

EO-WIDGET Stakeholder Meeting



Virtual Meeting
2021.10.07

Agenda

Time	Topic	Presenter
14:00 - 14:10	Welcome & Introduction of Meeting Participants	All
14:10 - 14:30	Available Checks by Monitoring Products & Service Offerings	GeoVille
14:30 - 14:40	Platform Services & EO-WIDGET Web App	EOX
14:40 - 14:50	Marketplace Concept	EOX
14:50 - 15:00	Feedback by Stakeholders	All

Activity Status

Accomplished so far:

Operational Monitoring for Austria established

- Monitoring products end-to-end integrated
 - Crop Type Map
 - Marker data bases
 - Harvest Detection and Grassland Mowing
- Proof of concept achieved:
 - Outsourcing of monitoring
 - Split in data products and widget visualisation
 - Configuration and exchange of declaration data in a cloud environment

Next step: Generalization and **Expansion into Market**

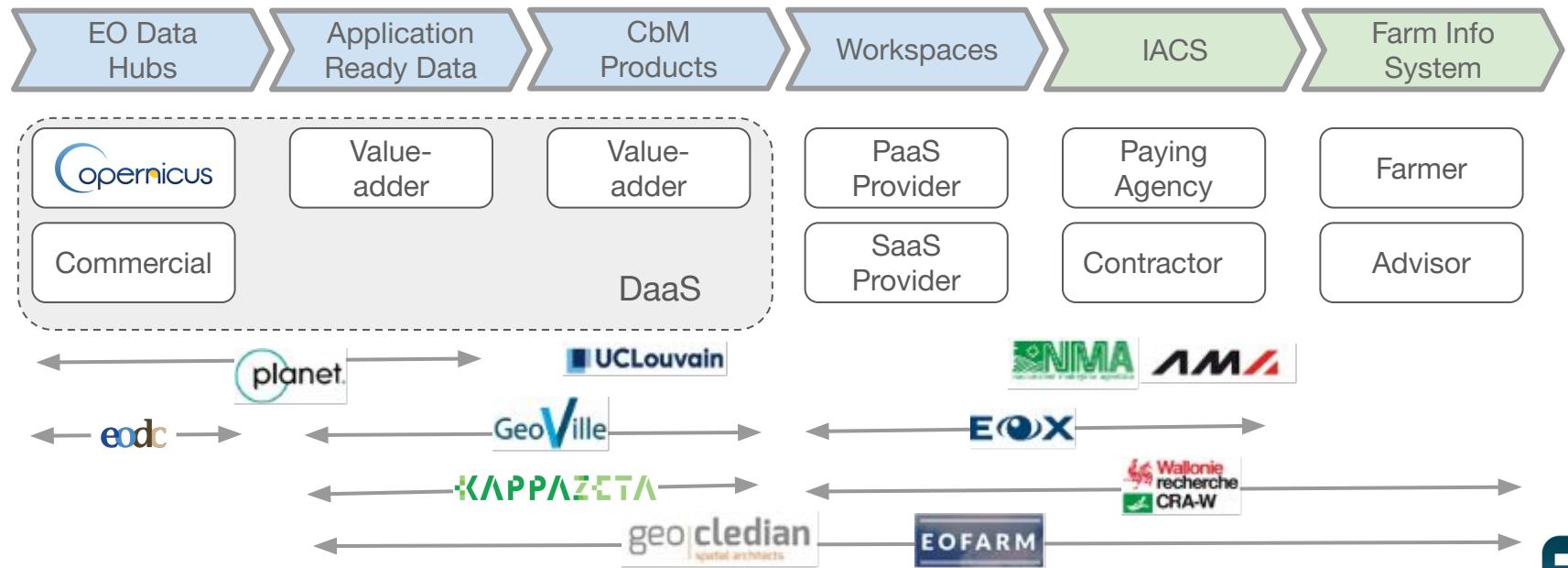
- Optimization and quality improvements

Planning
EO-WIDGET Project, before and beyond



Open Value Chain - join as you like!

Interoperability via common workflows and **complementary roles** of stakeholders for optimum adjustment to Paying Agencies' policies

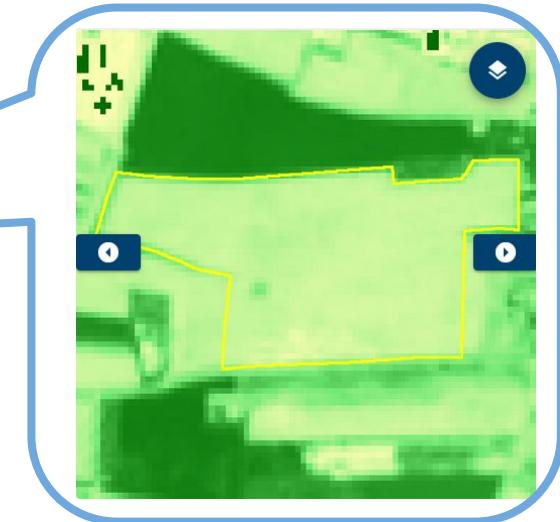
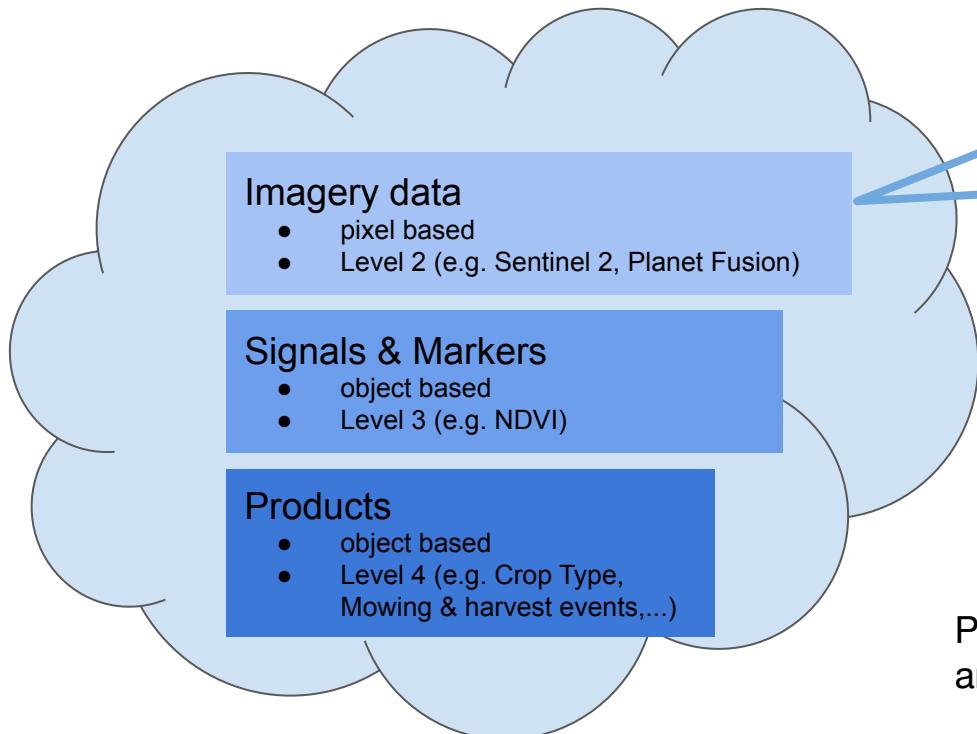


EO-WIDGET Available CbM Products and Service Offerings



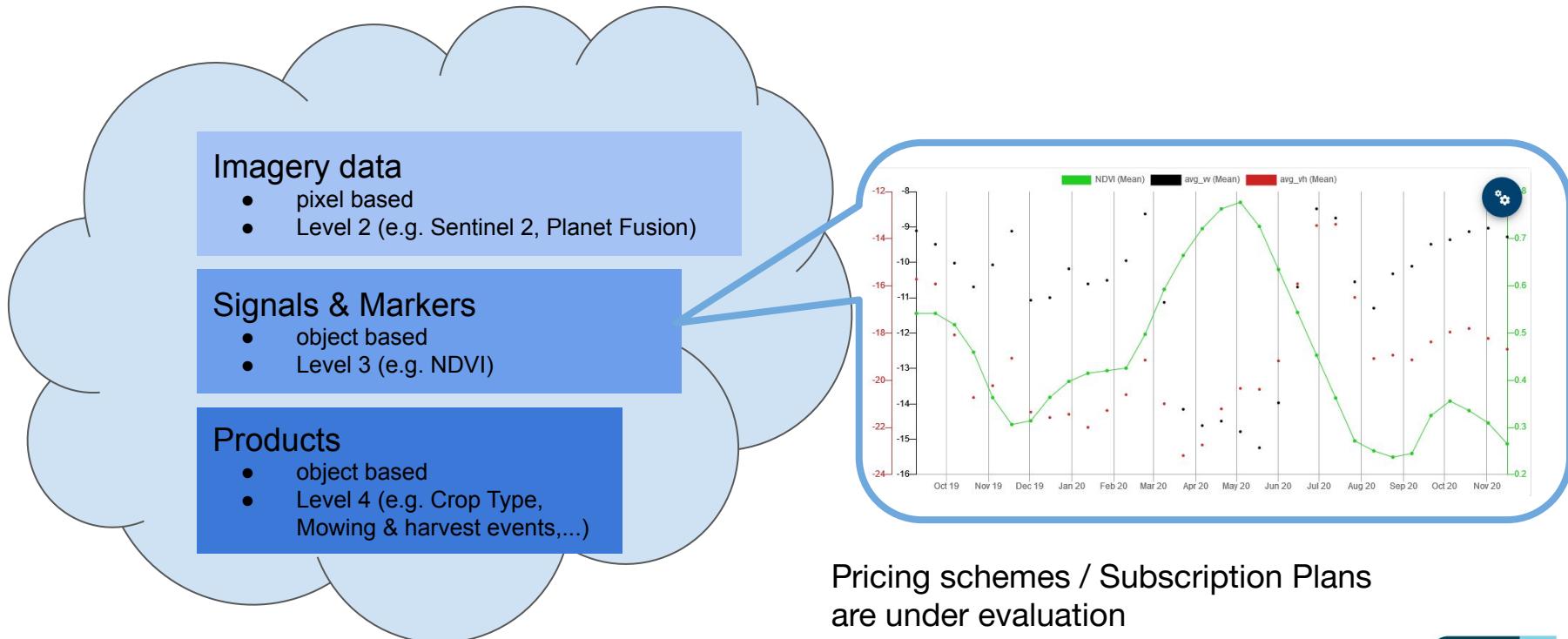
- Monitoring Products
- Planet Data
- Area Monitoring Workspace
- EO Signals and Web Map Service

Data Provisioning

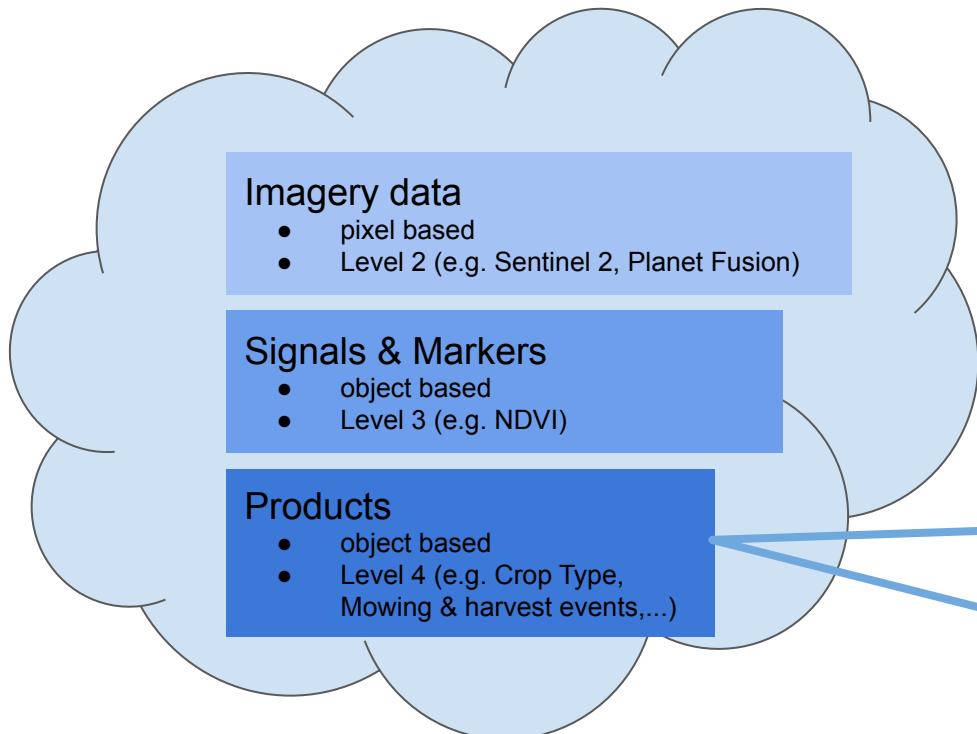


Pricing schemes / Subscription Plans
are under evaluation

Data Provisioning



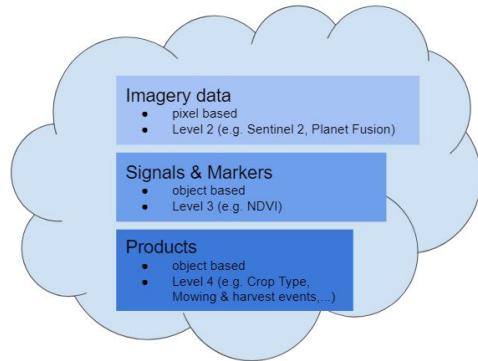
Data Provisioning



Pricing schemes / Subscription Plans are under evaluation



Data Provisioning - GeoVille Monitoring Products



GeoVille Monitoring Products

Subscription Package - Bundle



- For Sentinel-1 / Sentinel-2 based Monitoring products
- Level 3 Products – monthly updated
 - NDVI, COHE_VV, COHE_VH
- Level 4 Products, includes
 - Crop Type Product
 - Grassland Monitoring
 - Harvest Detection
 - Crop Cover (Fallow Land, Permanent Green Cover and NFC/Catch Crops)

Data Provisioning - GeoVille Monitoring Products



GeoVille Monitoring Products

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 - **Grassland Monitoring**
 - **Harvest Detection**
 - Crop Cover (Fallow Land, Permanent Green Cover and NFC/Catch Crops)

AMA as Beta User

Produced for two full growing seasons

- 2020 season in retrospective,
 - 16 months covered
- 2021 season in season
 - 12 months covered

Monthly updated GSAA declarations

- possibly changed declaration
- possibly changed parcel geometry

Access to products via

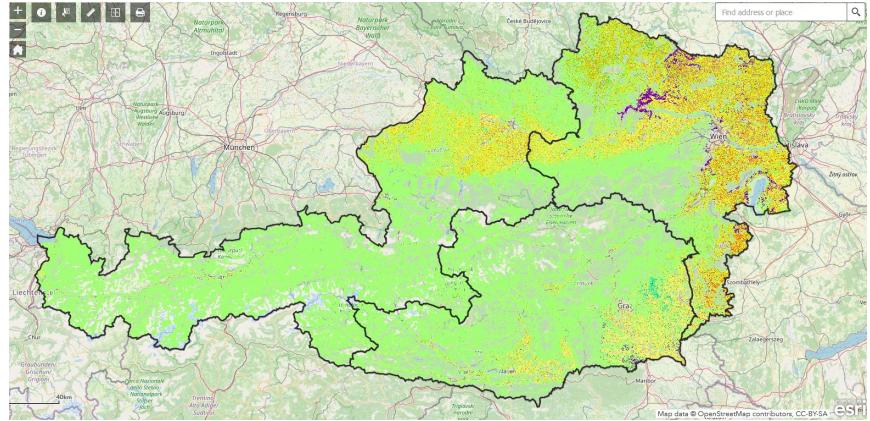
- API for direct access (database-database)
- within EO-WIDGET Web App

Quality Report for each product



Cultivated Crop Type Map

- **1.6 of the 2.6 Million parcels** assessed with Sentinel-1 and Sentinel-2
- **3.05 Million hectares** monitored (of 3.186 million hectares)
- **Monthly updated** from May to December for updated GSAA data
- Around **60 crop groups/classes** identified
- Every crop prediction **above 1 percent probability** shared with customer
- For 2021, **9 months** were analyzed so far
- For 2020, a **16 month** season was used
- **MAJA pre-processing** for improved cloud and cloud shadow detection was used



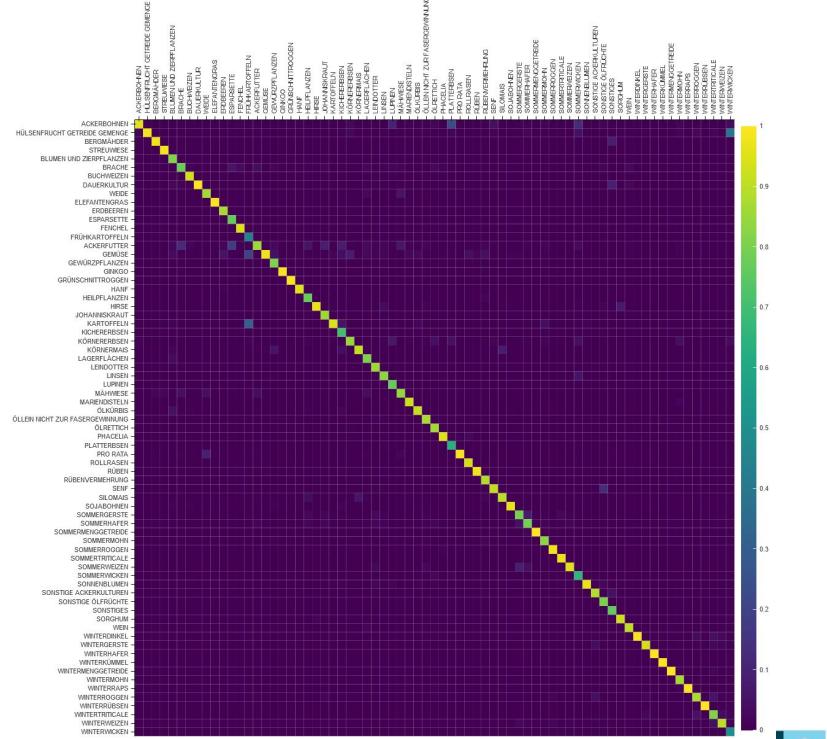
Crop Type Map of Austria 2021



Cultivated Crop Type Map

Normalized confusion matrix per crop type for 2020(attributed to area)

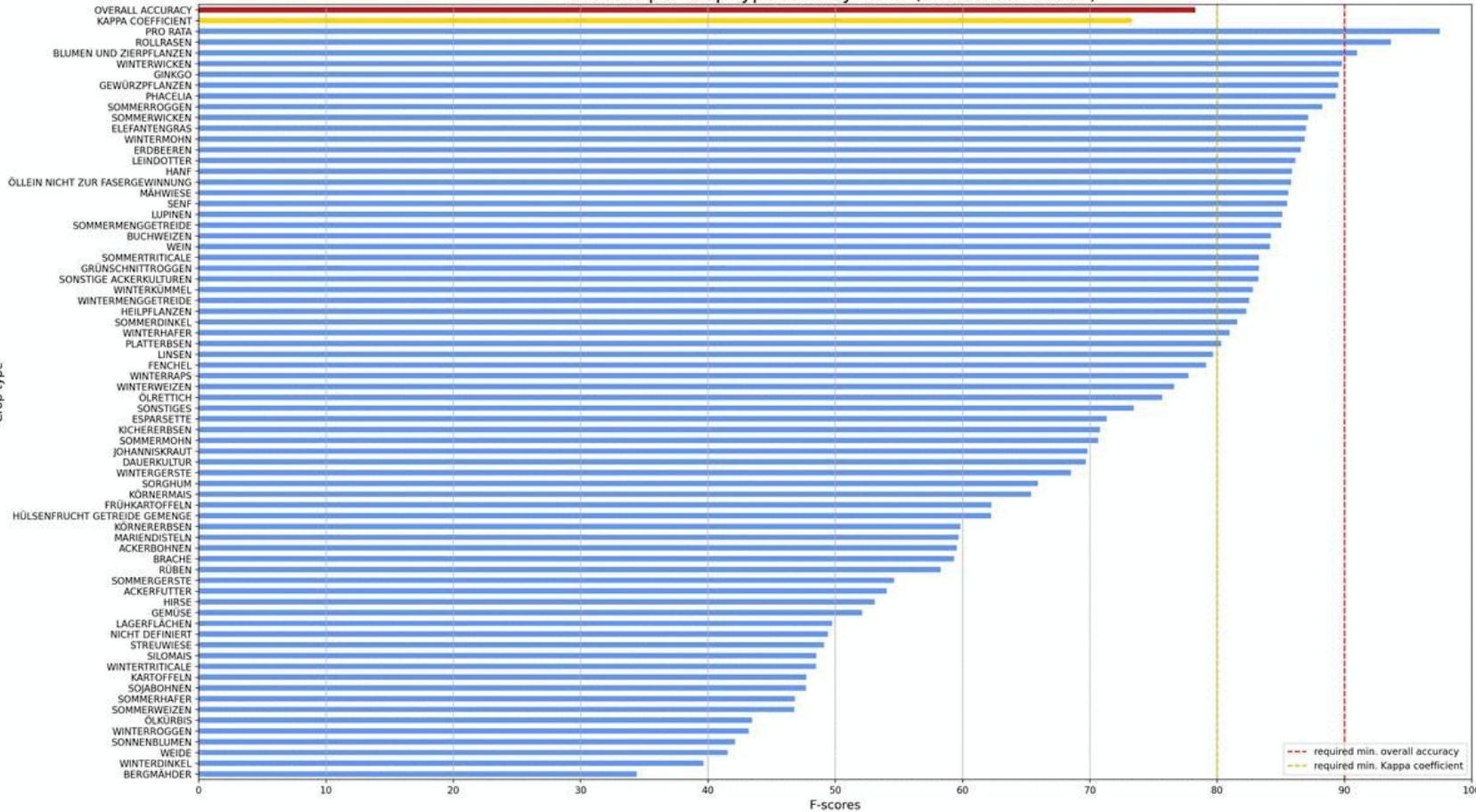
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Confusion Matrix for Crop Type Map
© 2021 GeoVille & EOx - Creative Commons  



F-score per crop type for May 2021 (attributed to area)

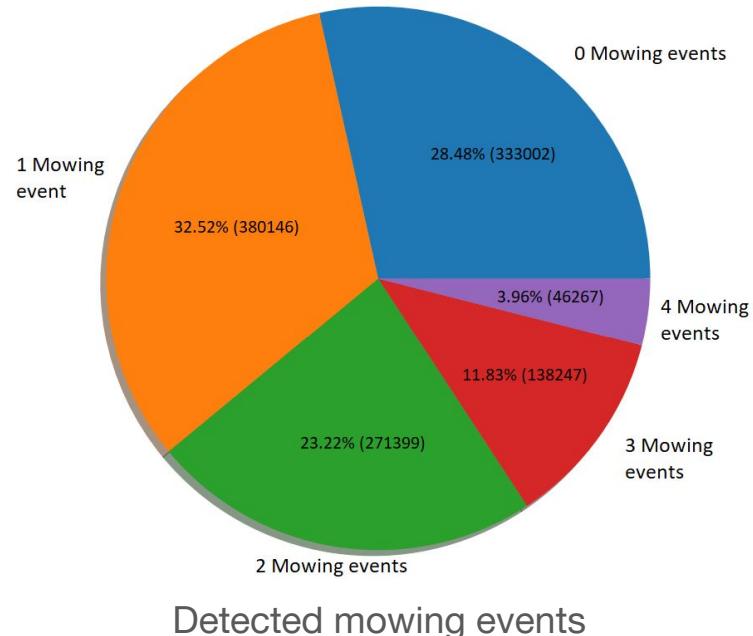


required min. overall accuracy
required min. Kappa coefficient

Grassland Monitoring - Mowing events

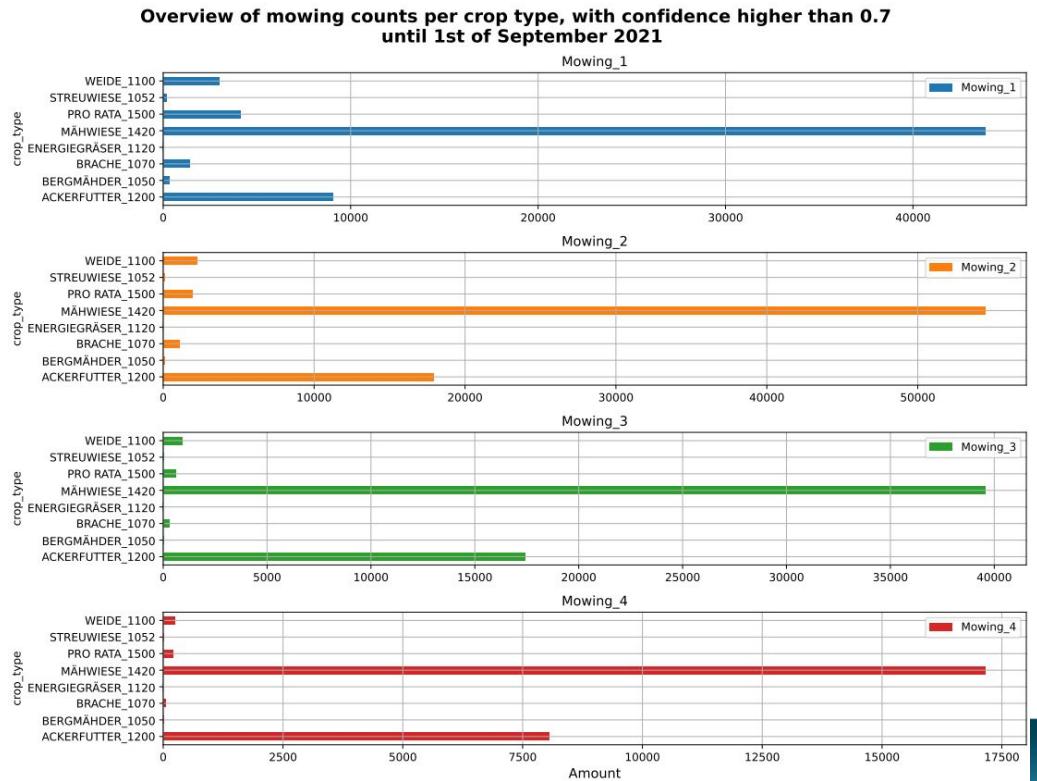
Mowing counts distribution of 1169061 total fields for until 1st of September 2021

- Identify number of mowing events based on Sentinel-1 and Sentinel-2
- Over **1.1 million parcels** were analysed
- Events between the **first of April and end of August**



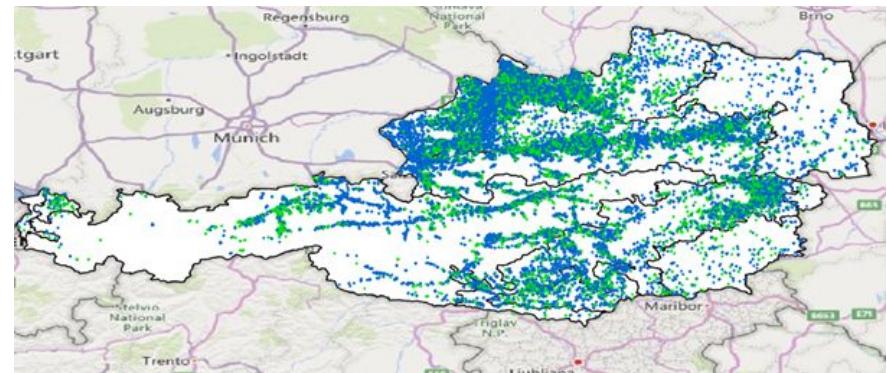
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- Mowing events per grassland type



Grassland Monitoring - Mowing events

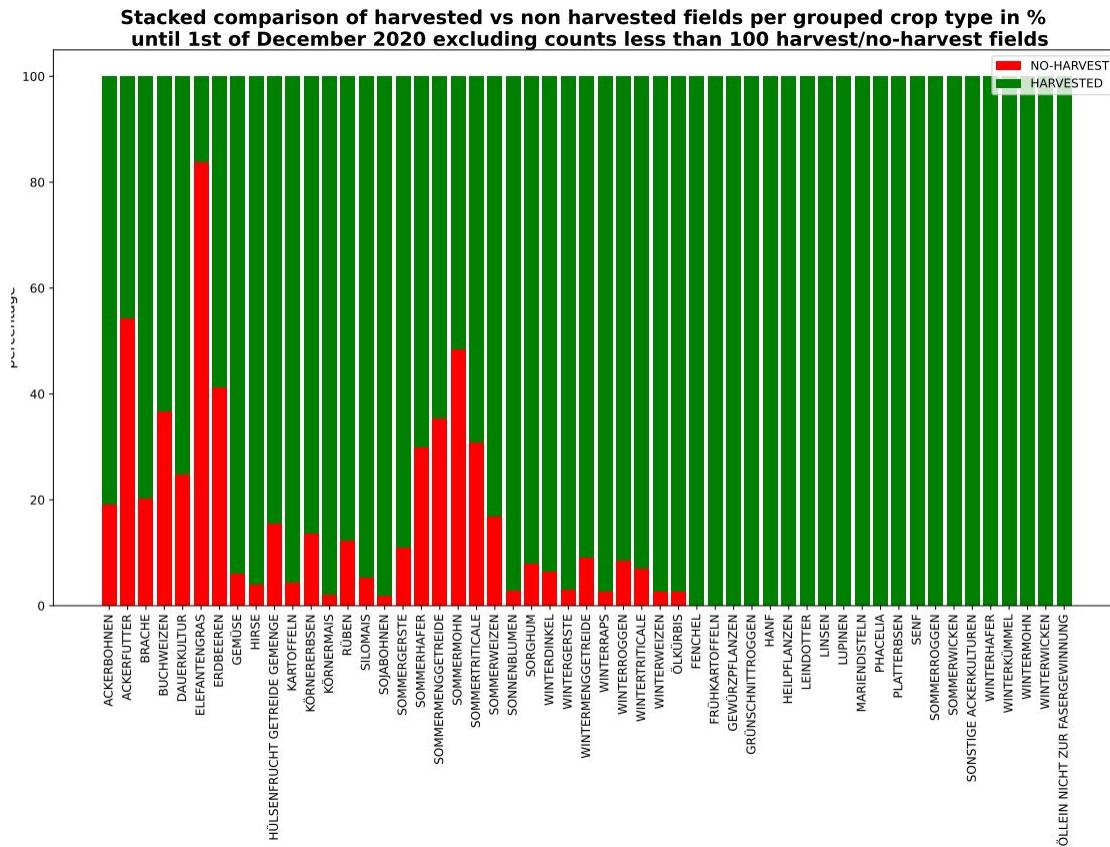
- Identify number of mowing events based on Sentinel-1 and Sentinel-2
- Over **1.1 million parcels** were analysed
- Events between the **first of April and end of August**
- Mowing events per grassland type
- Spatial distribution in Austria



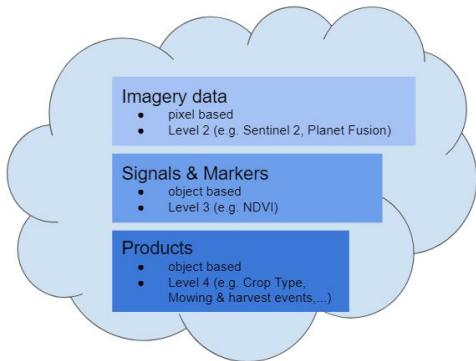
Mowing events distributed in Austria

Harvest Detection

- More than **610000 parcels** analysed with Sentinel-1 and Sentinel-2 (of ~950 000)
- The harvest was detected for around **86 percent** of all parcels (Not expected to be 100%)
- Detected percentage visualised **per crop type**
- Optimisation and in-situ validation ongoing



Data Provisioning - Planet HHR EO Data



Planet Fusion Subscription Package

- Level 2 and Level 3
- clipped to inconclusive/small parcels
- Source: Planet Fusion / PlanetScope
- use-case-specific Planet Fusion Licensing costs/model
- Signals: NDVI
- Update frequency: monthly
- Extras:
 - archiving of past seasons

Recommended reading:

Sen4CAP Webinar presentation with contribution from Planet within EO-WIDGET:

http://esa-sen4cap.org/sites/default/files/Sen4CAP_Webinar8_14Sep2021.pdf





Small Parcels in Austria

Austria has 906.611 small parcels (112.452 ha) that cannot be satisfactorily processed by using Sentinel-2.

Small parcels are (JRC definition) too small to fit 8 Sentinel-2 pixel centres inside with inner 5m buffer and less than 60% pixel loss.

Fusion Pilot on 29.323 representative small parcels with ground truth from year 2020.



EO-WIDGET Beta-App (OGD 2020 - Planet Fusion)

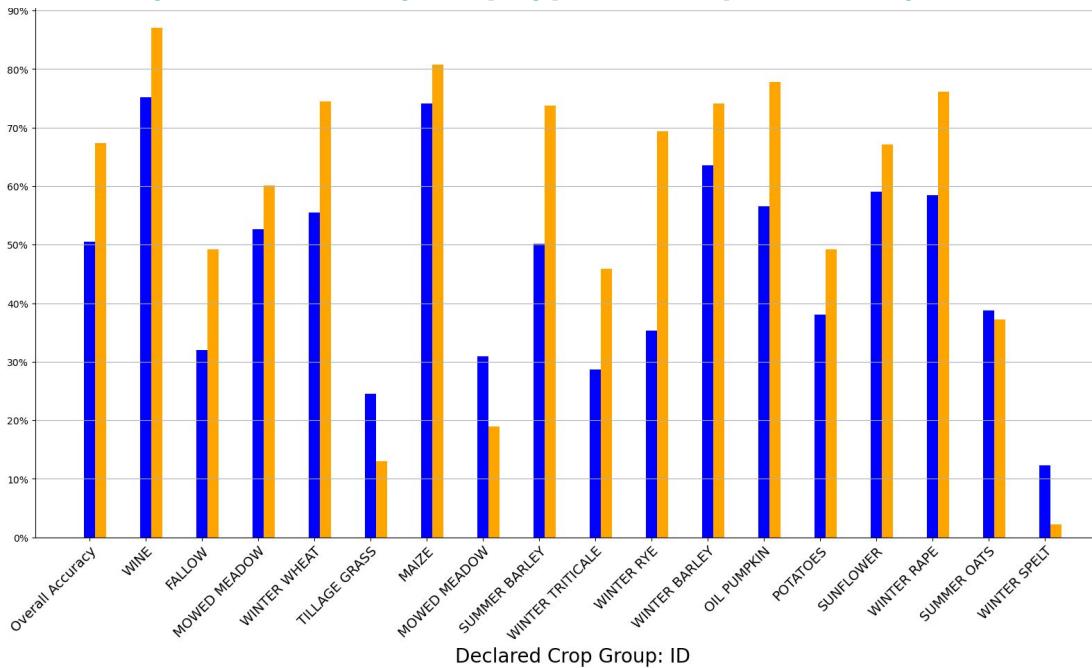
Reference date	Parcel ID	Declared crop code	Declared crop type	Conformance	Group ID	Group Name	Small Parcel
2020-06-30	102141044	771	GRÜNBRÄCHE	Yellow	1070	BRÄCHE	true
2020-06-30	103311486	661	SONSTIGE ACKERFLÄCHEN	Grey	1370	LAGERFLÄCHEN	true
2020-06-30	101448620	771	GRÜNBRÄCHE	Green	1070	BRÄCHE	true



Small Parcels in Austria

Applying a crop classification marker

Accuracy & F1-Scores by Crop type - small parcels only



Achieved Crop type prediction quality for Small Parcels with Planet Fusion data enables automated processing within Checks by Monitoring (CbM)



Sentinel 1 + 2

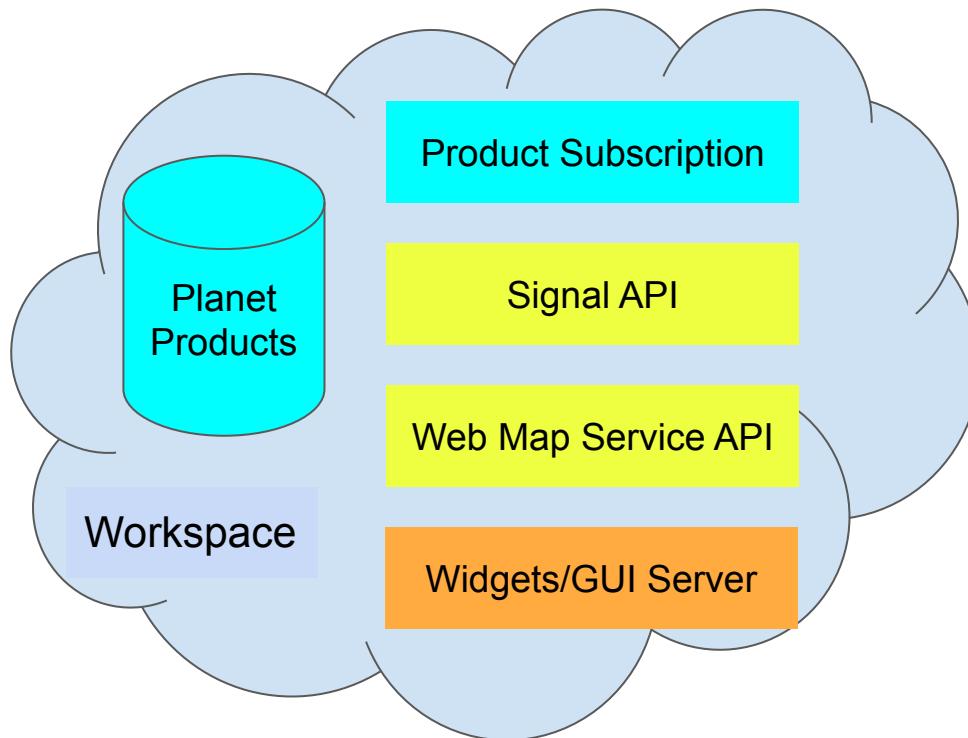


Planet Fusion

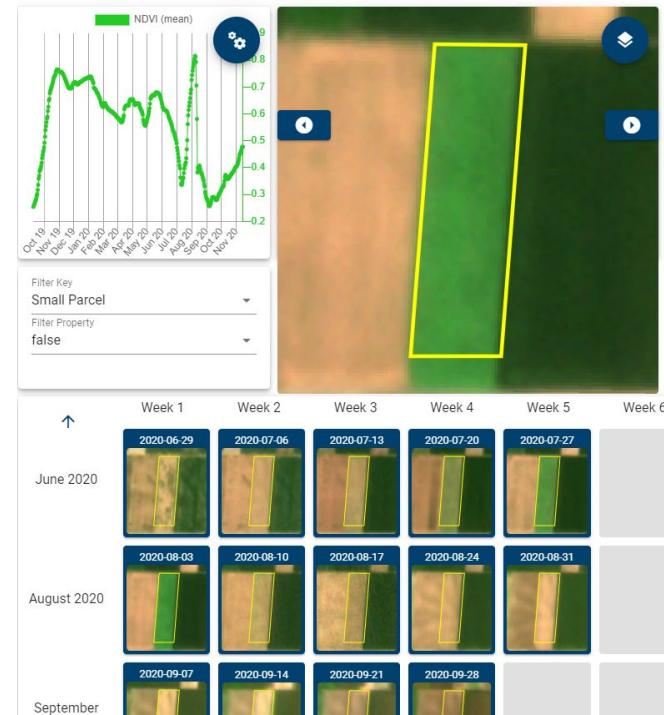


Planet Fusion “Data as a Service” for Agri Parcels

Parcel Data Access Services

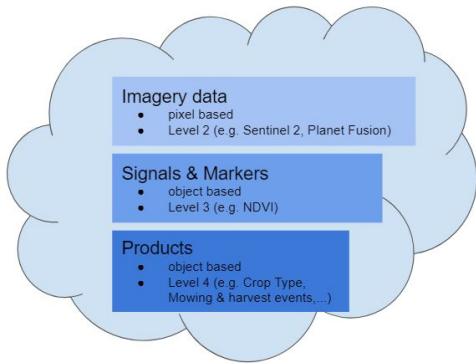


Signals & Portrayals



managed by provider

Data Provisioning - Sentinel EO Data



S2L2a + S1L2 Subscription Package

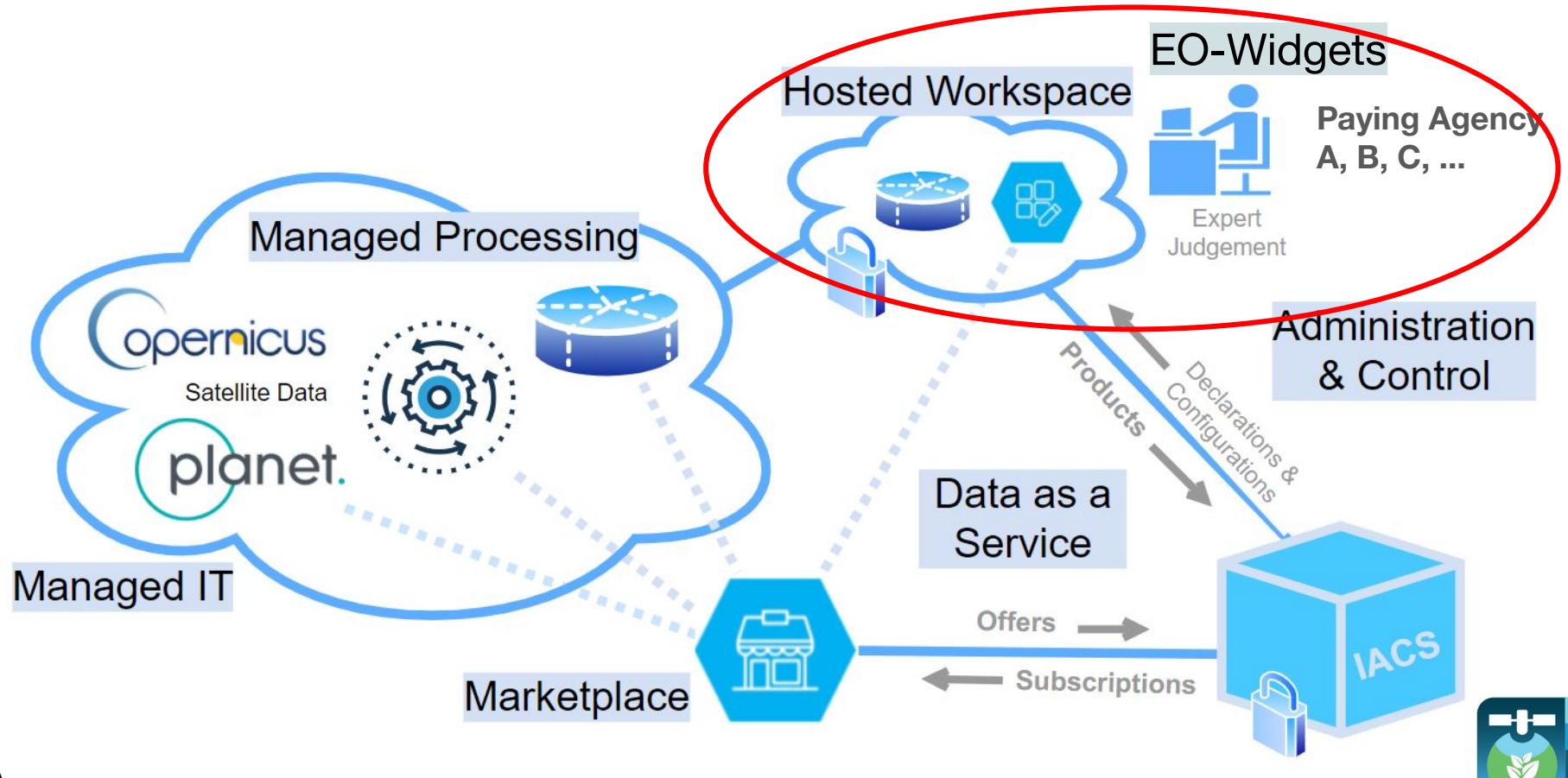
- Level 2 and Level 3
- Source: Sentinel 1, Sentinel 2 Level 2a
- Signals: NDVI, COHE_VV, COHE_VH
- Update frequency: monthly
- Extras:
 - archiving of past seasons

EO-WIDGET Platform Services & Web App

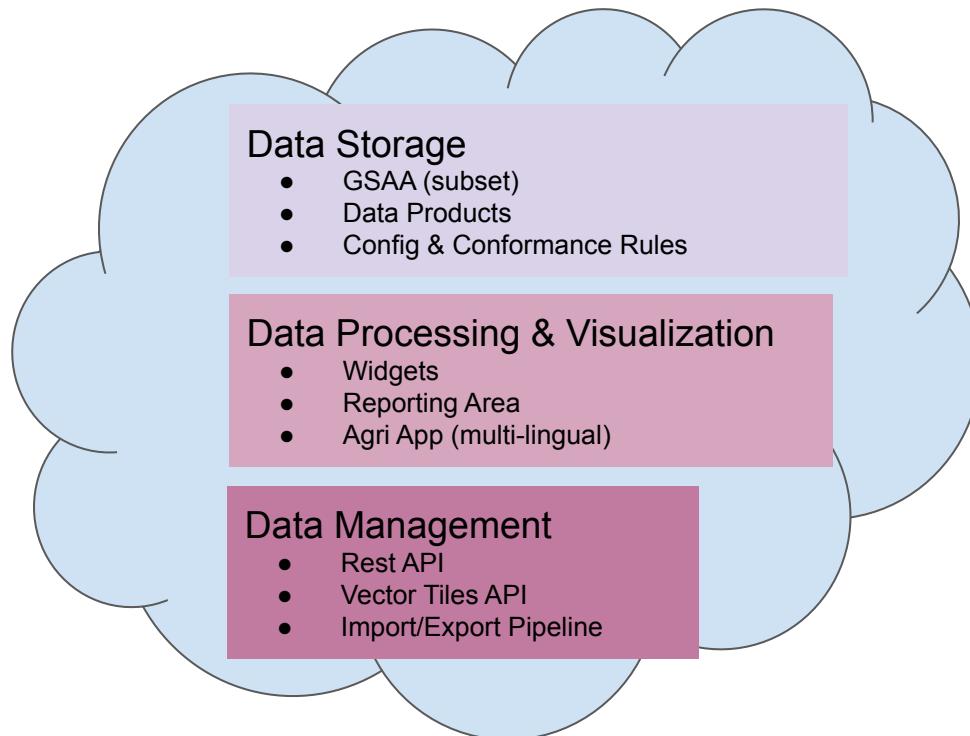


- Area Monitoring Workspace
- Open Source Widgets
- Expert Judgement Tool

Service Architecture



Area Monitoring Workspace



EXAMPLE

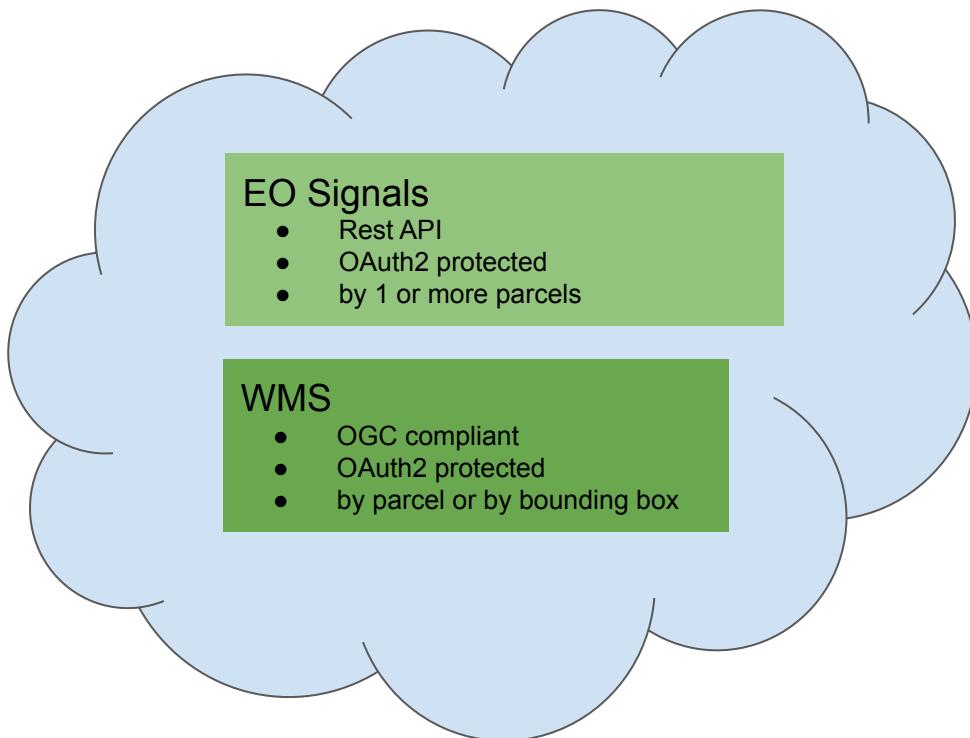
Multi-Version Subscription Plan

- up to 5 mio parcels with arbitrary meta information in up to 15 versions
- up to 10 scheduled data pipeline runs
- up to 100 GB overall storage
- SLA > 99% availability on APIs
- daily backup
- monthly archiving (3 years backwards)

other subscription plans available including free trial



EO Signals and WMS



EXAMPLE

Standard Subscription Plan

- up to 1 mio requests per month (requests for archived data counts 200%)
- max 200 request per minute
- SLA > 99% availability on APIs, direct API access allowed
- EO Signals spec: 1-5 signals per request, date filtering within season
- WMS spec: max 512x512px, EPSG:3857, zoom ≥ 12
- requires at least 1 data provider subscription
- Extras:
 - additional requests



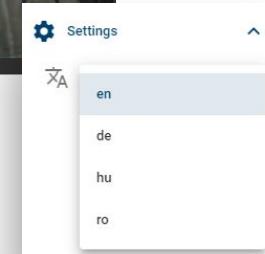
Data Processing & Visualization - Agri App - Expert Judgement Tool



Public Demo

<https://agri-ogr-at-public.demo.hub.eox.at/>

(no password required)



Widgets - Parcel Explorer App



Quality Assessment Tool



EO-WIDGET Beta-App (OGD 2020 - Planet Fusion-staging)

ama@example.com



MAB_PF_SVM_100_1000 MODEL NAME

2021-02-18 CONFIGURATION DATE

2020-06-30 PARCEL REFERENCE DATE

Small Parcels:

- include
- exclude
- only

Training Parcels:

- include
- exclude
- only

Valid Ranks



Weight Parcels by Area [?](#)

111,531 PARCELS

130,719 ha TOTAL AREA

91.44% OVERALL ACCURACY

92.02% F1-SCORE

90.38% KAPPA

Confusion Matrix



F1-Scores

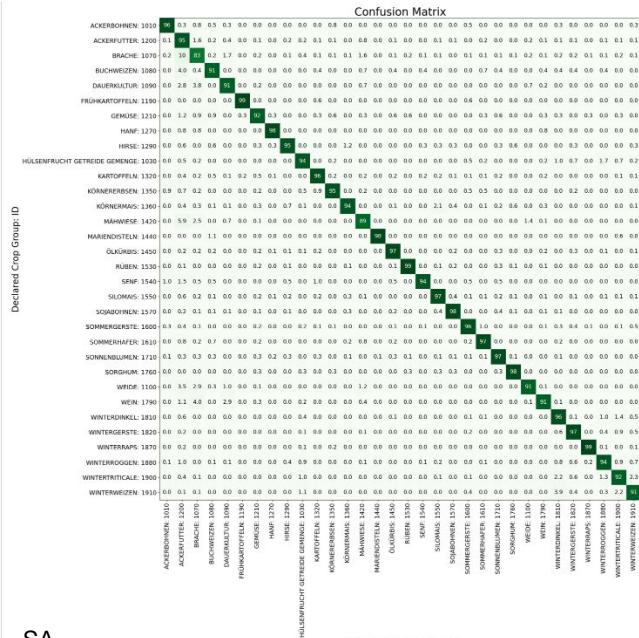


Omission-Agreement-Commission

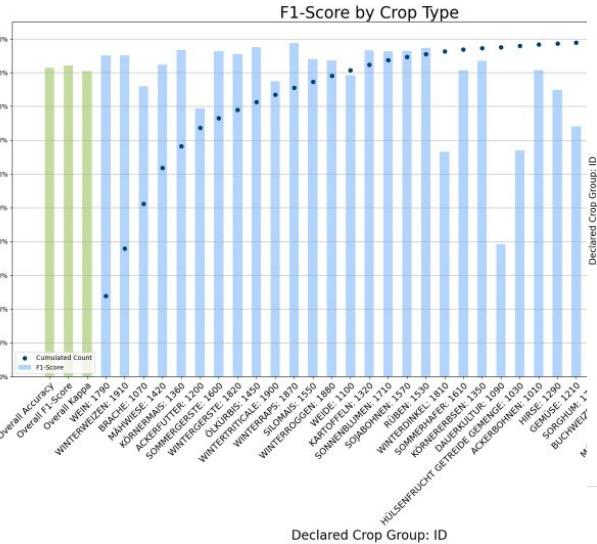


Quality Assessment Tool

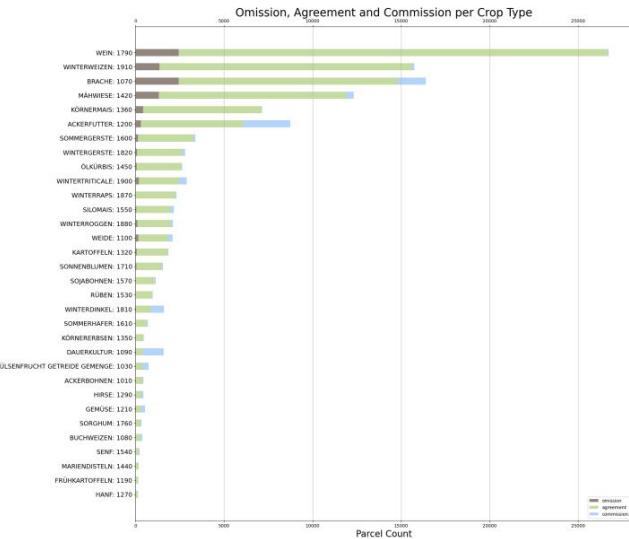
Confusion Matrix



F1-Score



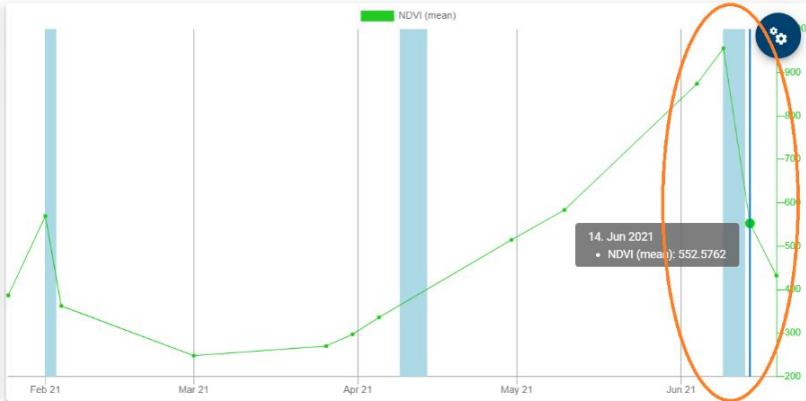
True Positives, False Negatives



Mowing

Config Date: 2021-06-18
Reference Date: 2021-07-01

- Cultivated Crop Type
- Grassland Mowing**
- Parcel Explorer
- Harvest
- Fallow Land
- Winter Catch Crops
- Nitrogen Fixing Crop
- Permanent green cover
- Biodiversity Strips
- Administration



Parcel ID	Holding ID	FS NR	Gross Area	Declared crop code	Declared crop type	Small Parcel	Number of Mowing Events	Mowing Event Compliancy	In-Situ Data Available
174213817	5	1339.9721	771	GRÜNBRACHE		true	NaN	not_eligible	true
182727539	6	49294.7579	635	LUZERNE		false	3	no_deviation	false
174214523	14	1840.4075	901	WEIN		true	NaN	not_eligible	false
174214522	14	1782.4634	901	WEIN		true	NaN	not_eligible	false

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Filter Key

Filter Property

June 2021

Week 1 31.05 - 06.06

Week 2 07.06 - 13.06

Week 3 14.06 - 20.06

Week 4 21.06 - 27.06

Week 5 28.06 - 04.07

Week 6

Week 7

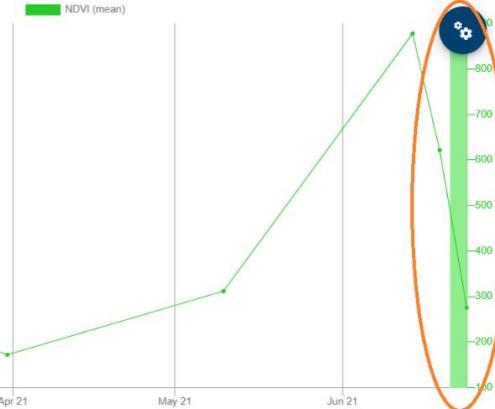


Harvest



Parcels

- Harvest Detection Conformance
- Reference parcel area
- Local background layers
- Geoland Basemap Overlay
- Geoland Basemap Oberfläche
- Geoland Basemap Gelände
- Geoland Basemap Orthofoto
- Geoland Basemap Grau

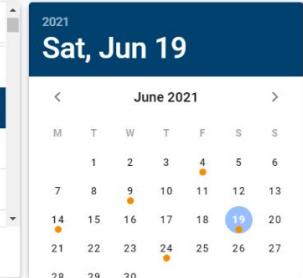


Parcel ID	Holding ID	FS NR	Gross Area	Declared crop code	Declared crop type	Small Parcel	Harvest Detection Compliancy	Harvest Event Confidence	Harvest Event Daterange	In-Situ Data Available
183149291		120	3500.9974	751	ÖLKÜRBIS	false	no harvest detected			false
182490518		4	6530.4786	155	SOMMERHAFER	false	above_upper_threshold	1	[2021-06-21, 2021-06-27)	false
172452831		4	50.3585	353	LSE RAIN / BÖSCHUNG / TROCKENSTEINMAUER	true	not_eligible			false
172453258		15	2208.623	901	WEIN	true	not_eligible			false

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Filter Key

Filter Property



↑

June 2021

Week 1 31.05 - 06.06

Week 2 07.06 - 13.06

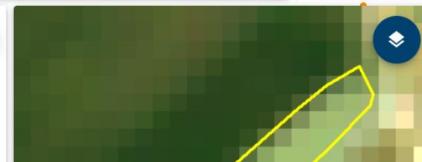
Week 3 14.06 - 20.06

Week 4 21.06 - 27.06

Week 5 28.06 - 04.07

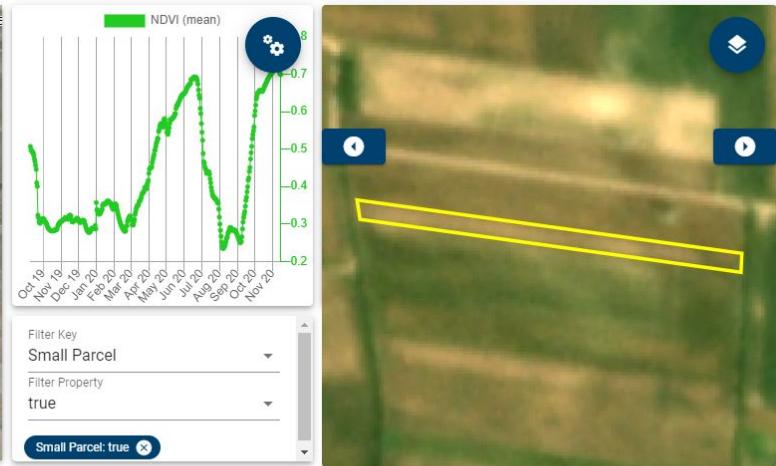
Week 6

Week 7





Inconclusive / Small Parcels



Reference date	Parcel ID	FART_ID	Declared crop code	Declared crop type ↑	Conform
2020-06-30	3073160.0	1693.0	353	TROCKENSTEINMAUER LSE RAIN / BÖSCHUNG / TROCKENSTEINMAUER	●
2020-06-30	3075112.0	1693.0	111	SOMMERGERSTE	●
2020-06-30	102937703.0	1693.0	661	SONSTIGE ACKERFLÄCHEN	●
2020-06-30	3075427.0	1693.0	138	WINTERWEICHWEIZEN	●
2020-06-30	3074913.0	1693.0	138	WINTERWEICHWEIZEN	●
2020-06-30	3074646.0	1693.0	138	WINTERWEICHWEIZEN	●



EO-WIDGET

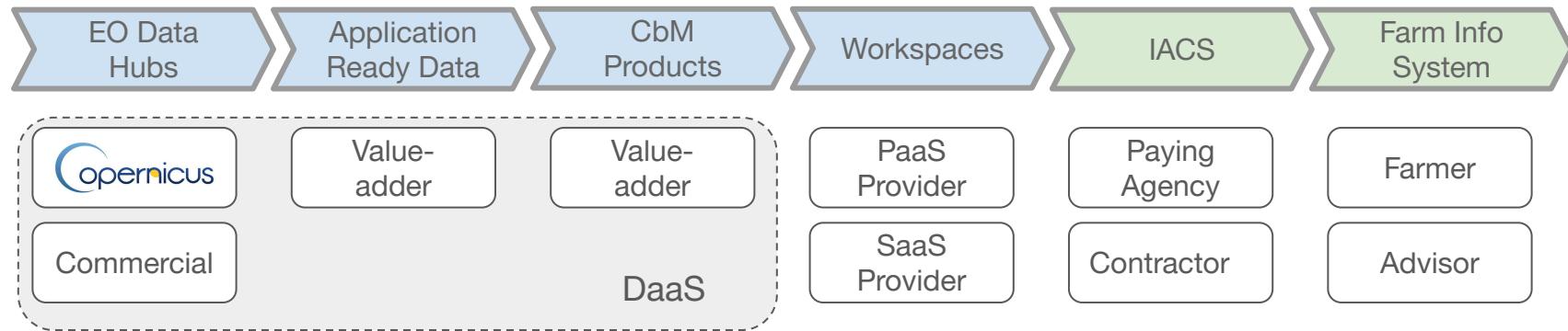
Marketplace Concept



- Open Value Chain Implementation
 - Data Products
 - Apps
 - Platform Services

Open Value Chain - join as you like!

Interoperability via common workflows and **complementary roles** of stakeholders for optimum adjustment to Paying Agencies' policies



Marketplace

EO-WIDGET

Marketplace

Types

- Data Products (3)
- Platform Services (2)
- Apps (1)

Search

Data Products



Monitoring Products
by GeoVille



Planet Fusion
by Planet



Data Provisioning
by EOX

Platform Services



Area Monitoring Workspace
by EOX



EO Signals and Web Map Service (WMS)
by EOX

Marketplace



EOHub Area Monitoring Workspace
by EOx

[README](#) [PRICING](#)

Subscription Plans

Single Version Plan

- connect your latest LPIS/GSAA data with the EO-WIDGET ecosystem, regularly updated based on an agreed interval (e.g. monthly)
- store up to 5 mio parcels with arbitrary metainformation
- consume parcel information via Vector Tiles API within agreed SLAs
- foundation for other Area Monitoring products

Multi Version Plan

- connect current and historic LPIS/GSAA data with the EO-WIDGET ecosystem, regularly updated based on an agreed interval (e.g. monthly)
- store up to 5 mio parcels with arbitrary metainformation in up to 15 versions
- consume parcel information via Vector Tiles API within agreed SLAs
- foundation for other Area Monitoring products

Free trial

Demonstrator

- connect a subset of your LPIS/GSAA data with the EO-WIDGET ecosystem
- store up to 100k parcels with arbitrary metainformation
- consume parcel information via Vector Tiles API (up to 100 requests / min)
- foundation for other Area Monitoring products

Plan Name	Parcels	Storage	Price (monthly)
Single Version Plan	<5 mio	<20GB	COMING SOON
Multi Version Plan	<5 mio	<100GB	COMING SOON
Demonstrator	<100k	<5GB	

Actions

[CHANGE PLAN](#)

Tags

GPU Jupyter Mass Processing

Provider

EOX

Support

EOX

Feedback by Stakeholders



Outlook

- Next stakeholder Meeting towards end of January 2022
 - Thursday afternoon slot ok for everyone?
- Continued interactions with existing stakeholders
- Open to new stakeholders
 - Please get in touch.

Further Info

Project Web Site:

<https://eowidget.services>

(needs update)

Help and Stakeholder Liaisons:

David Kolitzus

kolitzus@geoville.com

+43 512 562021-29

GeoVille

Gerhard Triebnig

gerhard.tribenig@eoxt.at

+43 664 6207655

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