



# A High-End SDI with PostgreSQL/PostGIS, GeoServer, MapServer and Mapbender

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# FIONA - Presentation

- What is FIONA?
- History of the project
- Software requirements
- Components
- Workflow
- Future developments



## FIONA – Flächeninformation und Online Antrag

- Online Agricultural Subsidy Application System
- Operated by the Ministry of Agriculture of the Federal State of Baden-Wuerttemberg in Germany
- Realization in 2005/06 in cooperation with CCGIS and BGS-AG and IZLBW



## FIONA - Prospects

- Reference Project **FloRLP**
- Realisation till spring 2006
- Looking for a fast – reliable – easy solution
- Low running costs
- Ease the subsidy progress



## What does FIONA offer?

- The portal provides authenticated and secured access for 80.000 farmers to coordinate the subsidies for their farmland

The screenshot displays the FIONA web portal interface. The main map shows a parcel with a red outline and a '2004 Schöntal' label. The interface includes a search bar, a legend, and several data tables.

**Gemeinde**

Name	Schöntal
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**Gemarkung**

Nummer	255
Name	Schöntal

**beantragte Flurstücke (Vorjahr)**

Schlagnummer	Anzahl Flurstücke
4	1
1	2
2	1
3	1

**Eigene Flächen**

Objekttyp	Landschaftselement
Bemerkung	a1
Erfassungsdatum	2006-03-16 14:30:22
Fläche [ha]	3.0654

**Antragsdaten Vorjahr**

Schlag	MC	bean. Fläche ohne LE	bean. Fläche der LE	Flst.
1	121	13.06	0.34	zeigen
2	121	0.14	0	zeigen

**Flurstücke Schlag Information**

080255-002-00098/000	Im FSV anzeigen
080255-002-00130/000	Im FSV anzeigen

Buttons: Übergabe GIS-Suche, Schließen



# FIONA

The farmer can:

- Apply for subsidy grants
- Measure
- Digitize
- Calculate their farmland area
- Get an overview of the subsidy areas



# FIONA – Open Source Technologie

The project is implemented with Open Source technologies.

- SUSE-Linux Enterprise Server
- Apache
- PostgreSQL/PostGIS
- GeoServer
- MapServer
- Mapbender



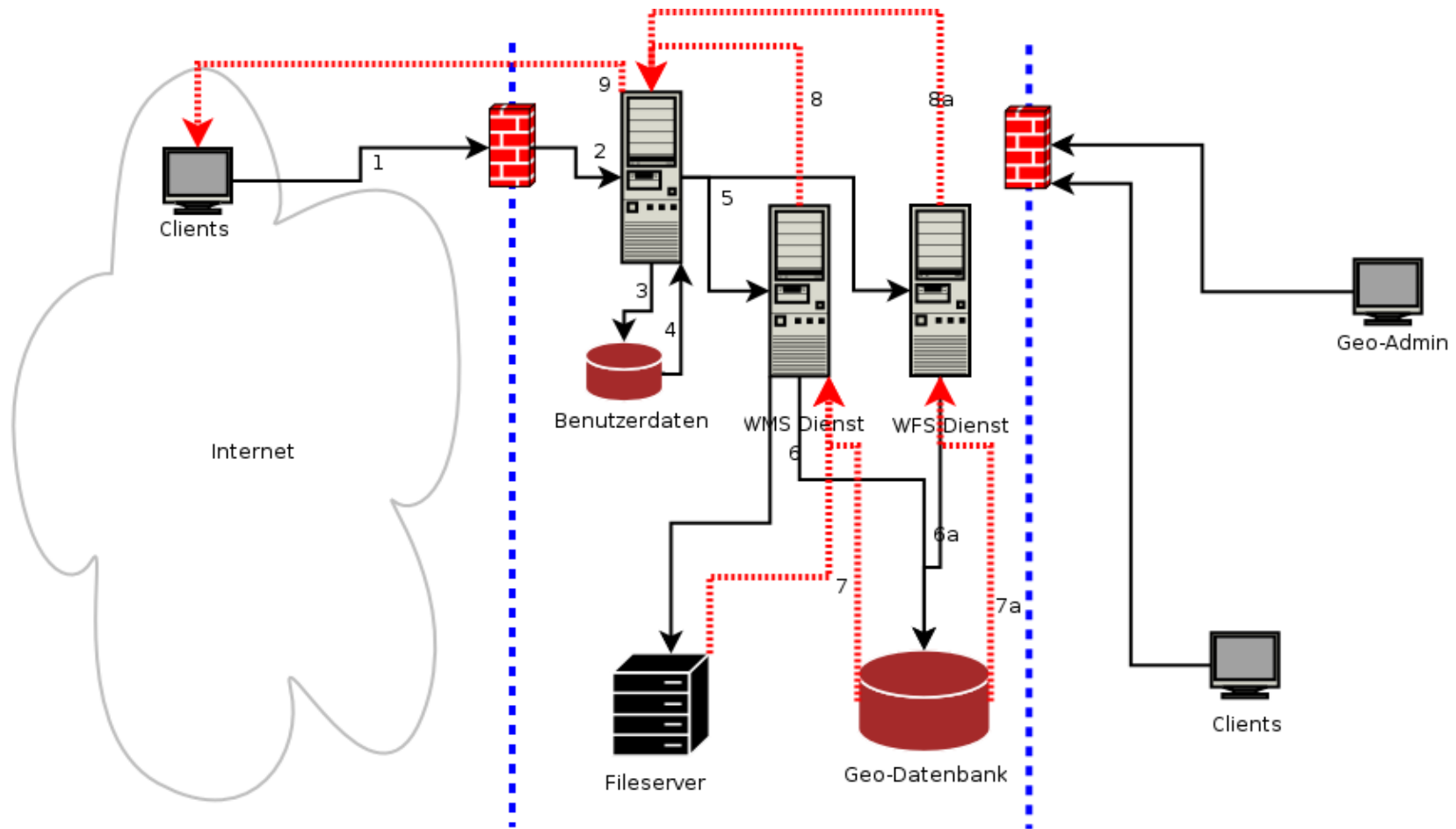
## Hardware components

- Application- & database-Server (2):
  - 4 CPUs, 8 GB RAM,
  - Resources aprox. 350 GB
- Web-Server:
  - 1 CPU, 2 GB RAM
  - Resources: at least 140 GB





# FIONA - the architecture



# FIONA - the Components

Information Service

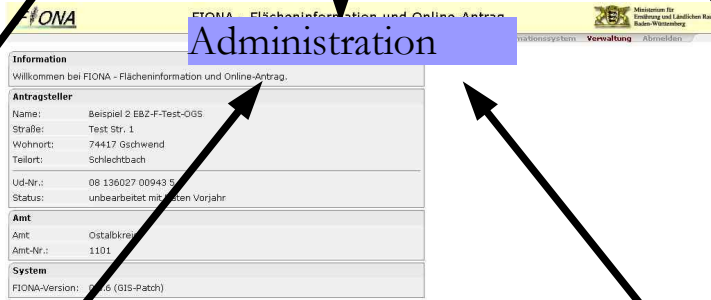


Authorisation



FrontController

Administration



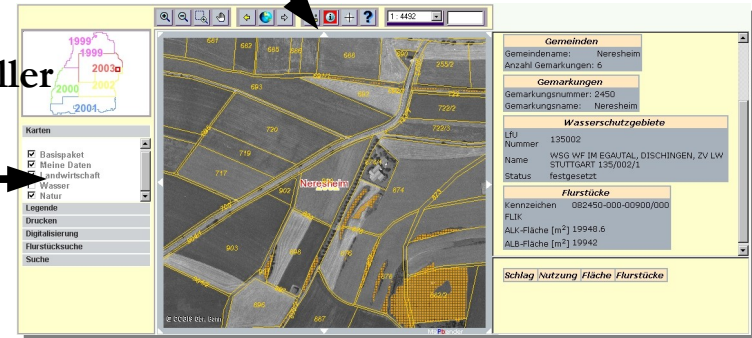
FSV

GIS

FrontController

Flurstückerverzeichnis

Zeile	Gemarkung	Flur-Nr.	Flurst-Nr.	Unter-Nr.	Kat.-Ref.-Fläche	Schlag-Nr.-VJ	NC VJ	Nutzf.-ohne LE VJ	Schlag-Nr.-NC	Akt.-ZA	ML
1	2220		2576	1	2,8666	8		1,78	79	995	
2	2220		2576	1	2,8666	9		0,85	99	951	M
3	2220		2576	1	2,8666	55		0,95	78	143	L
4	2225		6079		0,1317	5		0,18	78	143	L
5	2225		6099		0,1314	1		0,84	49	122	M
6	2225		6092		0,1443	1	1	1,34	45	122	M
7	2225		6095		1,8643	1	1	1,76	45	122	L
9	2225		6097		0,2128	1		0,21	33	715	M
10	2225		6106		0,3874	49		0,38	33	715	M
11	2225		6110		3,2592	50	3	3,25	6	995	



## FIONA - Data Access by OGC Standards

The access to the data is realised with services based on OGC Standards.



- Web Map Service (WMS):  
MapServer
- Transactional Web Feature Service:  
WFS-T GeoServer
- Download of geometries as GML



## Datavolume

- Datavolume of GIS aprox. 250 GB
  - aprox. 180 GB Orthofotos (Filesystem)
  - PostGIS Geom 20 GB
  - FSV Data at least 60 GB
  - Transaction-logs at least 5 GB, other Logs about 1 GB, DB-Backup 40 GB



## PostgreSQL/PostGIS

- 8.5 million parcels of the federal state (cadastre data)
- Additional subjects (nature, water)
- Userbased geometries (polygons, points)
- User has read and write access
- PostGIS Geom 20 GB



## MapServer as WMS

- Background imagery is served by MapServer WMS
  - Orthophotos of the federal state
  - Cadastral data of the parcels
  - Nature
  - Water



## GeoServer – Access to the Geodata

- Read and Write access to geographic features is provided by GeoServer as OGC WFS-T
- User specific features are overlaid and served by GeoServer WFS



## Mapbender Portal

- FIONA – GIS
- Management of user access and orchestration of the OGC services.
- Integration in the portal
- Providing the functionality for administrators and users
- Navigation, FeatureInfo and Digitizing, Gazetteer





## Workflow before FIONA was set up

- Farmers filled out formulars
- Draw their parcels in maps on paper
- Send them to the authorities



## FIONA - simplified the Workflow

- Farmer logs in with his account
- User-dependent display of the parcels
- Project is opened with the extent of the farmers parcels
- Online digitizing is provided
- Online application for subsidy
- Faster processing
- Less errors
- More transparency for farmers and administration



# Administration Frame

- Status of FSV and login informations


FIONA - Flächeninformation und Online-  
Flurstücksverzeichnis

<b>Information</b>	
Willkommen bei FIONA - Flächeninformation und Online-Antrag. Ihre letzte Anmeldung erfolgte am: Mittwoch, 15. März 2006 10:59:36	
<b>Antragsteller</b>	
Name:	Marius FIONA-DEMO
Straße:	Fionahausener Str 119
Wohnort:	74099 Fionatal
Teilort:	
Ud-Nr.:	08 000000 00030 0
Status:	In Bearbeitung von Antragsteller
<b>Amt</b>	
Amt:	Landratsamt Testhausen
Amt-Nr.:	1234
<b>System</b>	
FIONA-Version:	0.8.3a



# FIONA-FSV (Parcel Catalog)

- Displaying informations from the last years
- Check of input, filter, ordering
- Booking
- Analysis

**Suche**

Suche nach:  
Alles Anzeigen

* Zeile	Gemarkung Fluk	Flur- Nr.	Schlag- Nr. VJ	NC VJ	Nutzf. ohne LE VJ	Schlag- Nr.	NC	Akt. ZA	ML
1	2220	2576	1	2,8666	8	1.78	79	995	
2	2220	2576	1	2,8666	9	0.85	99	451	M
3	2220	2576	1	2,8666	55	0.95	78	143	
4	2225	6079		0,1817	5	0.18	78	143	L
5	2225	6089		0,0134	1	0.94	45	122	M
6	2225	6092		0,1443	1	1.34	45	122	M
7	2225	6095		1,8643	1	1.76	45	122	L
9	2225	6097		0,2128	1	0.21	33	715	M
10	2225	6106		0,3874	49	0.38	33	715	
11	2225	6110		3,2582	50	3.25	6	995	

**Editing / Input**

Einzelbearbeitung | Sammelbearbeitung | Protokoll

Zeile: 5 | FLIK: DEBWLI22250420LF | Staat: D | Bu-Land: 08 | Gemarkung: 2225

Flur-Nr.: | Flurst-Nr.: 6089 | Unter-Nr.: | Kat-/Ref.-Fläche: 0,0134 | LOS-Nr.: |

Schlag-Nr.: 45 | Skizze-Nr.: | Nutzf. ohne LE: 0,94 | Fläche der LE: 0,10 | CC-LE vorh.: |

Kulturart: WEIDEN | NC: 122 | DG-Status: | Aktivierung ZA/Pächter: | Gekopp. Maß.: |

NaRo/EN-Vert-Nr.: | Hopfen-Code: | EAP-Datum: | Tabak-Nr.: | LPR: |

MEKA 1-7: 31 | Mulchs.-Herbst: | SchALVO: | AZW/EAP: |

NC VJ: 453 | Nutzf. ohne LE VJ: 0,94 | Fläche der LE VJ: 0,10 | Nutzf. mit LE VJ: | ST: | Schlag-Nr. VJ: 1 | Pfl: |

Zeile wurde gespeichert.



# FIONA-GIS

- Displays the parcels of the farmer and basic data
- Connection between FSV and GIS by parcel number

The screenshot displays the FIONA-GIS web application interface. The main map shows a parcel with a red outline and a pink label '2004 Schöntal'. The interface includes a search bar, a legend, and several data panels.

**FIONA - Flächeninformation und Online-Antrag**

Ministerium für Ernährung und Ländlichen Raum Baden-Württemberg

Flurstücksverzeichnis Geoinformationssystem Verwaltung Abmelden

1:4743

**Gemeinde**  
Name Schöntal

**Gemarkung**  
Nummer 255  
Name Schöntal

**beantragte Flurstücke (Vorjahr)**

Schlagnummer	Anzahl Flurstücke
4	1
1	2
2	1
3	1

**Eigene Flächen**

Objekttyp Landschaftselement  
Bemerkung a1  
Erfassungsdatum 2006-03-16 14:30:22  
Fläche [ha] 3.0654

Löschen

**Antragsdaten Vorjahr**

Schlag	NC	bean. Fläche ohne LE	bean. Fläche der LE	Flst.
1	121	13.06	0.34	zeigen
2	121	0.14	0	zeigen

**Flurstücke**

Flurstück	Schlag Information
080255-002-00098/000	Im FSV anzeigen
080255-002-00130/000	Im FSV anzeigen

Übergabe GIS-Suche Schließen

Suche Eigene Objekte

3535326 / 5467641

GIS

# Component of the GIS

The screenshot shows a web-based GIS application interface. At the top, there is a toolbar with navigation and search icons. The main map area displays a cadastral map with yellow parcel boundaries and a pink highlighted parcel labeled '004'. To the left is a sidebar with navigation options like 'Karten', 'Legende', and 'Suche'. To the right is a detailed information panel for the selected parcel. Below the map, there is a search and download section. Callouts in blue boxes identify specific components: 'menubar' points to the top toolbar; 'Attribut- and FeatureInfo' points to the right-hand information panel; 'Search' points to the search input field; 'WFS Search for parcels' points to the search button; 'Search & download of own objects' points to the 'Suche Eigene Objekte' section; and 'Schlagbildung – extended FeatureInfo' points to a table at the bottom right.

**menubar**

**Attribut- and FeatureInfo**

**Search**

**WFS Search for parcels**

**Search & download of own objects**

**Schlagbildung – extended FeatureInfo**

Antragsdaten Vor.				
Schlag	NC	bean. Fläche ohne LE	bean. Fläche der LE	Flst.
2	175	3.41	0	<input type="button" value="zeigen"/>



## FIONA - Features of the GUI

- Access to actual data via WMS
  - Basic data as background information
  - Display of the parcels of the farmer
  - Parcels from the last year appear
  - Additional data (like nature 2000, water protection area)

All necessary data for a correct subsidy appliance is provided



# FIONA - Features of the GUI

Feature information about the parcels:

- Parcel number
- Area
- Type
- Information about earlier subsidies

<b>Flurstück</b>				
Nummer	080260-000-00709/000			
FLIK	DEBWLI026000GIS5			
Katasterfläche [ha]	1.0314 (ALB)			
GIS-Fläche [ha]	1.0313 (ALK)			
<b>Landkreis</b>				
Name	Hohenlohekreis			
<b>Gemeinde</b>				
Name	Schöntal			
<b>Gemarkung</b>				
Nummer	260			
Name	Oberkessach			
<b>Eigene Flächen</b>				
Objektyp	Landschaftselement			
Bemerkung	Baumgruppe			
<b>Antragsdaten Vorjahr</b>				
Schlag	NC	bean. Fläche ohne LE	bean. Fläche der LE	Flst.





## FIONA - Features of the GUI

- Gazetteer for administration units (f.e. commune)
- Gazetteer for parcels
- Gazetteer for the own digitized parcels or points subject to the type (forest, farmland)

**Flurstücksuche**

GMK	Flur	Flurst.	U-Nr.
08	1480	0	2178
			0

**oder FLIK:**

081480-000-02178/000

Flächen als Liste ▾

Objektart... ▾

Objektart...

Landschaftselement

Wald

Landw. Nutzfl.

Hof-Weg-Gebäude

sonstige nicht LN

sonstiges



## FIONA - Features of the GUI

- Download of digitized polygons as GML
- PDF-print with comments, project information and legend



## FIONA – Experiences with the System

- Users have to get used to the portal and its multiple functions
- Introduction of the farmers by information sheets and short courses
- performance problems due to slow connection to the internet (modem)
- Transfer potential for the software
- Cooperation of authorities by open and modular architecture
- Interoperability in datamanagement and function



## FIONA – Future Developments

- Editing of existing geometries
- Snapping on existing geometries
- SLD support



## FIONA – Test the SDI

- [FIONA demo login](#)
- [mapbender wiki information about FIONA](#)



Thank you for your attention !

If you have any questions contact me

Astrid Emde



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At the FOSS4G 2006 booth 10

