

INSPIRATION – Spatial Data Infrastructure in the Western Balkans



Enforcement and implementation of licensing regarding SDI - Geo Rights Management -

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November 21-22, 2012, Zagreb

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What is (Geo) Rights Management?



- **Rights Management**
 - Access control
 - Policy management
 - License management
 - User management and authentication
- **Geo-specific requirements**
 - Seamless SDI integration
 - Spatial authorization
 - Non-atomic data





Rights Management and Security

- **Rights management defines and maintains policies**
- **Security enforces policies**
- **Security aspects**
 - Confidentiality
 - Integrity
 - Authenticity
 - Non-repudiation
 - ...





How is security achieved?

- **Confidentiality**
 - Protection from unauthorized reading
 - Encryption
- **Integrity**
 - Protection from data manipulation
 - Signature
- **Authenticity**
 - Protection from simulating a false originator
 - Signature
- **Non-repudiation**
 - Evidence for existence of communication
 - Storage of signed messages





Encryption and Signature

- **Asynchronous cryptography (Public Key Cryptography)**
- **Foundation: Pair of keys**
 - Private key: Has to be kept secret by its owner
 - Public key: Can be shared arbitrarily
- **Data encrypted with the private key can only be decrypted by the according public key (signature)**
- **Data encrypted with the public key can only be decrypted by the according private key (encryption)**



Requirements for a Security Concept



- **Fulfill security requirements!**
- **Typically: Access control for SDI services**
- **Requirements:**
 - User is identified
 - Verification of request originator (authenticity)
 - Safeguarding that request is not modified (integrity)
 - Protection from unauthorized reading of requests and responses (confidentiality)
 - Especially for commercial transactions: Provide evidence for the communication (non-repudiation)





Access Control

- **Enforcement of policies**
- **Policy: Combination of...**
 - Subjects (users)
 - Resources (services, feature types, layers, ...)
 - Actions (GetMap, GetFeatureInfo, GetFeature, Transaction, ...)
 - potentially obligations („Yes, but...”)
- **On request**
 - Analysis of requests (subject, resources, Action)
 - Check if request is covered by policies
 - Decision (yes, no, yes but...)





How to get a permission?

- **Classic: Assignment by administrator**
 - Legal agreements have to exist
 - Especially suitable for routine processes
- **Dynamic: Online licensing**
 - Electronic license conclusion
 - Result: License (legal and technical)
 - License contains access rights
 - License may be charged





Electronic Licensing

- **2 Aspects:**
 - License conclusion
 - License enforcement
- **What is a license (technically)?**
 - Evidence for a permission
 - Agreement between user and provider
 - A contract
 - A certificate of rights and duties





What is a Licence?

- ...a permission for something which is otherwise forbidden.
- ...a permission to use.
- ...a „Sharing agreement“.

- Licence contract
 - An agreement to give a licence to somebody
 - Defines rights and duties of involved parties
 - A representation of permissions for an entity to use certain resources under certain conditions



What is your current status in terms of rights management?



- How do you licence?
- To whom?
- (How) do you charge?
- (How) do you measure?
- Which (kinds of) services are subject to rights management?
- How do you convey terms of use?
- What are your current use cases?
- What are your intended use cases?
- Which impact does INSPIRE have?
- How far do you want to automise?
- How does this relate to your e-commerce solution?
- ...?



Different Ways of Licensing





Different Kinds of Licences

- DRM style
 - Licence allows use of a certain data set
 - Well-known in the music industry
 - Could mean giving away the data set for free and trust the DRM technology to allow usage only as defined in a licence
- Access control style
 - Licence allows access to services
 - Usage restrictions can be applied, but are not enforced
 - Basic assumption: Users can be trusted not to violate the licence conditions





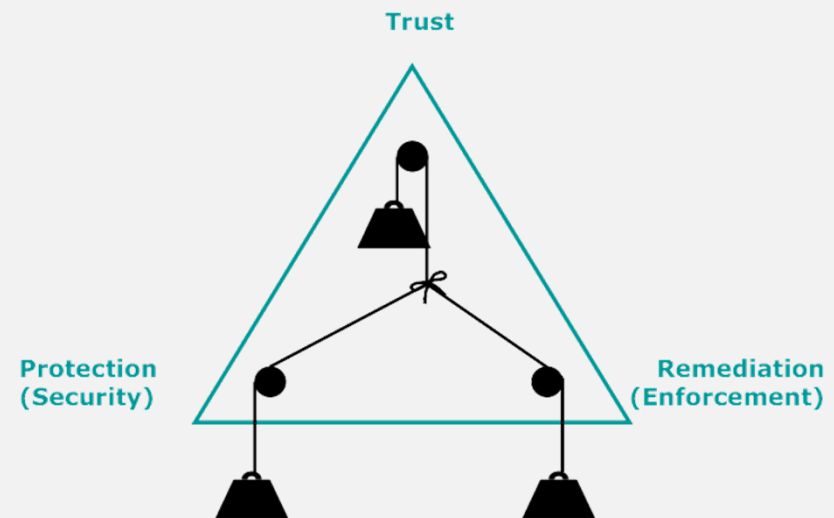
Trust or Protection?

- Balancing

- Trust
- Protection
- Remediation

- For each system:

- All aspects should be in balance
- ‚Sweet spot‘ may vary from system to system



Source: OGC Document 06-004r4
Geospatial Digital Rights Management
Reference Model (GeoDRM RM)



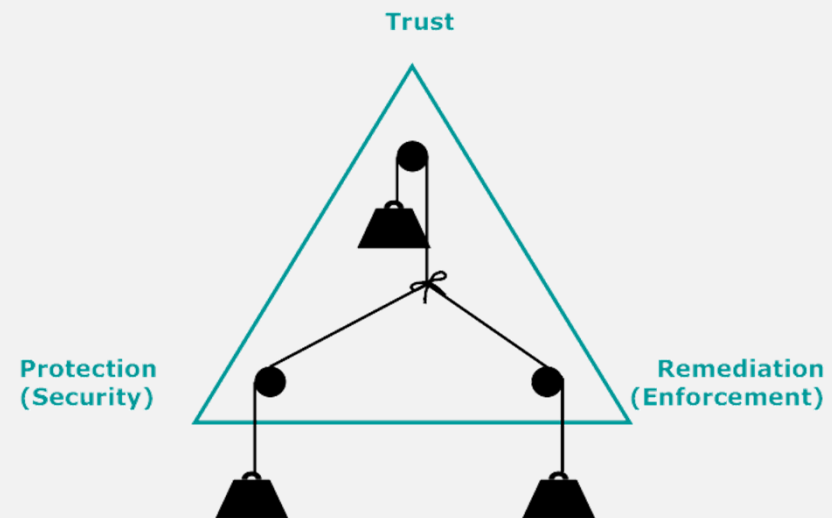
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Trust or Protection?

- **Where is the value?**
 - In the data!
- **What is protected?**
 - Service access, rather than data usage
- **Why?**
 - Trust!
 - Typical assumption:
 - Protection against unauthorized access
 - Trust in authorized users



Source: OGC Document 06-004r4
Geospatial Digital Rights Management
Reference Model (GeoDRM RM)



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Requirements for Online Licensing



- **Complete coverage of offline licenses**
- **Elements of an electronic license:**
 - Licensee and licensor
 - Rights and duties
 - Access rights
 - Usage rights
 - Service level agreements
 - Duration
 - Costs
 - Legal terms (disclaimers, terms and conditions, ...)
 - ...





Advantages of Online-Licensing

- Speed
 - Licence can be used immediately after conclusion
- Efforts
 - No manual interference of the data provider, just define the models
- Transparency
 - Licence models can always be checked, calculated automatically, reproduceable
- Measurement
 - Intensity of use can be tracked (and charged) individually
- Marketing
 - Ease of use may attract new customers



CHALLENGES FOR LICENSING SOLUTIONS



- Be generic
 - Support different license models
 - Click-through vs. configurable licenses
 - Free of charge vs. flat rate vs. pay-per-use
 - Pre-paid vs. post-paid
 - General access vs. user-specific access vs. license configuration-based access
 - Provide an easy-to-use workflow to
 - clearly convey license terms
 - allow easy license conclusion
 - give immediate access
 - limit access to license terms



Legal Background for Online licensing



- **INSPIRE Directive, Article 14/4**
 - Where public authorities levy charges for the services [...], Member States shall ensure that e-commerce services are available. Such services may be covered by disclaimers, click-licences or, where necessary, licences.
- **This is currently transformed in national law**
 - In Germany: “Geodatenzugangsgesetz”



(Geo) Rights Management Standards



- **ISO TC211** has released two international standards relating to DRM, based on work originating from the Open Geospatial Consortium (OGC) consensus building process
 - **ISO 19149**, Geographic information - **Rights expression language for geographic information** – GeoREL
 - **ISO 19153**, Geographic information – **Geospatial Digital Rights Management Reference Model** (GeoDRM RM)
 - Abstract framework



(Geo) Rights Management Standards



- **OGC GeoDRM Reference Model**
 - Abstract framework
- **OASIS WS-Security**
 - Encryption and signature
 - Protocol extensions (Security Token)
- **OASIS XACML / OGC GeoXACML**
 - Rights definition language
- **OASIS SAML**
 - Definition language for Security Tokens (Identity, Licenses)



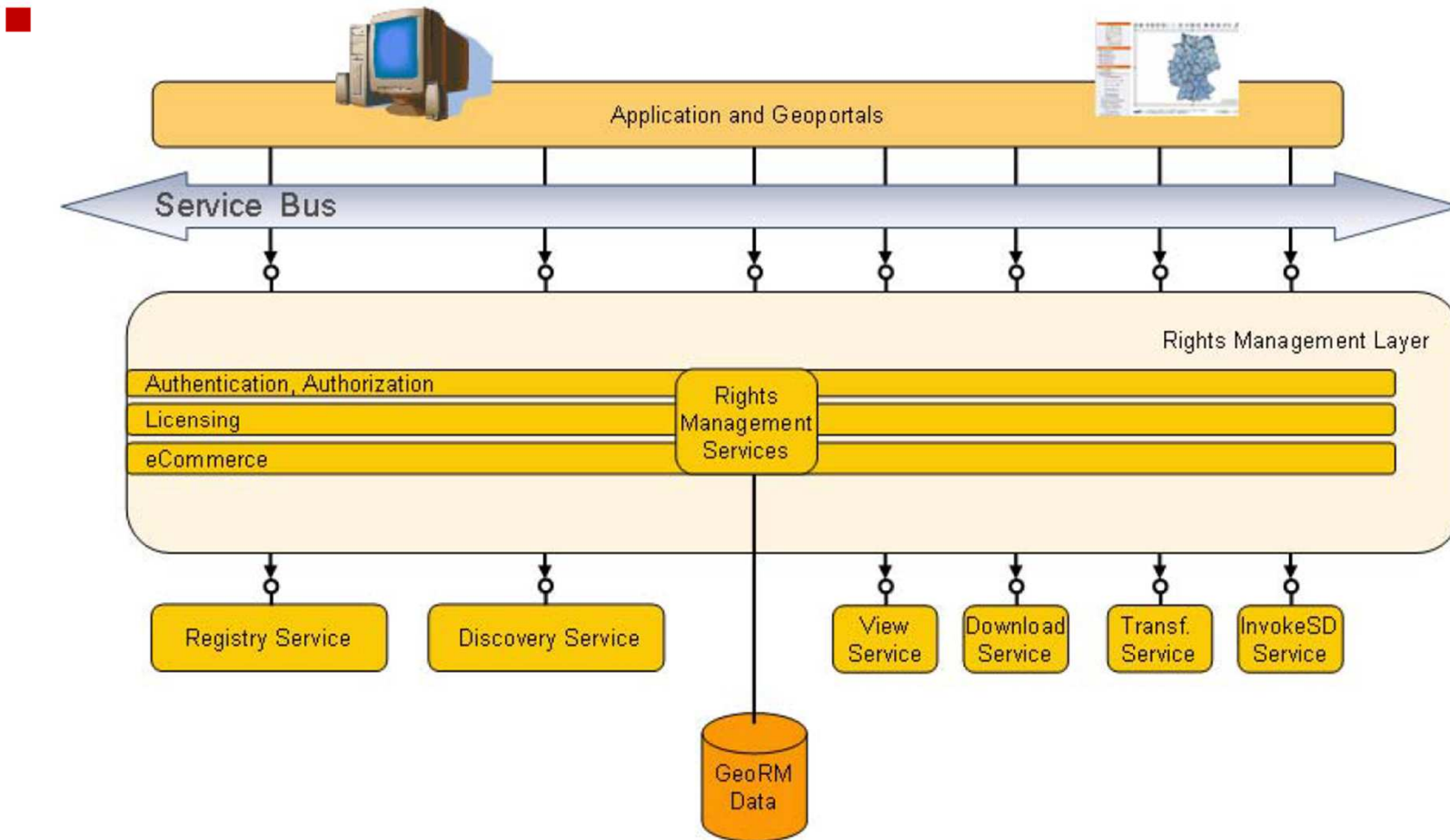
(Geo) Rights Management Standards



- **W3C WS-MetadataExchange / WS-Policy / WS-SecurityPolicy**
 - Description of technical service metadata
- **OGC GeoRM Common (work in progress)**
 - Extension of service interfaces (SAML)
 - Extension of protocols (WS-Security)
 - Extension of service metadata (WS-MEX, WS-Policy)
 - Extension of error handling
- **INSPIRE (Network Services Architecture Draft 3.0)**
 - Extension of protocols („Rights Management Key“)
 - Consistent to OGC and OASIS



Rights Management and INSPIRE Network Services



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IMPLEMENTING A LICENSE MANAGEMENT REGIME



- License management involves two types of information management
- Security management for access to the information asset
- Managing licensing terms
- Example of software that implements both forms of management is sdi.suite from con terra GmbH
 - securityManager
 - licenseManager





Foundation of licenseManager

- Generic license model definition
 - Who is allowed to get this license?
 - What is the license duration?
 - Is it an individual or a group license?
 - What are the terms of use?
 - Are there generic parameters? Such as
 - Enumeration (e. g. purpose of use: commercial, private, education, ...)
 - Boolean (e. g. give access to 3rd parties?)
 - Numeric (e. g. how many users?)
 - Text (whatever...)



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licenseManager sdi.suite con•terra

Users | Protected Services | Policies | **License Models** | Licenses | Gates | Administrator | Start Page | My Profile | Logout

License repository (7)

- URL (3)
- INSPIRE Feature Download (0)
- INSPIRE View (1)
- WCS (0)
- WFS (0)
- WFS-T (0)
- WMS (3)
 - Brandenburg-DNM
 - NRW-Mineralien_License
 - TOP_Sachsen

License model available for the following roles

Choose role

- Alle_Autobahnen
- Alle_Flächen
- Alle_Flächen2
- BB

License model is available for all roles

License duration

Choose duration

- 1 Month
- 6 Months
- 1 Year
- 5 Years

Delete New Days

Licensee

Choose license user

- Individual
- Group of licensee
- configurable, default Individual

License texts

Choose text element

- Licence Conditions
- Schedules

New Edit Delete

License parameter

Choose Parameter

- purpose
- 3rd
- users

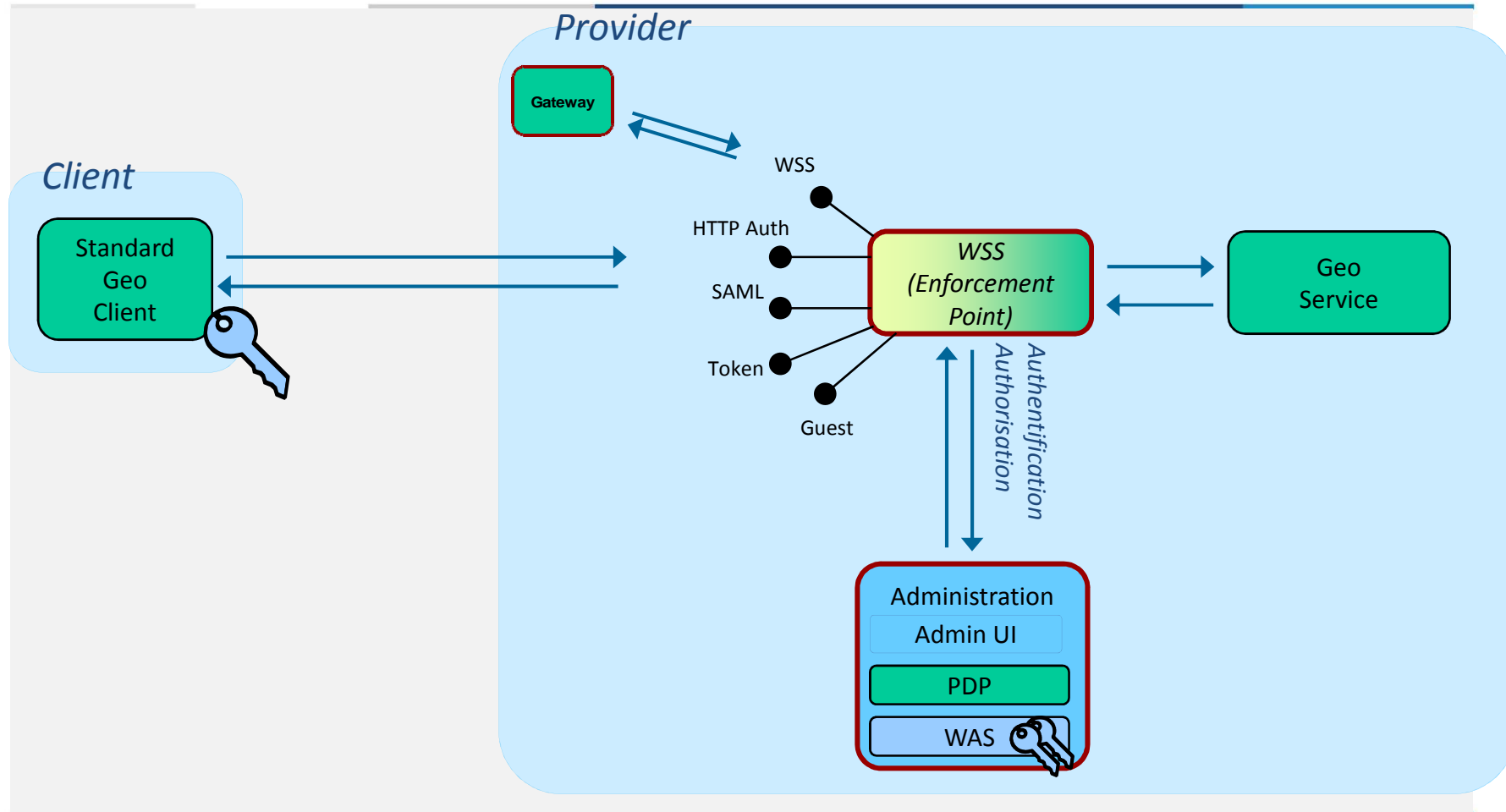


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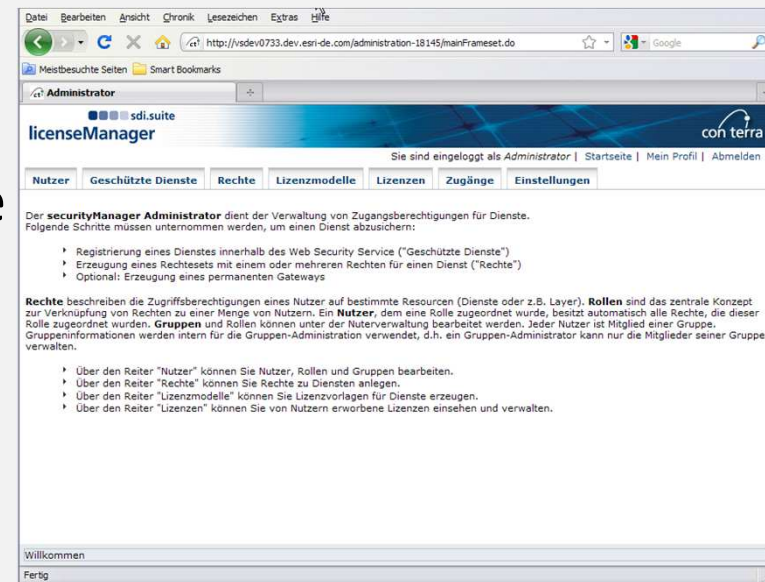
licenseManager Architecture





Administrator

- User and license management
- Self-registration and user pages
- Management of enforcement points
- Management of licence models
- Management of licences
- Management of gates
- Everything is stored in a database



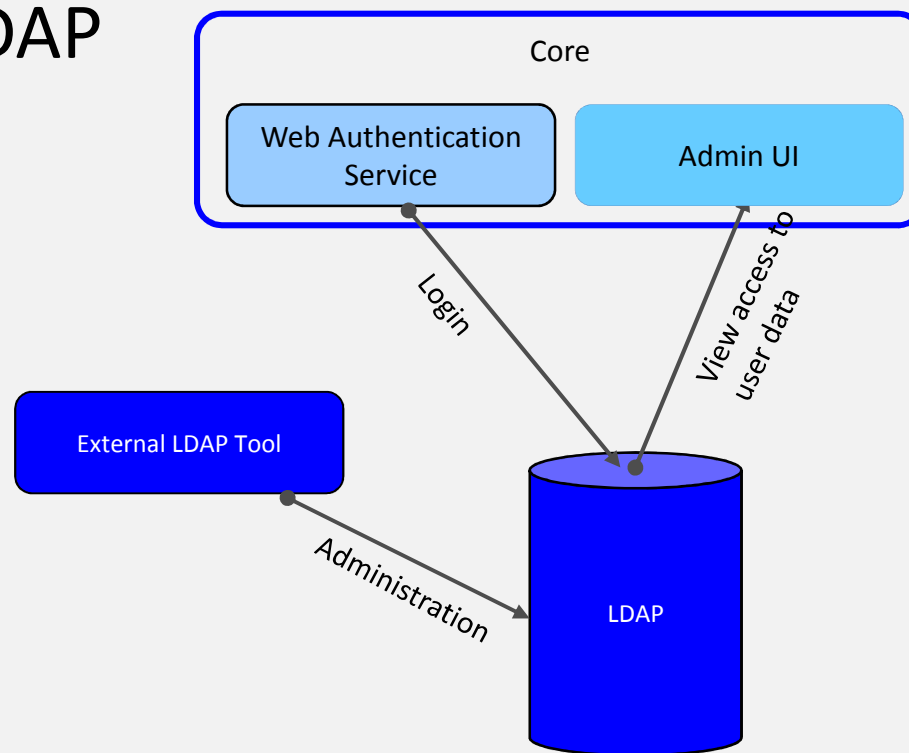
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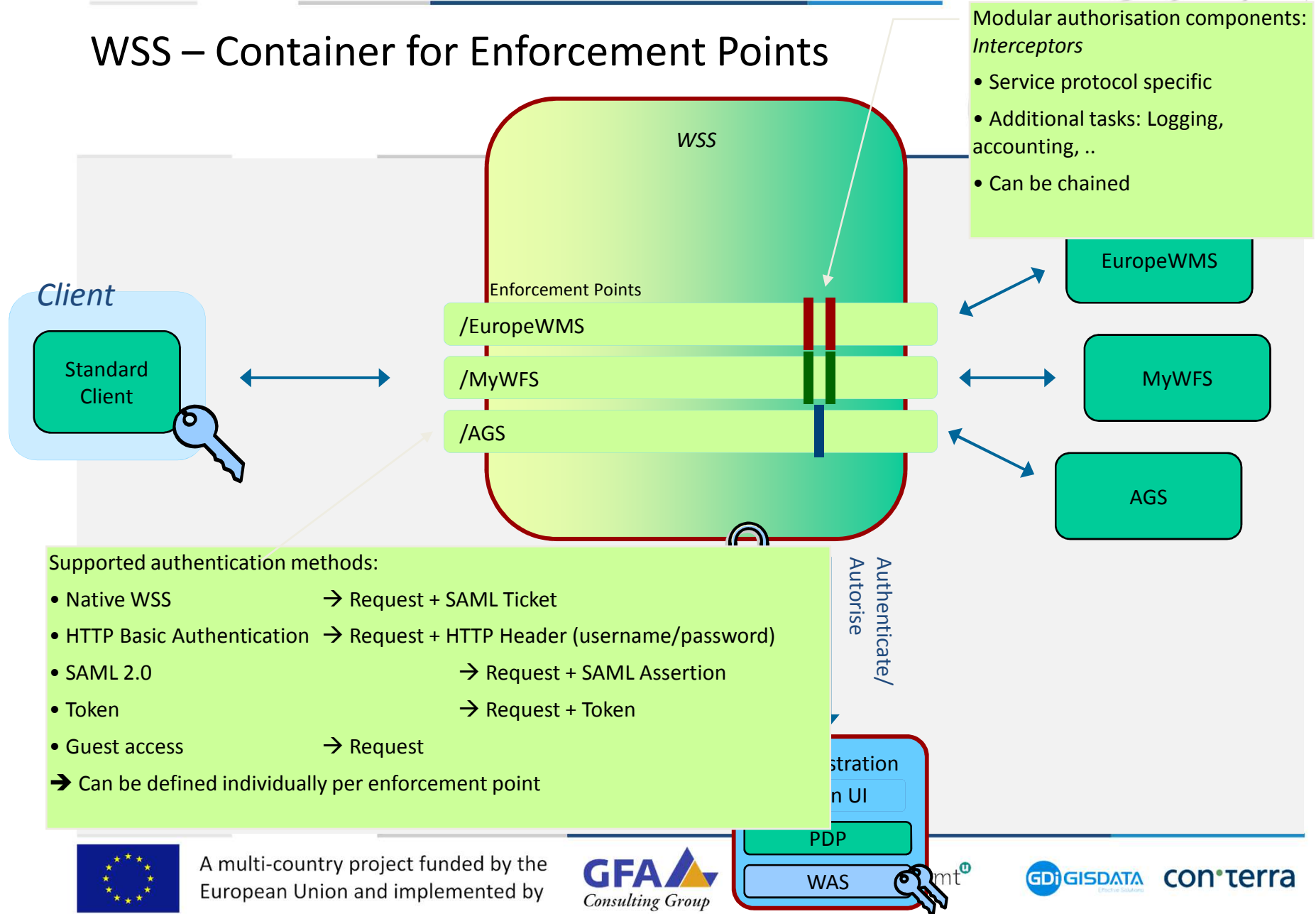


Use of Existing LDAP Systems

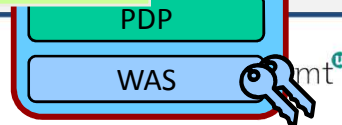
- Web Authentication Service can authenticate to LDAP system
- User information is requested from the LDAP (and mapped to roles, groups, etc.)
- User management by LDAP administration
- Read-only access
- No self-registration via licenseManager



WSS – Container for Enforcement Points



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Spatial Authorisation

- Available for
 - WMS, WFS, INSPIRE View, INSPIRE Download
- Spatial restrictions for
 - map visualisation (clipping)
 - requesting vector data: identification, queries, etc.
- Results:
 - Raster data: clipping to the authorised area
 - Vector data: spatial filter is added → only objects within the authorised area will be requested
- Authorisation geometries will be provided by WFS



ACCESS POLICIES AND PRICE MODELS



- Assign
 - Layer / Feature Type permissions
 - Operation permissions
 - Spatial permissions
 - Either fixed or configurable
- Define
 - Price model for license acquisition
 - Base price matrix and factors for all configuration options
 - Price model for usage
 - Price per request / feature / megapixel...
 - May also depend on configuration options





licenseManager’s Policy Model

- Policies are based on a triple of Resource | Subject | Action

ID	Resource	Subject	Action
1	WMS A	gartmann	Access
2	Layer topo	*	GetMap

- Policies can include obligations and conditions

ID	Resource	Subject	Action	Obligation
1	WMS A	gartmann	GetMap	Area of Belfast

- Policy decision
 - Yes / no (permit / deny)
 - Obligations (yes, but...)

Decision	Obligation
Permit	Area of Belfast





Licence Conclusion

- By administrator (on behalf)
- By user
- Via Gateway



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Manage Gates

- Goal: Access from standard clients



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Licence Management

- Administrator can see all licences
- User can see own licences
- All parameters are provided (including access URLs)
- Display of all accounted costs since last invoice
- Gateway workflow offers existing licences





Further Administration Aspects

- E-mailing:
 - Based on Apache Velocity
 - <http://velocity.apache.org/engine/releases/velocity-1.6.2/user-guide.htm>
 - Templates in location:
%LicManPath%/webapp/wpos/WEB-INF/conf/templates/mail
 - Templates for self-registration in
%LicManPath%/webapp/administration/WEB-INF/classes/registration
- WPOS management interface
 - <http://%LicManURL%/wpos>



SAMPLE SCENARIO: INSPIRE BASIC LICENSE



- Click-through only
 - Terms and conditions apply
 - For certain user groups only
 - Full access after acceptance
 - No fees
-
- Demo scenario: Portal integration



Portal Login



Geoportal

[Login](#) [Register](#) [Help](#) [About](#) [Feedback](#)

HOME

SEARCH

BROWSE

LAUNCH MAP VIEWER

Login

Please provide your credentials.

Username:

Password:

[Login](#)

[Forgot Password?](#)

* *Bold-Italic labels indicate a required field*

Select 'Preview'



Geoportal Welcome, inspire [Logout](#) [My Profile](#) [My Licenses](#) [Help](#) [About](#) [Feedback](#)

[HOME](#) [SEARCH](#) [BROWSE](#) [VALIDATION](#) [LAUNCH MAP VIEWER](#)

Search

Records shown from: This Site
Click here to select different site or configure search.

Additional Options

[Clear](#)

WHERE

- Anywhere Intersecting Fully within

My Saved Searches

Results 1-5 of 5 record(s)

- Expand results [Zoom To Results](#) [Zoom To Searched Area](#)

[ESRI StatesCitiesRivers USA \(licensed\)](#)

[BRD WMS \(secured\)](#)

[Administrative Units \(secured\)](#)

[BRD WMS \(licensed\)](#)
a licensed resource
[Open](#) [Preview](#) [Add To Map](#) [Details](#) [Metadata](#)

[Administrative Units](#)

See results through REST

API: [GEORSS](#) [ATOM](#) [HTML](#) [FRAGMENT](#) [KML](#) [JSON](#) [CSV](#)

License Warning



Geoportal Welcome, inspire [Logout](#) [My Profile](#) [My Licenses](#) [Help](#) [About](#) [Feedback](#)

[HOME](#) [SEARCH](#) [BROWSE](#) [VALIDATION](#) [LAUNCH MAP VIEWER](#)

Search

[My Saved Searches](#)

Service not usable: No license available! ✕

- Currently there is no license available for use. Please obtain a new one.
- [Create new license](#)

[BRD WMS \(licensed\)](#)
a licensed resource
[Open](#) [Preview](#) [Add To Map](#) [Details](#) [Metadata](#)

[Administrative Units](#)

See results through REST
API: [GEORSS](#) [ATOM](#) [HTML](#) [FRAGMENT](#) [KML](#) [JSON](#) [CSV](#)

License Terms & Conditions



- The contractor shall be subject to the same obligations as the User under this Licence;
- The contractor shall not be given the power to grant rights to the Intellectual Property;
- The contractor shall not have any rights to use the Intellectual Property for purposes beyond the contract; and
- The contractor shall have no right to retain the Intellectual Property after the end of the contract or this Licence.

Force majeure

No Party shall be liable for failures or have the right to terminate this Licence for any delay or failure in performance under this Licence if such delay or failure is caused by force majeure.

The non-performing Party shall inform the other Party in writing as soon as is practicable about the force majeure circumstances specifying the nature and extent of the circumstances. The non-performing Party has no liability in respect of the performance of such of its obligations as are prevented by the force majeure events during the continuation of such events, and for such time after they cease as is necessary for that Party, using all reasonable endeavours, to commence its affected operations in order for it to perform its obligations.

Force majeure shall mean any cause preventing a Party from performing any or all of its obligations which arises from or is attributable to acts, events, omissions or accidents beyond the reasonable control of the Party so prevented including without limitation strikes, lock-outs or other industrial disputes (whether involving the workforce of the Party so prevented or of any other party), act of God, war, riot, civil commotion, act of terrorism, malicious damage, compliance with any law or governmental order, rule, regulation or direction, accident, breakdown of plant or machinery, fire, flood or storm.

Conflict resolution

In the event of any dispute over the Licence, the Parties shall attempt to resolve the issue(s) by negotiations. The Parties agree to suspend the Licence until the dispute is resolved.

In the event of the said issues not being resolved within three (3) months from the start of the negotiations, this Licence shall be governed by and construed in accordance with the law of Northern Ireland and each Party agrees to submit to the exclusive jurisdiction of the Courts of Northern Ireland.

Period of Licence and Termination

This Licence shall be effective from the Commencement Date and will remain in force until directed otherwise by the European Parliament.

This Licence can only be terminated in writing by giving the other Party thirty (30) days written notice and only if the other Party has performed a material breach of this Licence.

I accept the license conditions

[Conclude license](#)

[Cancel](#)



License Confirmation

licenseManager

License Acquisition

Your license id is: UUID_20120515-020311-623-44292-6361

Thank you for obtaining this license. Now you can access the secured resource.

Note: You maybe need to re-authenticate when using the secured resource.

Please keep this license id for possible later inquires.

[Continue](#)


[Details](#) [Review](#) [Relationships](#) [Preview](#)

BRD WMS (licensed)

URL:

Embed:



 BRD WMS (licensed)

a licensed resource

[Open Preview](#) [Add To Map](#) [Details](#)
[Metadata](#)

COMPLEX SCENARIO: INSPIRE SPECIFIC LICENSE



- Configuration options
- Spatially limited access (user selects area of interest)
- Limited functionality (user decides whether GetFeatureInfo shall be licensed)
- Price models apply (depending on configuration)
- Full access after acceptance

- Demo scenario: License shop



Shop Login



The screenshot shows a web interface for 'licenseManager'. At the top left, there are four colored squares (blue, green, red, yellow) followed by the text 'sdi.suite'. The main title 'licenseManager' is in a large, bold, sans-serif font. To the right of the title is the 'con terra' logo. Below the title, there is a white box with a blue border containing the text 'Please log in'. Inside this box, there are two input fields: 'Username' with the value 'rga' and 'Password' with a masked password of seven dots. Below the password field is a 'Log in' button. At the bottom of the white box, there is a link: 'No account? [Register!](#)'.



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Select Service

sdi.suite
licenseManager con terra

[rga](#) | [Start Page](#) | [My Profile](#) | [Logout](#)

Conclude A New License

Click on the name of the service within the table to conclude a new license for this service.
2 matches

Service name	Service type	Description	Available licenses
Inspire Natura2000 SPAs licenced	INSPIRE View Service	Inspire Natura2000 SPAs	
TOP Sachsen lic	WMS	Topographic map of Saxony	

2 matches

[Back](#)





Select License Model

A screenshot of a web application interface titled "licenseManager" with the URL "sdi.suite" in the top left. The interface is for "License Acquisition" and asks the user to "Please choose among the following license models:". There are two main options, each with a "Select" button: "INSPIRE_Specific_Licence" (described as "INSPIRE licence as defined in the guidelines for data and service sharing...") and "INSPIRE_Basic_Licence" (described as "Licence model following the Guidance on the 'Regulation on access to spatial data sets and services of the Member States by Community institutions and bodies under harmonised conditions'"). A "Cancel" button is located at the bottom left of the selection area. The "con terra" logo is visible in the top right corner of the interface.



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License Configuration



other party), act of God, war, riot, civil commotion, act of terrorism, malicious damage, compliance with any law or governmental order, rule, regulation or direction, accident, breakdown of plant or machinery, fire, flood or storm.

Conflict resolution

In the event of any dispute over the licence, the parties shall attempt to solve the issue by negotiations. Either Party may suspend the Licence until the dispute is resolved. In the event of the said issues not being solved within 3 months from the start of the negotiations, the parties may bring the issue to the applicable court of law.

Applicable law and jurisdiction

Any dispute arising that cannot be solved by negotiation is to be handled as a dispute under the law of Germany.

Termination

This Licence will terminate at the end of the licence period as specified in parameter 'License Duration'. This Licence can also be terminated by the Parties. Termination can not be without a reasonable cause. If there is a material breach of contract, the licence can be terminated with immediate effect. In all other cases it should be given 60 days written notice by registered mail. In any of these cases, any data will be deleted by the User if not otherwise licensed for use.

Schedules

Schedule 1 - Subject

.....

Schedule 2 - Delivery

...

...

Schedule 10 - End User Licence

...

Price of the license

Cancel

License Acceptance



other party), act of God, war, riot, civil commotion, act of terrorism, malicious damage, compliance with any law or governmental order, rule, regulation or direction, accident, breakdown of plant or machinery, fire, flood or storm.

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Schedules

Schedule 1 - Subject

.....

Schedule 2 - Delivery

...

...

Schedule 10 - End User Licence

...

I accept the license conditions

Change configuration

Change license model

Conclude license

Cancel



Confirmation

 **licenseManager** 

License Acquisition

Your license id is: UUID_20120514-212053-918-56080-4165

Thank you for obtaining this license. Now you can access the secured resource.
Note: You maybe need to re-authenticate when using the secured resource.
Please keep this license id for possible later inquiries.

[Continue](#)

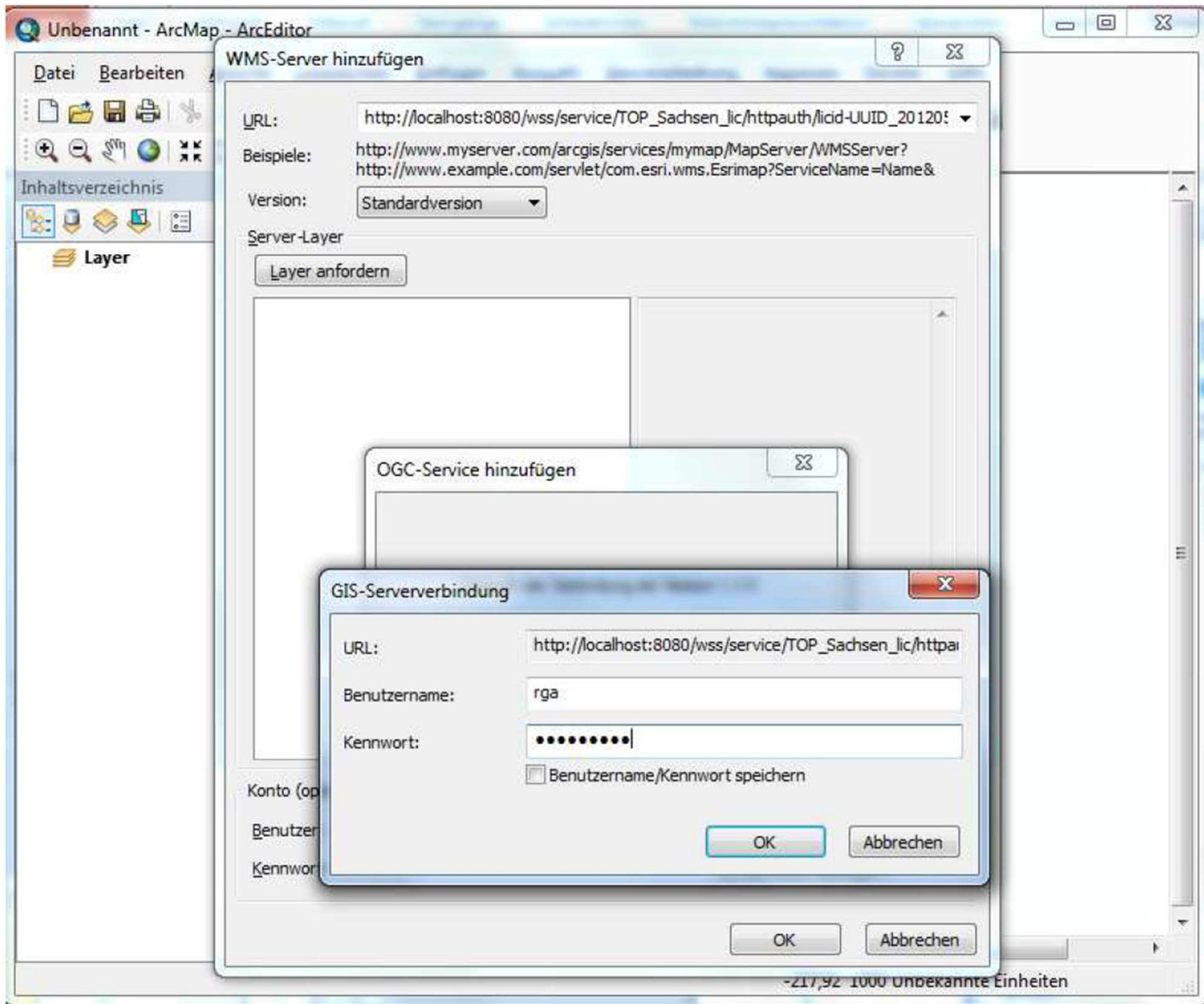
 **licenseManager** 

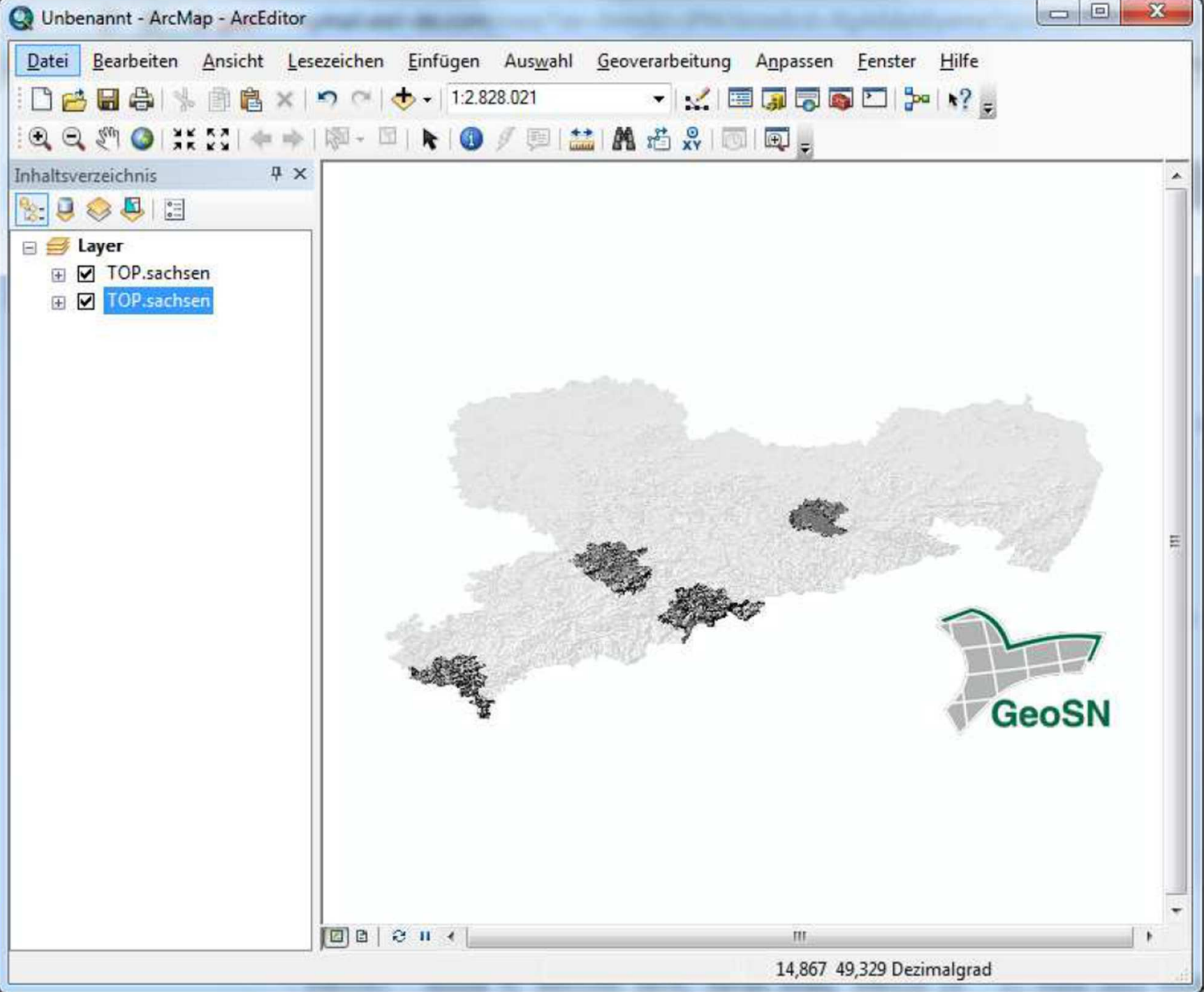
[rga](#) | [Start Page](#) | [Logout](#)

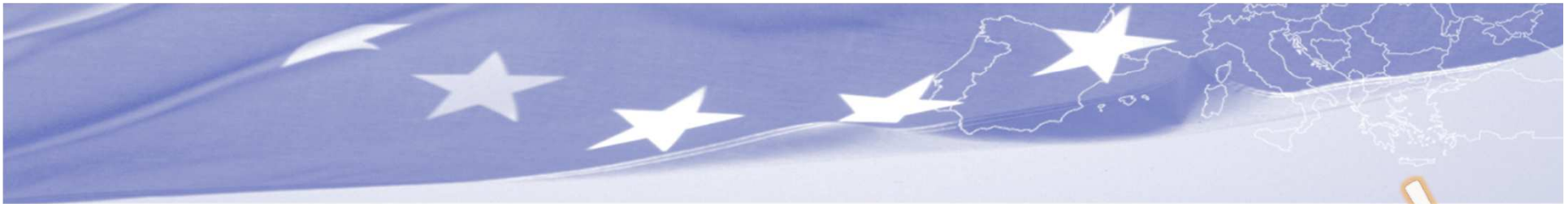
Access to licensed service

▶ HTTP Basic Authentication URL:
http://localhost:8080/wss/service/TOP_Sachsen_lic/httpauth/licid-UUID_20120514-212053-918-56080-4165

[My Profile](#)







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inspiration
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