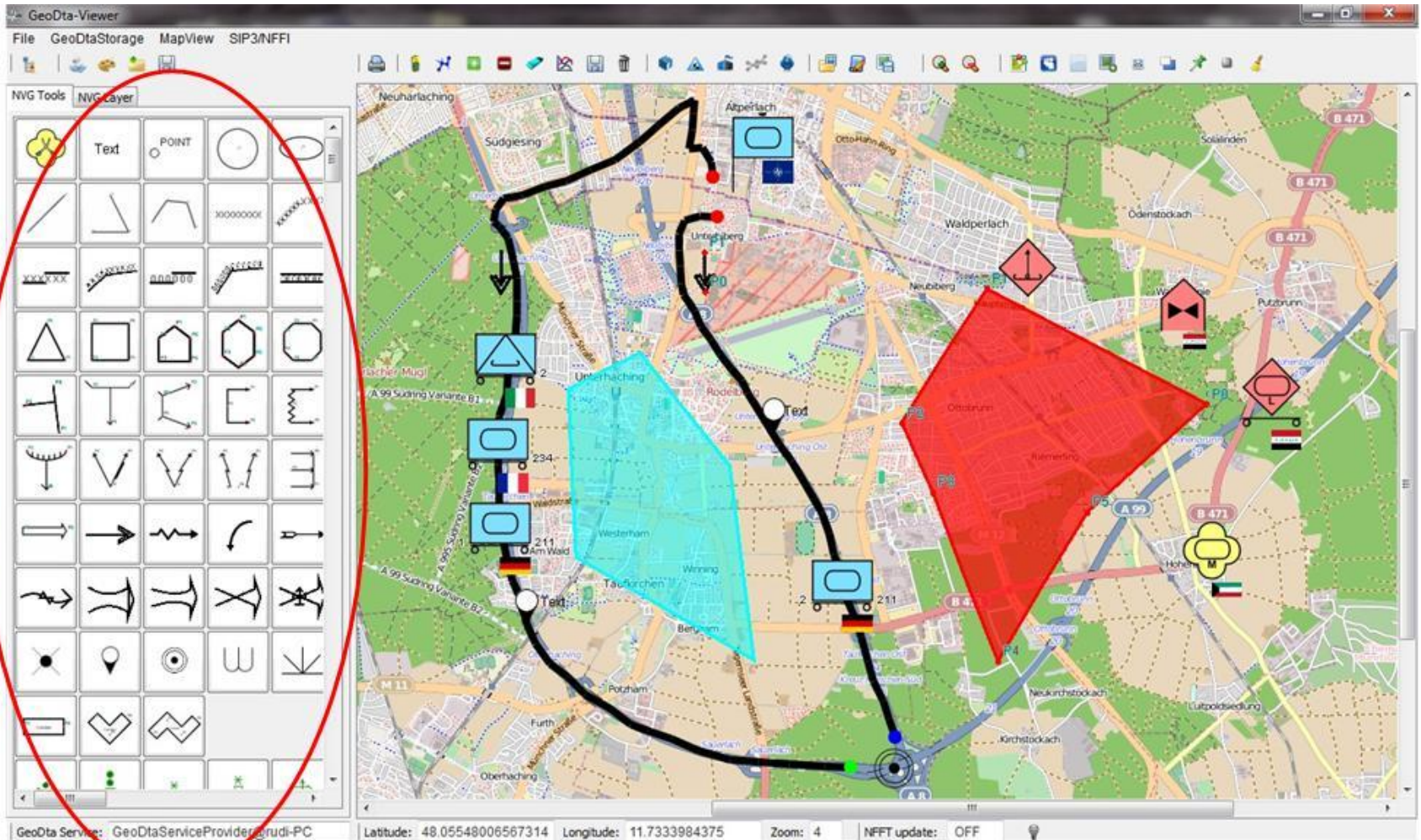
Unit OperStatus Data:
Status code: OPERATIONAL
Footprint: null Strength: null

The status bar at the bottom shows: GeoData Service: GeoDataServiceProvider@clan205. Latitude: 49.06554369112604 Longitude: 11.32621765136718 Zoom: 3 NFFI update: ON



RuDi & OpenGIS/Lage: Anwendungsbeispiele

Erstellen eines NVG-Layers (Symbolgenerator MIL-STD-2525B Standard)



NATO Vector Graphic
Symbol Shapes nach
MIL-STD-2525B Standard

NATO Vector Graphic Layer
(mit Routenplaner Layer)

NVG-Layer Name

The screenshot shows the GeoDta-Viewer interface with the following components:

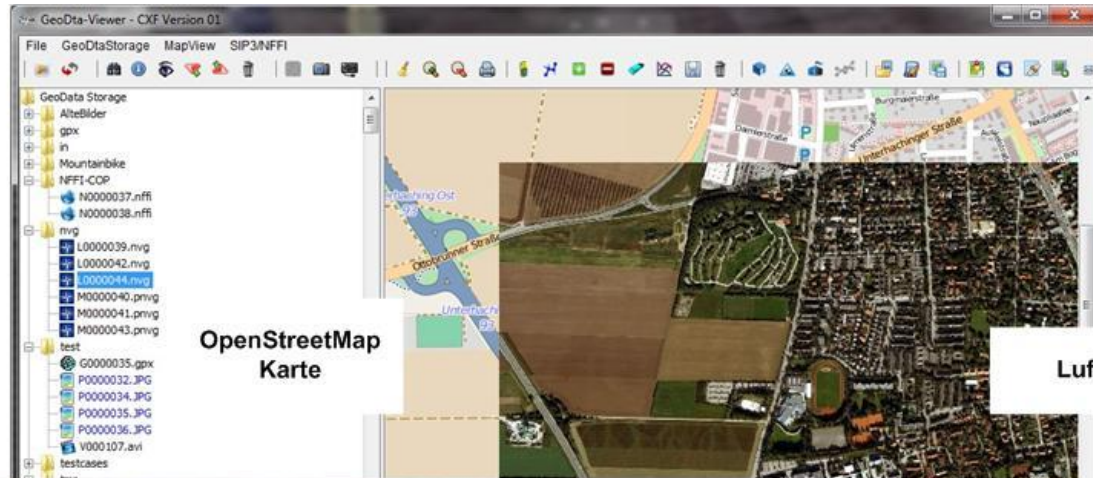
- NVG Layer Name:** L0000044.nvg (highlighted in red)
- NVG Tools:** A toolbar with icons for editing symbols, highlighted by a blue oval and labeled "Tools zum ändern der Symbole".
- Objects List:** A tree view on the left showing various object types like arc, circle, polygon, etc. The "polygon" object is selected and highlighted in blue.
- NVG-Layer Objekt:** An arrow points from the selected "polygon" object to a specific polygon on the map, which is highlighted with a red border and labeled "NVG-Layer Objekt".
- GeoDta Viewer: Fill Color and Opacity Dialog:** A dialog box in the foreground showing a color palette with 24 color swatches and an opacity slider. The "black" color is selected, and the opacity is set to approximately 7. This dialog is used to modify the fill of the selected NVG object.

Füllung des selektierten NVG Objekts einstellen



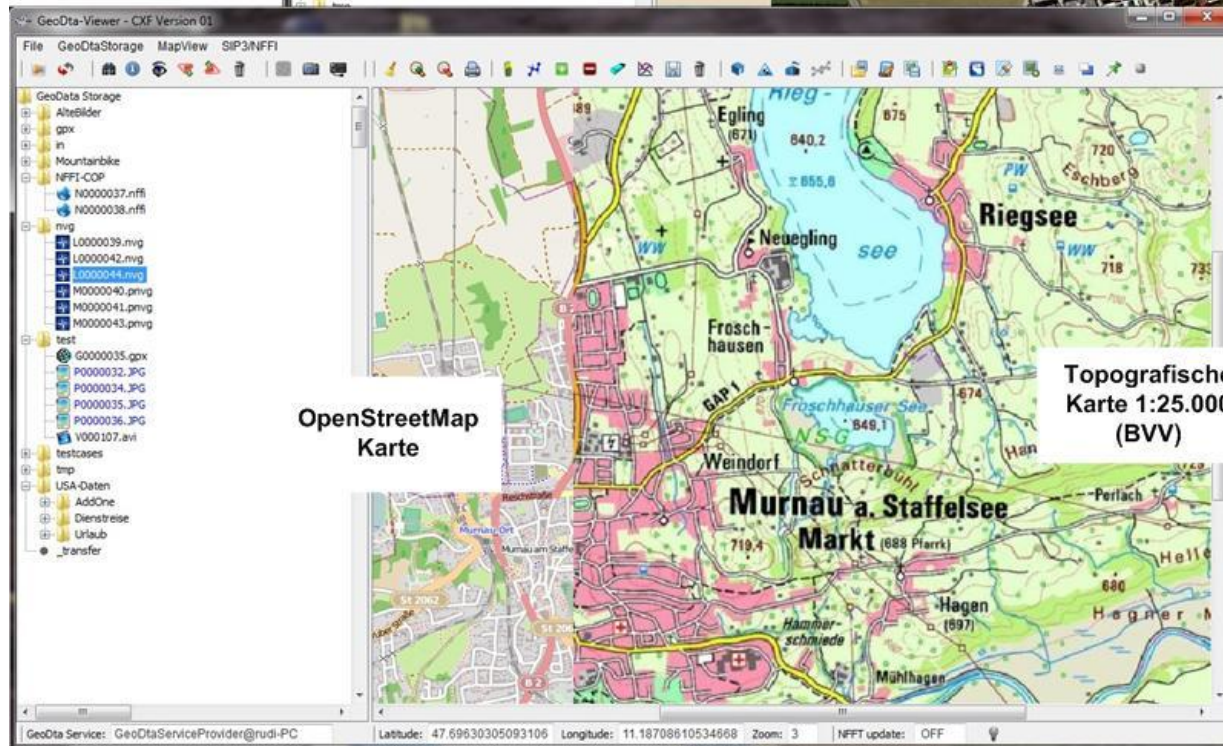
RuDi & OpenGIS/Lage: Anwendungsbeispiele

Luft- bzw. spezifisches Karten Overlay



OpenStreetMap Karte

Luftbild



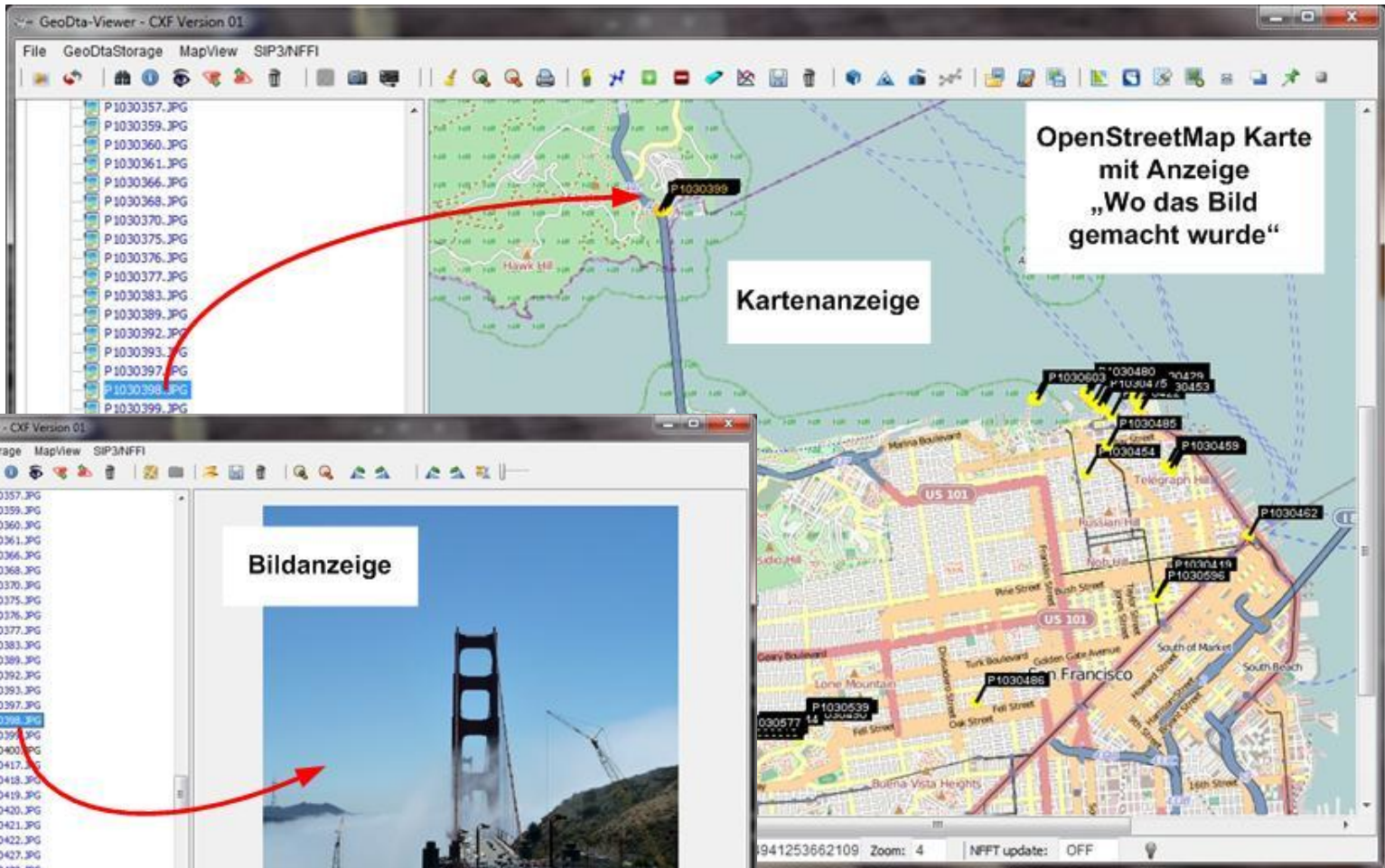
OpenStreetMap Karte

Topografische Karte 1:25.000 (BVV)



RuDi & OpenGIS/Lage: Anwendungsbeispiele

Photoanzeige / Positionsanzeige





RuDi & OpenGIS/Lage: Anwendungsbeispiele

Anzeige Taktischer Daten Link (TDL) Tracks (via WS-Notification)

The screenshot displays the GeoDta-Viewer - CXF Version 2.1 interface. The main window shows a map with several tracked platform tracks represented by colored lines and markers. A detailed data window is open, providing the following information:

Platform Identification Data:	
Number:	30018
TrackSource:	CONSOLIDATED

Platform Positional Data:	
Latitude:	54.20973480469607
Longitude:	7.303469043628795
Validity Time:	2012-06-01T10:50:07.003481Z
Course:	225.00001048586248
Speed:	8.0

Platform additional Data:	
Identity:	HOSTILE
Track Quality:	not defined
Environment:	AIR
RealTime:	not defined

The map shows a coastal area with various locations labeled, including Lütjensdamm, Cuxhaven, Oldenburg, Bremerhaven, and Haderslev. The status bar at the bottom indicates the current coordinates (Latitude: 55.38535176994392, Longitude: 6.7181396484375), Zoom: 9, and NFFI update: OFF.



RuDi & OpenGIS/Lage: Kombiniertes Anwendungsbeispiele

Routenvorgabe / Photos / Höhenprofile / NFFI-Tracking

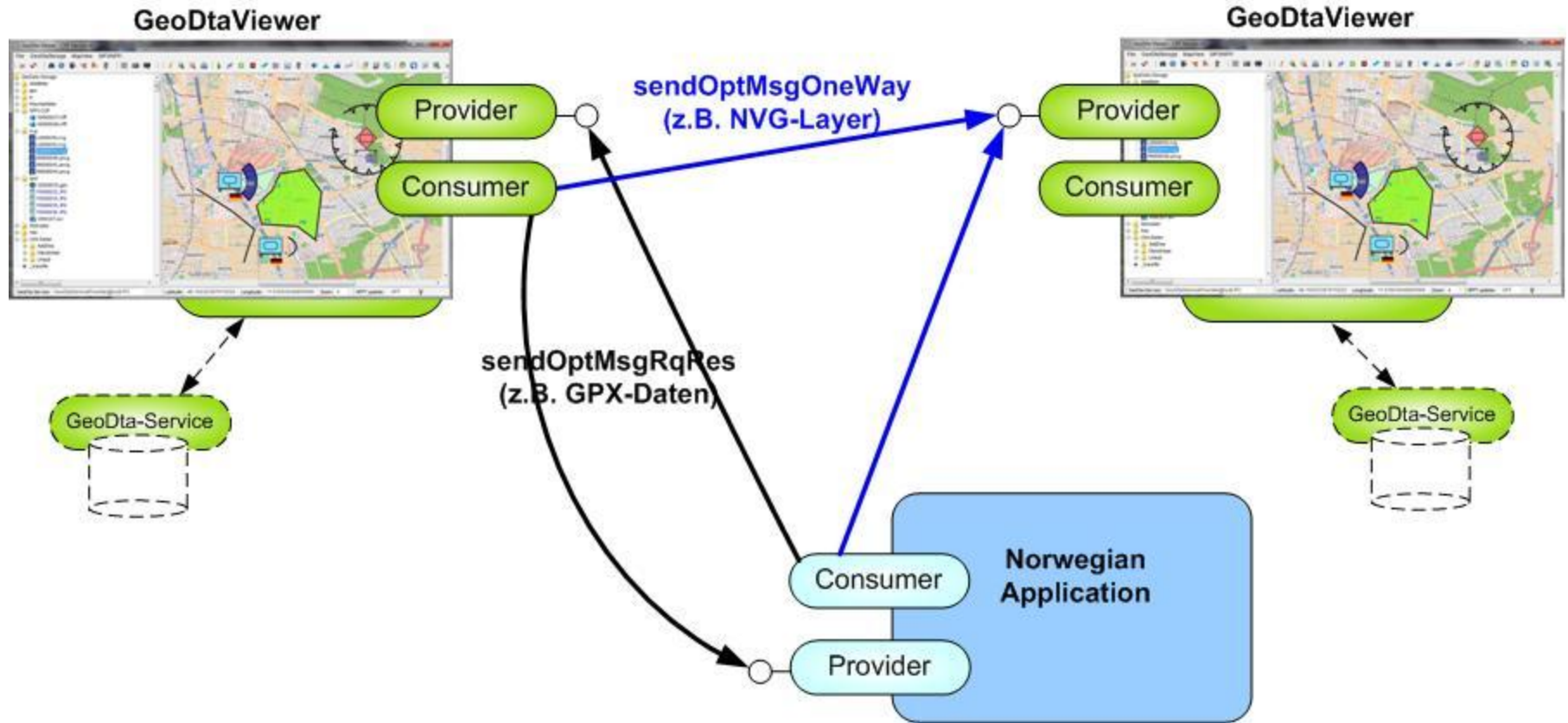
The screenshot displays the GeoData-Viewer - CXF Version 2.1 application interface, which is divided into several functional panels:

- Top Panel:** A map view showing a route with various waypoints labeled (e.g., P1020307, P1020308, P1020305, P1020303, P1020300, P1020314, P1020292, P1020293, P1020292, P1020293, P1020292, P1020293, P1020292, P1020293). A red arrow points from a specific point on the map to the elevation profile panel.
- Left Panel:** A file explorer showing a directory structure for 'GeoData Storage' with subfolders like 'Ahtdler', 'gpx', 'mountainbike', and 'TegernseeGebirgeBikeTour62'. It lists various files including photos (e.g., P1020292.JPG) and GPX files (e.g., TegernseeGebirgeBikeTour62.gpx).
- Top-Left Panel:** A photo viewer showing a cyclist riding on a forest path. A red arrow points from this photo to the corresponding file in the left panel.
- Top-Right Panel:** An elevation profile graph showing altitude (0m to 20m) over distance (0km to 20km). A red arrow points from a specific point on the profile to the map. Below the graph, it displays: 'GPS Point: 106 km: 1.844 Altitude: 915 m'.
- Bottom-Right Panel:** A 'Display of a notify NFFI entry' dialog box. It shows unit identification data (Shortname: GM211-1, Symbol: SFG-UCAT-MOGM-), positional data (Country: Germany, System: Intelligence, Longitude: 11.8922099, Subsystem: Ilts, Latitude: 47.7054606, TransponderID: car01, Altitude: 878.7824707, Date: 2012-04-26T07:24:27.926Z), and operational status (Status code: OPERATIONAL, Footprint: null, Strength: null).



RuDi & OpenGIS/Lage: Kombiniertes Anwendungsbeispiele

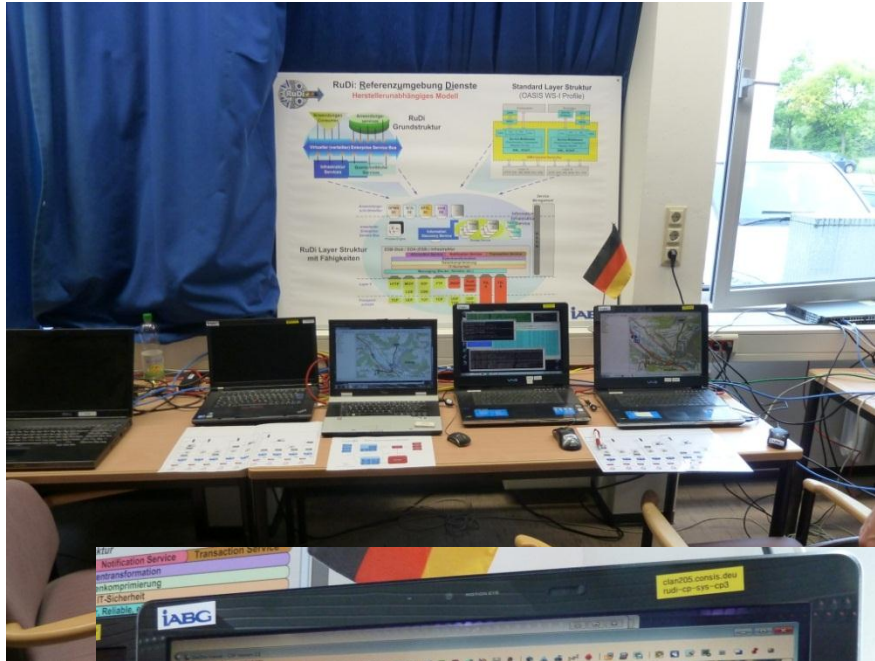
Operational-Message-Service: Senden & Empfangen von GIS-Daten



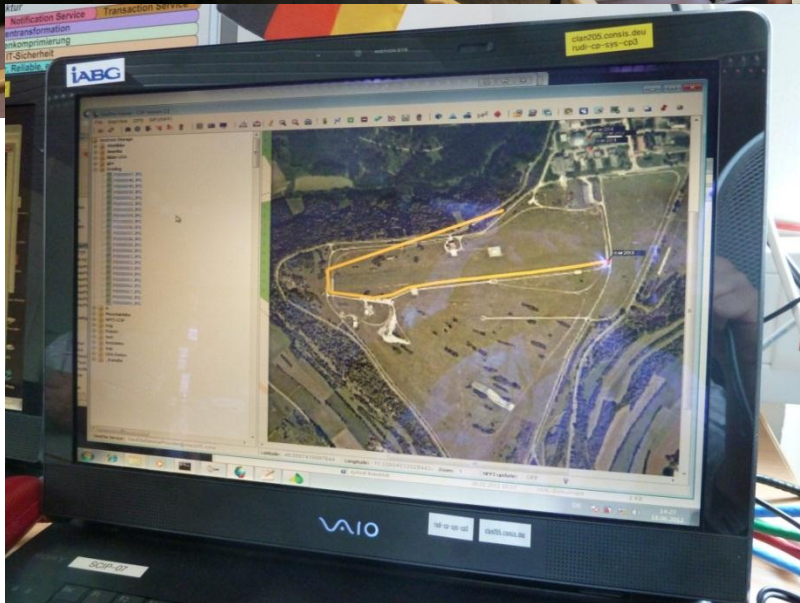


RuDi & OpenGIS/Lage: Life bei WTD81 (CoNSIS Experiment)

Verlegbarer Gefechtsstand



Mobiler Knoten





OpenGIS/Lage mit Multilevel und –layer Sicherheitsfähigkeiten



Ziel ein Multilevel u. –layer Fähigkeit zu unterstützen mit:

- **Authentication** (Prüfung der Identität – Identifizierung)
- **Authorization** (Prüfung der Berechtigung –Zugriffsberechtigung)
- **Encryption** (digitale Verschlüsselung)
- **Signature** (digitale Unterschrift)
- **Labeling** (digitale Kennzeichnung von Informationsobjekten)

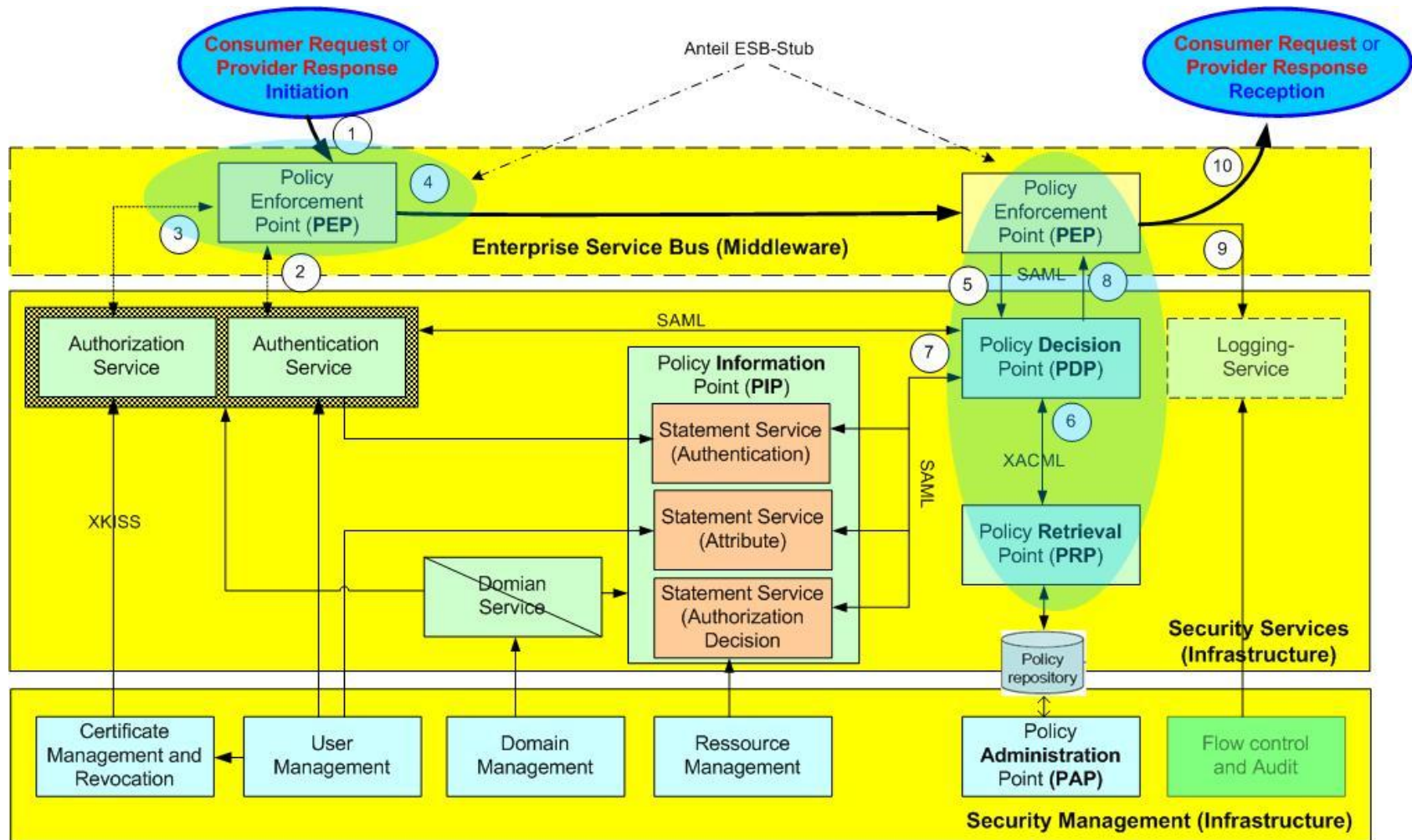
Hierzu wird basierend auf dem **SOA Gedanken** „*bestehende Fähigkeiten & Standards zu verwenden*“ die:

- **IT-Sicherheit** (OASIS Standard WS*-Security, etc.)
 - **NATO Standard zum Labeln** (Kennzeichnung von Daten)
- der Referenzumgebung Dienste (RuDi) genutzt.



RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur

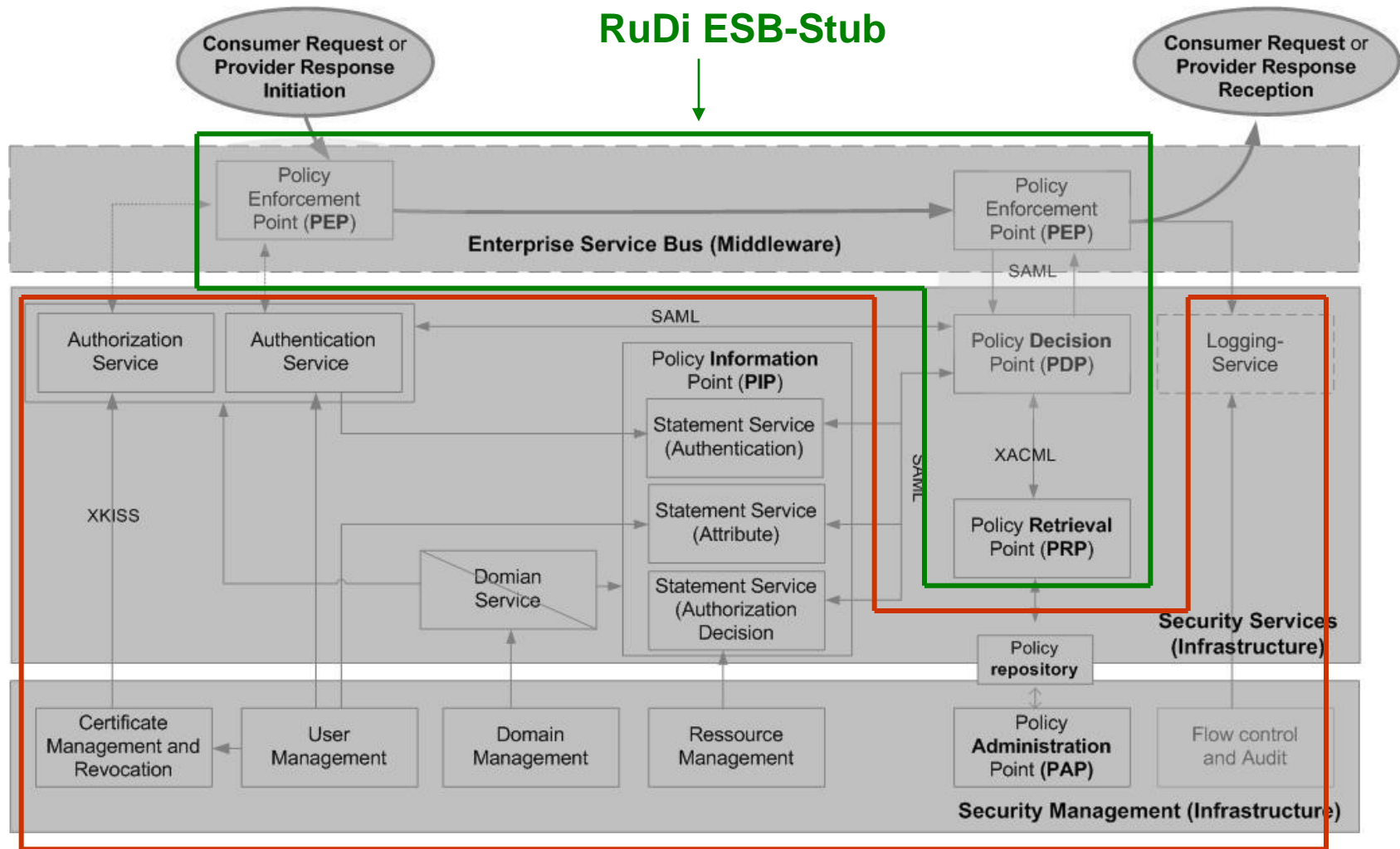
Basismodell basiert auf OASIS-Standards: WS*-Security etc.





RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur

RuDi Realisierung: Aufteilung in ESB-Stub und SOA-Infrastruktur

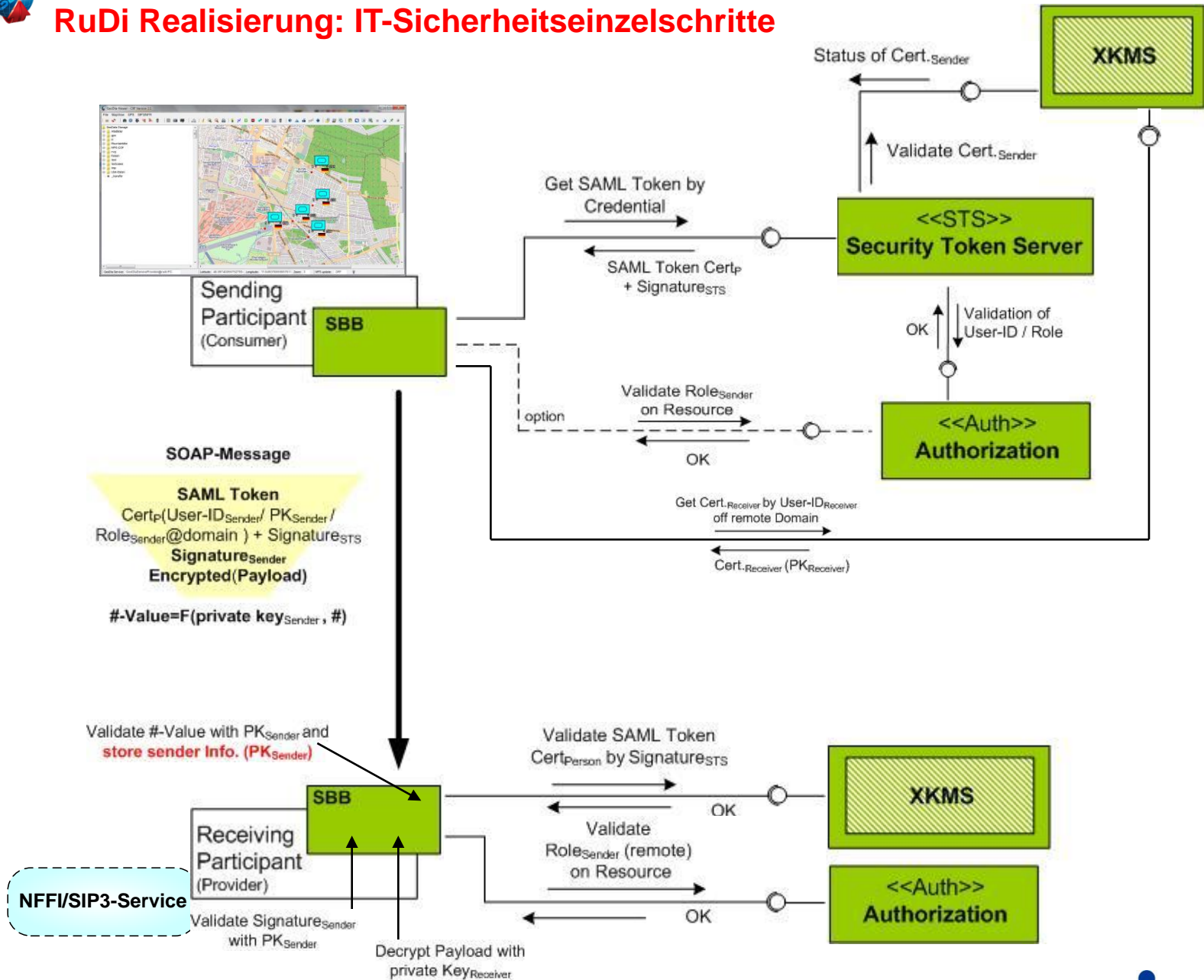


RuDi SOA-(ESB-)Infrastruktur



RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur

RuDi Realisierung: IT-Sicherheitseinzelschritte





RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur

Beispiel: RuDi IT-Sicherheitseinstellungen

Participant Policy

The screenshot displays the RuDi Service Registry Explorer interface. On the left, the 'Service Registry View' shows a tree structure of services. A red circle highlights the 'SIP3_Service_ReqRes@vn1.rudi.deu' service, with the label 'Provider with policy' next to it. A red arrow points from this service to the 'RuDi-Explorer - Change/Update Participant Policy' window. This window shows 'Participant Policies' with 'DeleteDataOperation' circled in red. Another red arrow points from this operation to the 'RuDi-Explorer: Change/Update new operational Policy' window. This window shows the 'Policy Definition' with 'Shortname: MTBopdxauth' and 'URI: MTBopdxauth'. Below this, 'Policy Assertions' are listed with checkboxes for 'HTTP Transport', 'Authentication (SAML-Token)', 'Authorization', 'SOAP body Signature', 'SOAP body Encryption', 'Labeling', and 'Compression for SOAP body (GZip)'. The XML code for the policy definition is also visible.

Participant Policy

Operational Policy

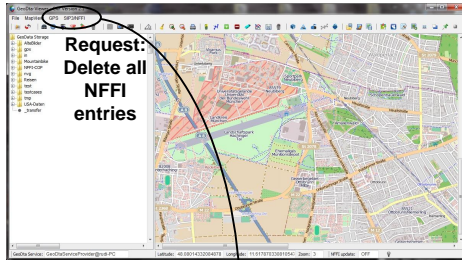
Policy Assertions

Provider with policy



RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur

Beispiel: Service-Operation mit WS*-Security



HTTP-Tracer

Admin | Port 14715

Stop Listen Port: 14715 Host: 127.0.0.1 Port: 14711 Proxy

State	Time	Request Host	Target Host	Request...	Elapsed Time
Done	2012-08-07 07:26:11	127.0.0.1	127.0.0.1	POST /services/reqRes_Service/HTTP/1.1	14036

```

<wss:Security xmlns:wss="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd" xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.xsd" xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion" xmlns:xs="http://www.w3.org/2001/XMLSchema-instance" >
  <saml:Issuer/>
  <ds:Signature xmlns:ds="http://www.w3.org/2000/09/xmldsig#" >
    <ds:SignedInfo >
      <ds:CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
      <ds:SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />
      <ds:Reference URI="#_5B0F4FF79DA8C2D3C913443243716597" >
        <ds:Transforms >
          <ds:Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
          <ds:Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
          <ec:InclusiveNamespaces xmlns:ec="http://www.w3.org/2001/10/xml-exc-c14n#" PrefixList="xs" />
        </ds:Transforms >
        <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
        <ds:DigestValue>dNGNtUd6H4YtRPR6LYdaUfYdIJE=</ds:DigestValue >
      </ds:Reference >
    </ds:SignedInfo >
    <ds:SignatureValue>B0SYFS8D2AJCS31AC2ekwG5QtpMppfXgQBKAkpDUuoC4Hoj5UwKE2jrOaIOwgvzpPn3h+CWDPvKGl4UdmSwCD</ds:SignatureValue >
    <ds:KeyInfo >
      <ds:X509Data >
        <ds:X509Certificate>MIICtCCAdqgAwIBAgICBBIwDQYJKoZIhvcNAQEFBQAwHDEaMBGGA1UECwwRUnVEaV99DQITaxQHJ1ZG
      </ds:X509Certificate >
    </ds:KeyInfo >
  </ds:Signature >
</wss:Security >
  
```

XML Format Save Resend Switch Layout Close

Security Token

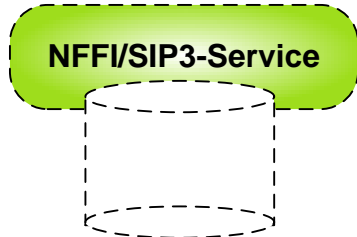
Signature

Zertifikat

SOAP-Message

SAML Token
 [Cert_P(User-ID_{Sender}/PK_{Sender}) +
 Role_{Sender}@domain] + Signature_{STS}
 Signature_{Sender}
 Encrypted(Payload)

#-Value=F(private key_{Sender}, #)

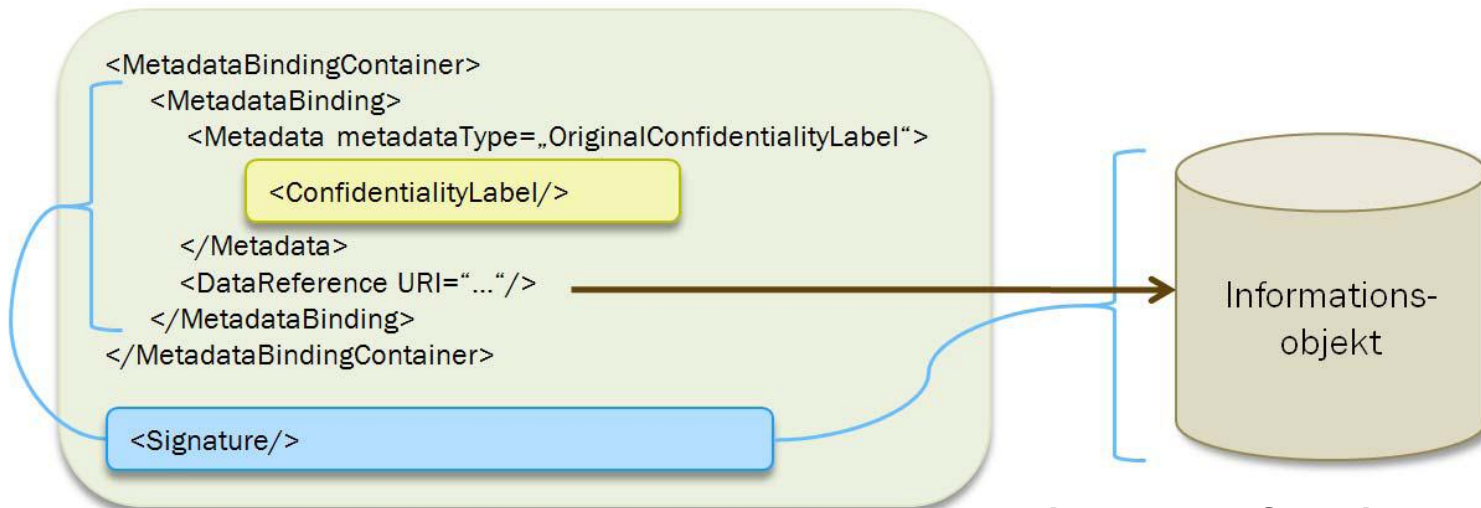




Confidentiality Label (Beispiel)

```
<ConfidentialityLabel>  
  <ConfidentialityInformation>  
    <PolicyIdentifier>DEU</PolicyIdentifier>  
    <Classification>GEHEIM</Classification>  
    <Category Type=„RESTRICTIVE“>  
      <GenericValue>Nur Deutschen zur Kenntnis</GenericValue>  
    </Category>  
  </ConfidentialityInformation>  
</ConfidentialityLabel>
```

Basis: NATO „XML Labelling and Binding“ / „NATO Research Task Group on XML in Cross-domain Security Solutions (RTG-031/IST-068)“.

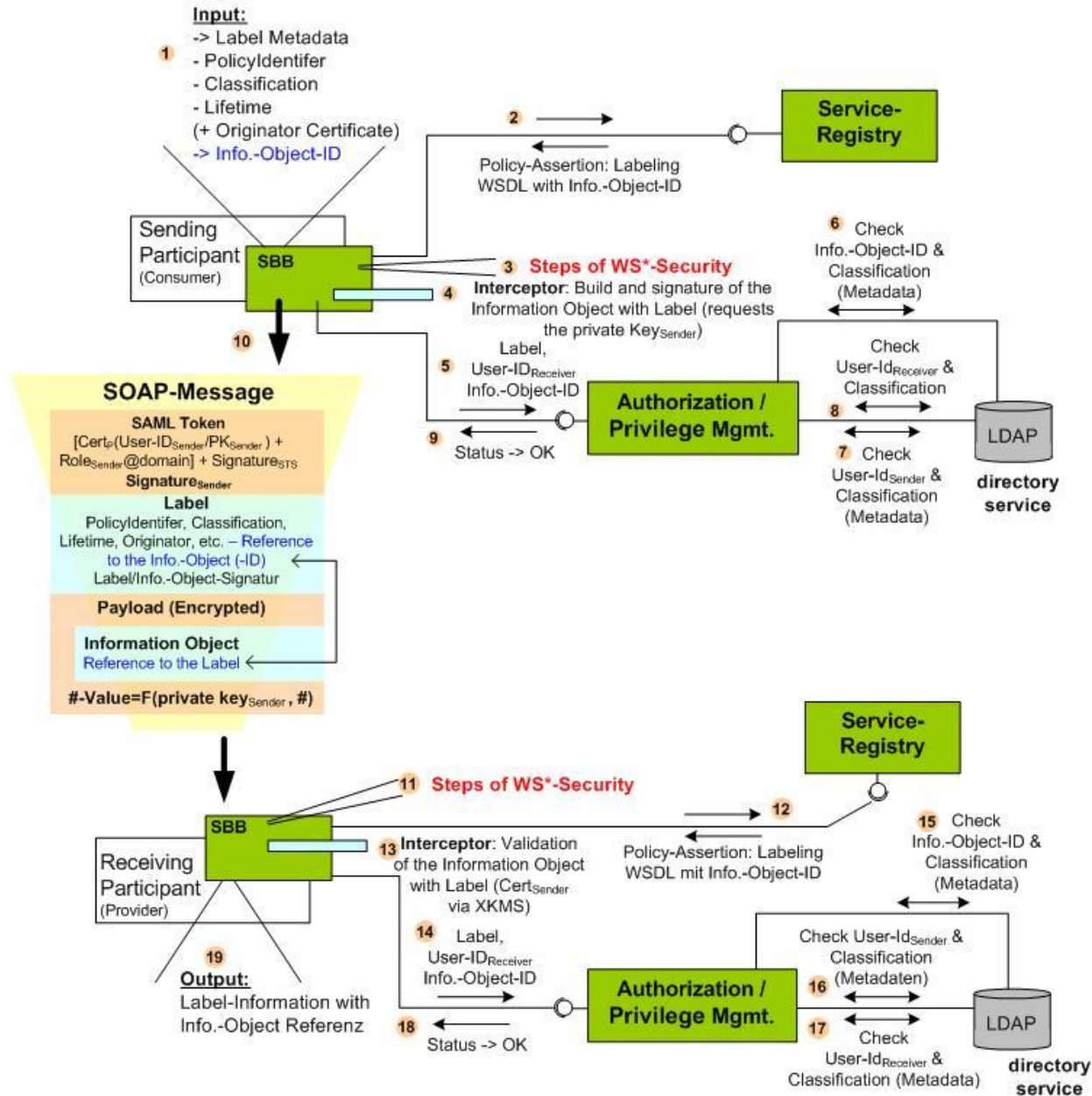


Bindung des Security Labels an ein Informationsobjekt via Signatur



RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur

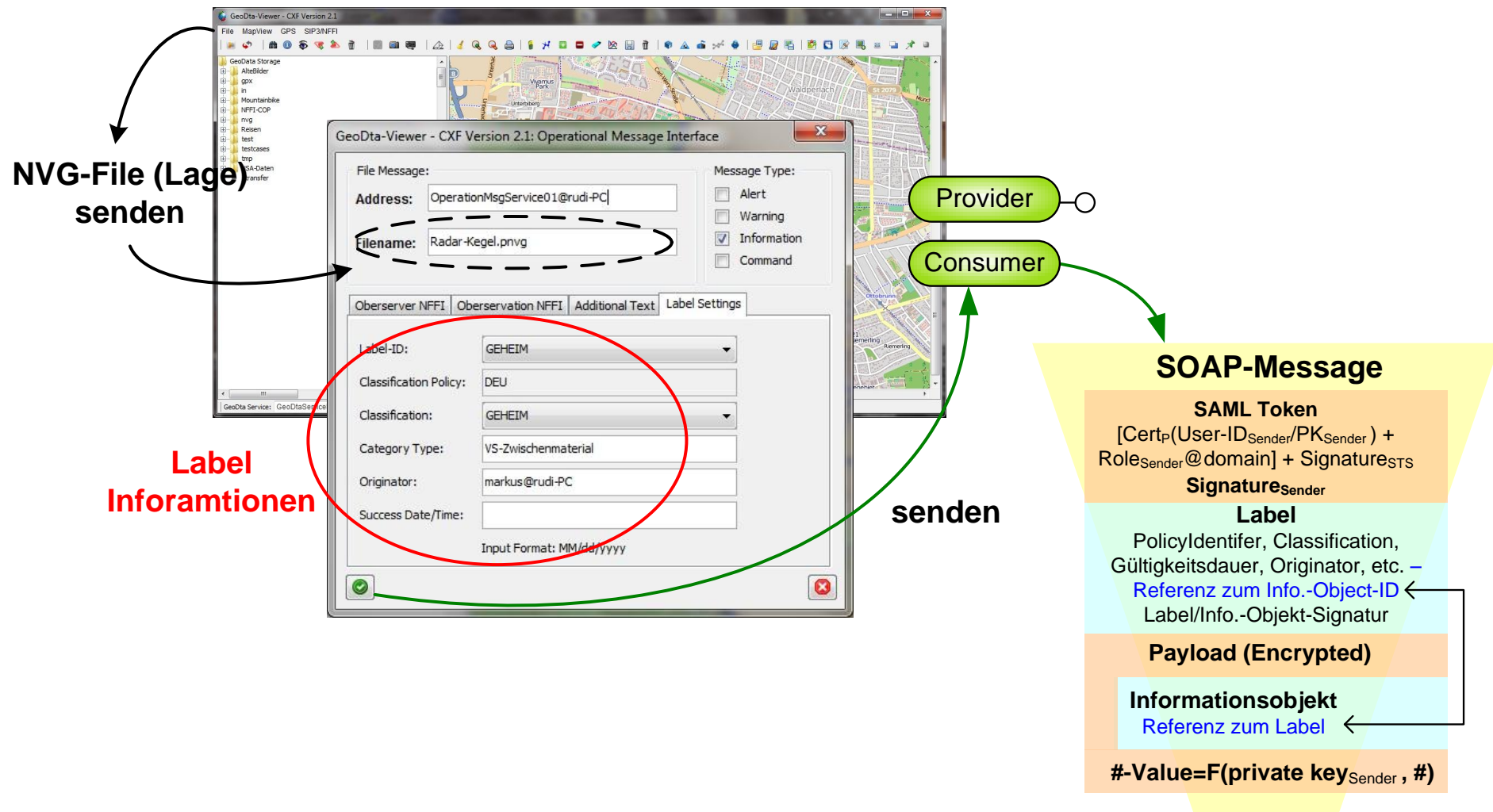
SOAP-Message Erweiterung: RuDi Message Flow mit Labeling





RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur

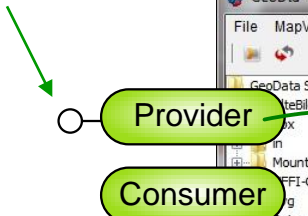
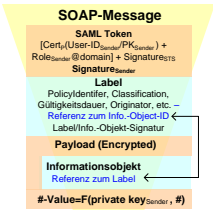
Beispiel: Senden einer gelabelten NVG Lage (VS-Zwischenmaterial/GEHEIM)





RuDi & OpenGIS/Lage: IT-Sicherheitsarchitektur / Labeling

Beispiel: Empfangen und Anzeigen einer gelabelten NVG Lage



GeoData-Viewer - CXF Version 2.1

File Message:
Address: OperationMsgService01@rudi-PC
Filename: Radar-Kegel.pnvg

Message Type:
 Alert
 Warning
 Information
 Command

Observer NFFI | Observation NFFI | Additional Text | Label Settings

Label-ID: GEHEIM
Classification Policy: DEU
Classification: GEHEIM
Category Type: VS-Zwischenmaterial
Originator: markus@rudi-PC

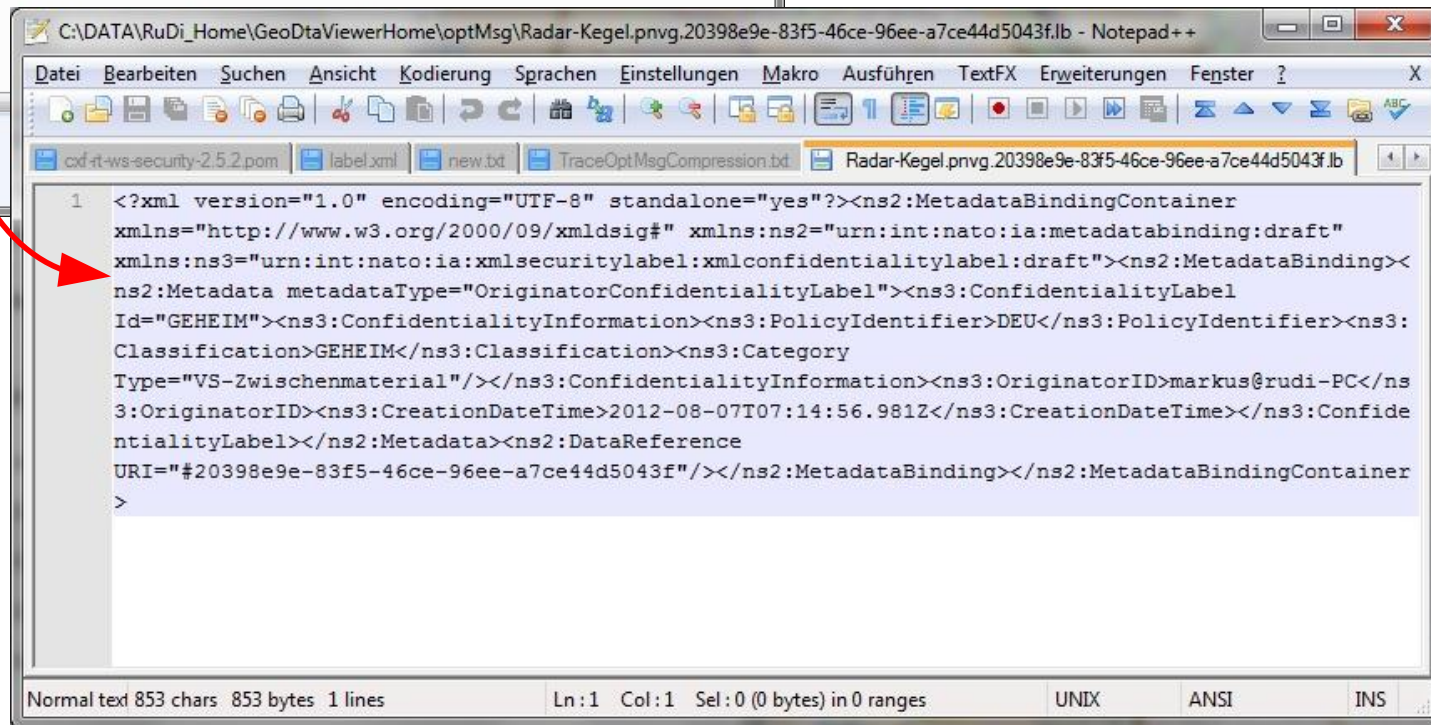
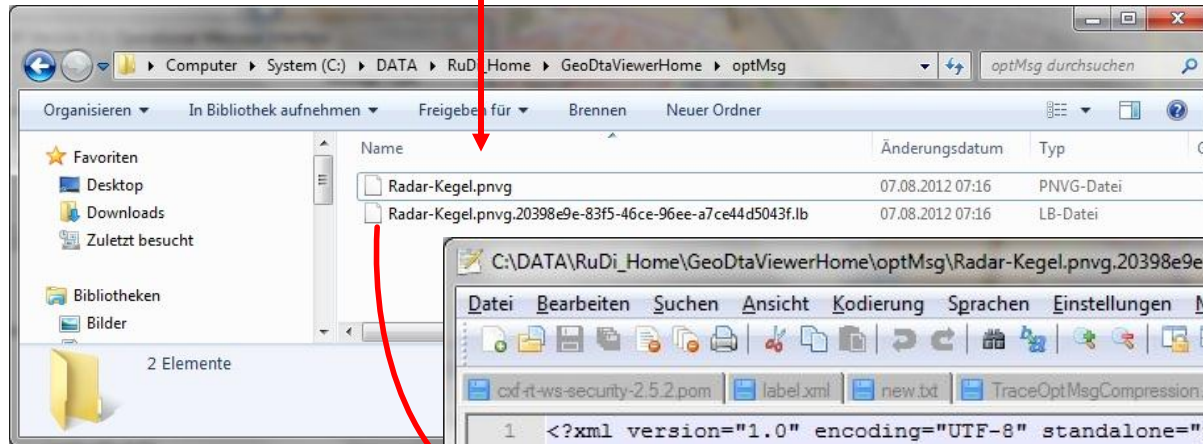
NVG-File (Lage) anzeigen

Label Inforamtionen

NVG-File (Lage) und Label gespeichert



Informatinsobjekt & Label



**Label File
(Inhalt)**

Fragen?

Markus Franke

System-Ingenieur

Führungs- & Kommunikationssysteme

(Projektleiter RuDi & OpenGIS/Lage Ersteller)

Tel.: 089 / 6088 2497

Email: Markus.Franke@iabg.de

