

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**

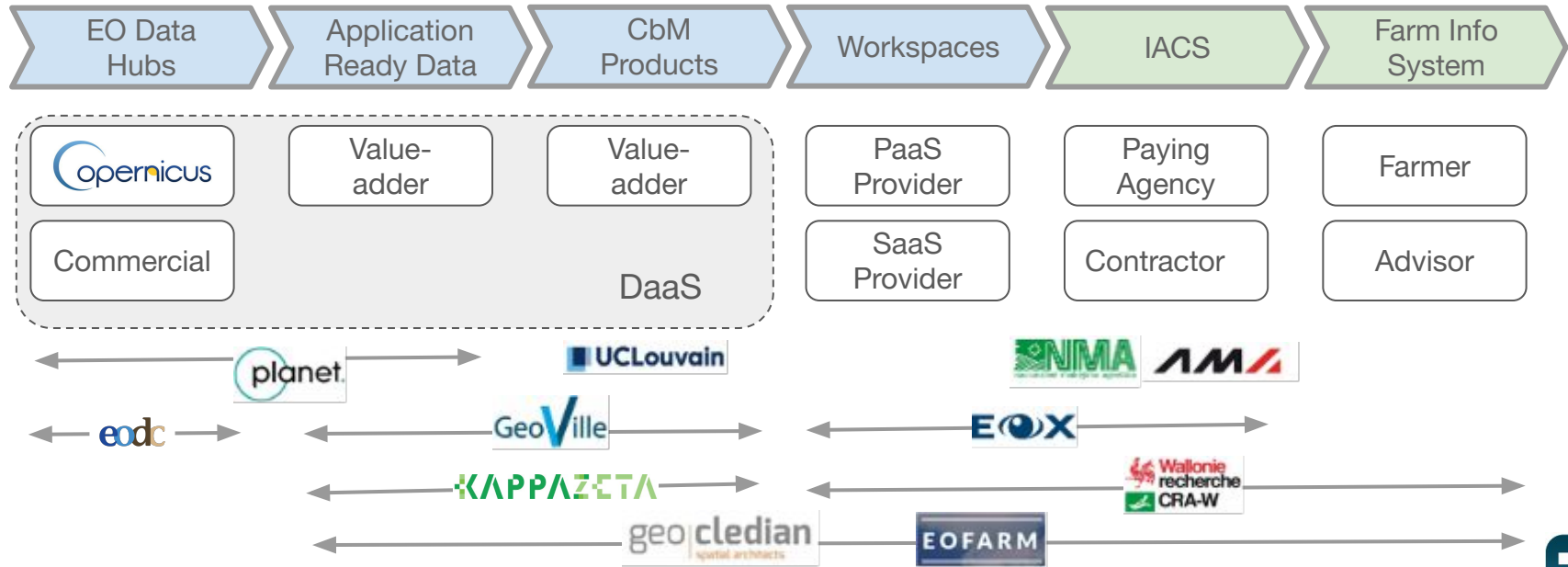
- Optimization and quality improvements

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

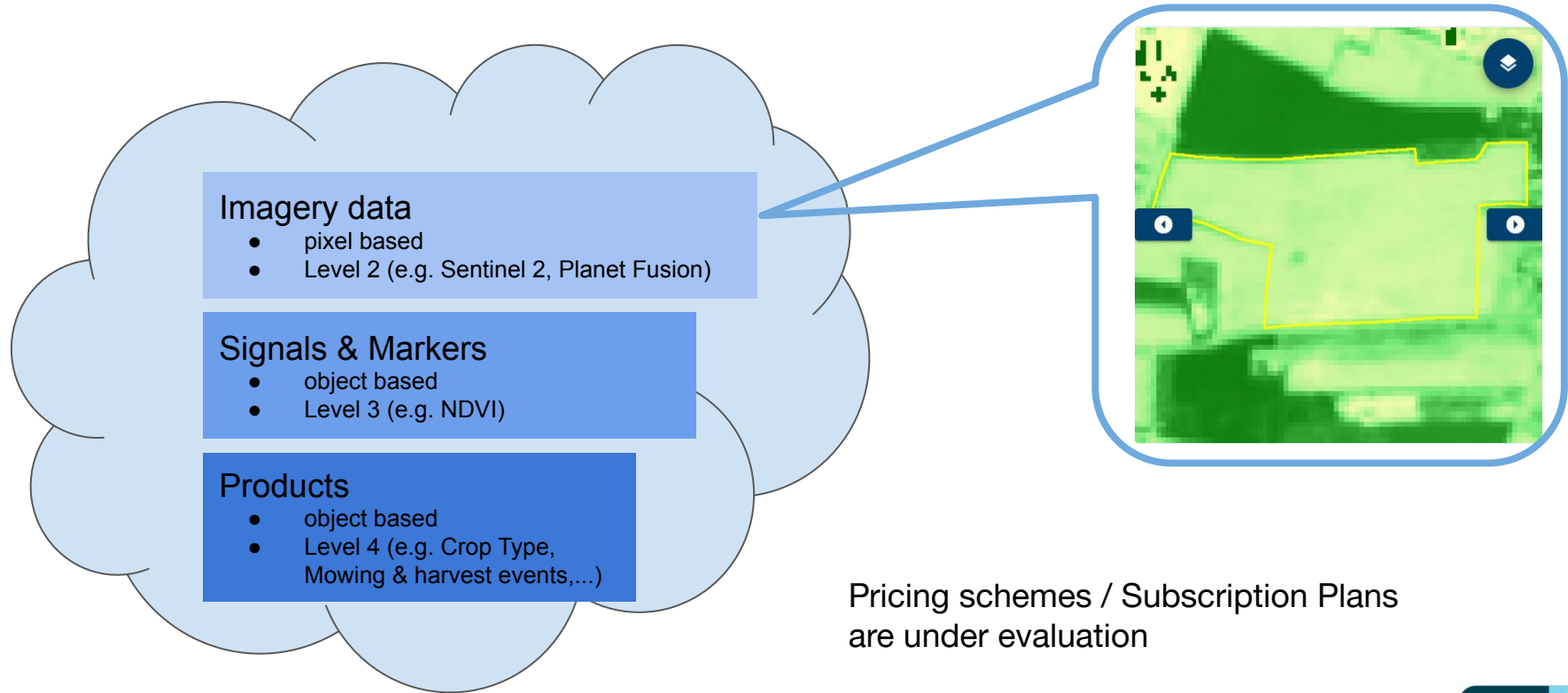


EO-WIDGET Available CbM Products and Service Offerings

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



Data Provisioning



Data Provisioning

Imagery data

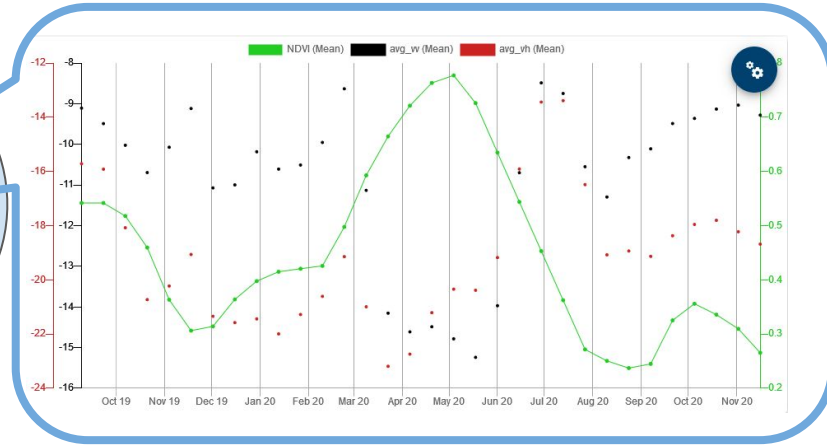
- pixel based
- Level 2 (e.g. Sentinel 2, Planet Fusion)

Signals & Markers

- object based
- Level 3 (e.g. NDVI)

Products

- object based
- Level 4 (e.g. Crop Type, Mowing & harvest events,...)



Pricing schemes / Subscription Plans
are under evaluation



Data Provisioning

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- pixel based
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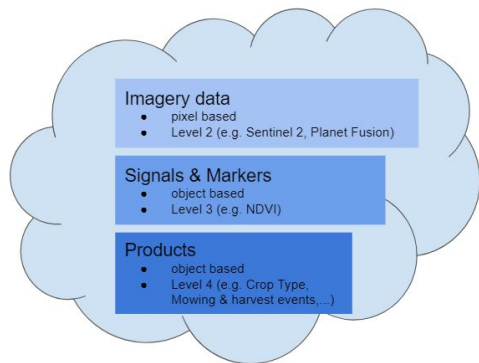
- object based
- Level 3 (e.g. NDVI)

Products

- object based
- Level 4 (e.g. Crop Type, Mowing & harvest events,...)



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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 - **Crop Type Product**
 - **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

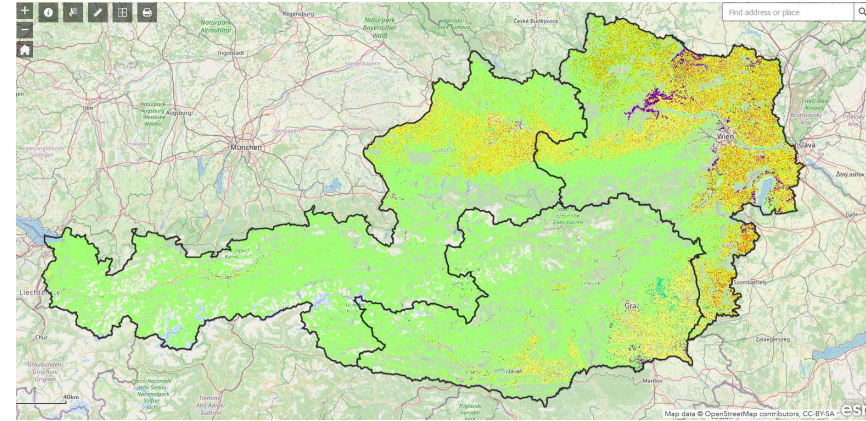
- API for direct access (database-database)
- within EO-WIDGET Web App

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

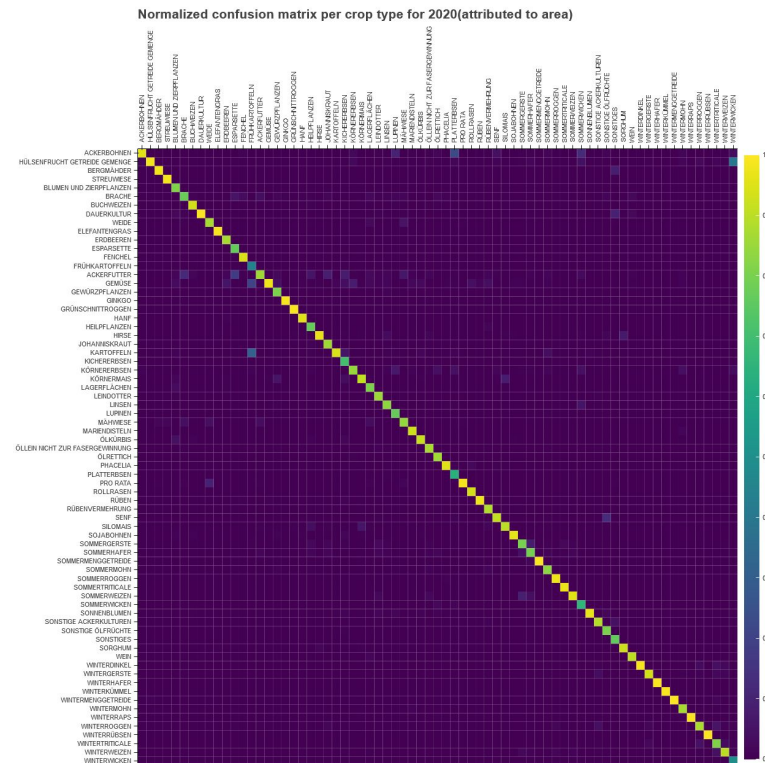


Crop Type Map of Austria 2021



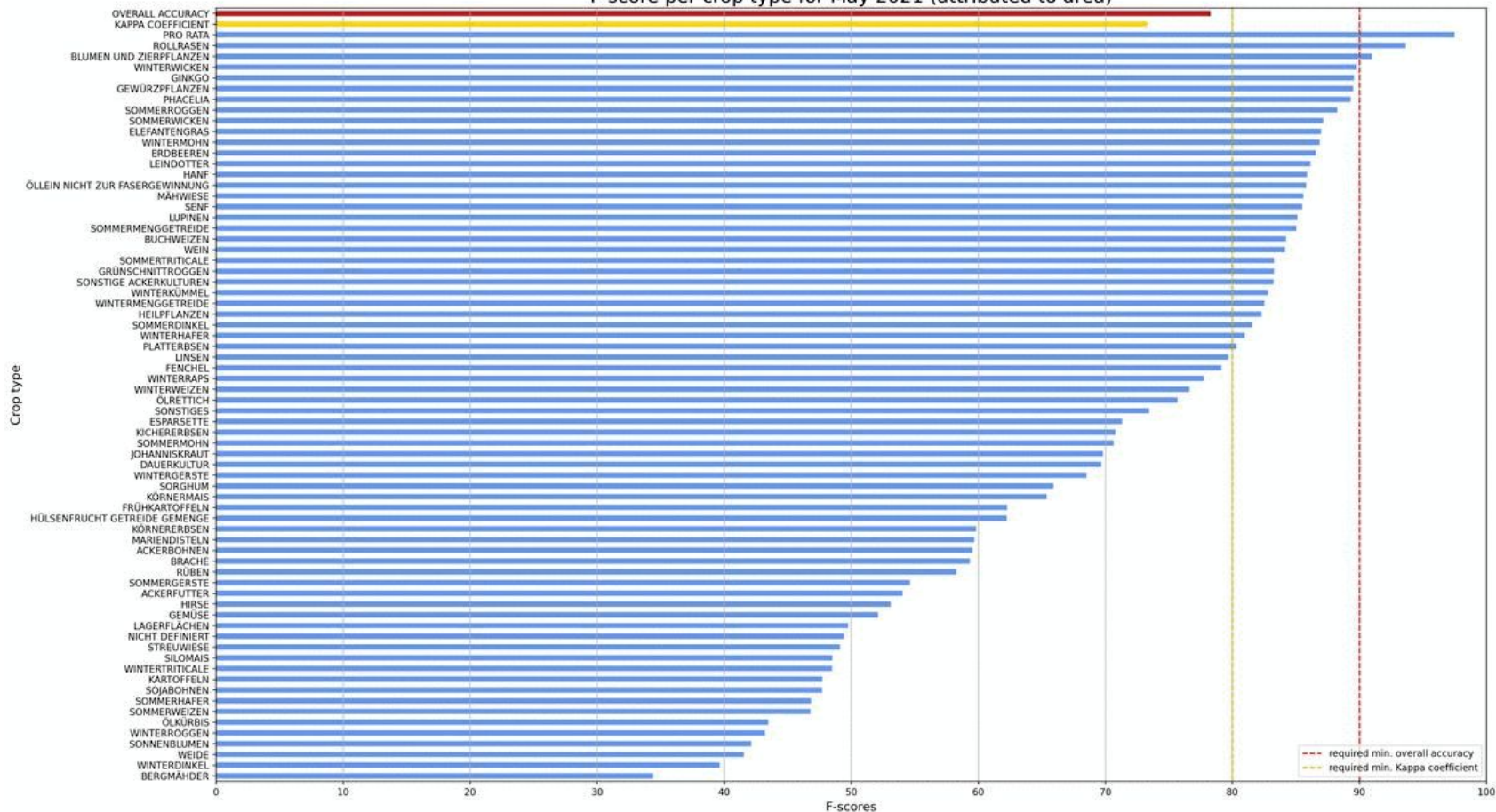
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Confusion Matrix for Crop Type Ma

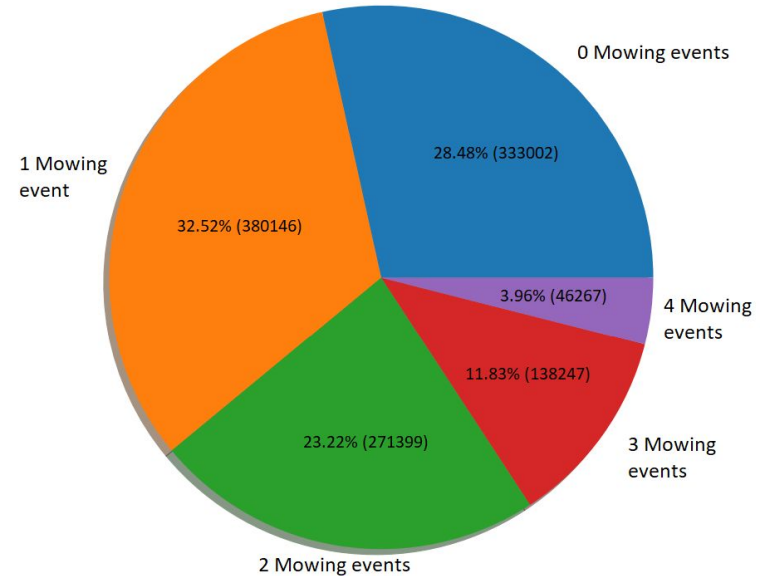
F-score per crop type for May 2021 (attributed to area)



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**

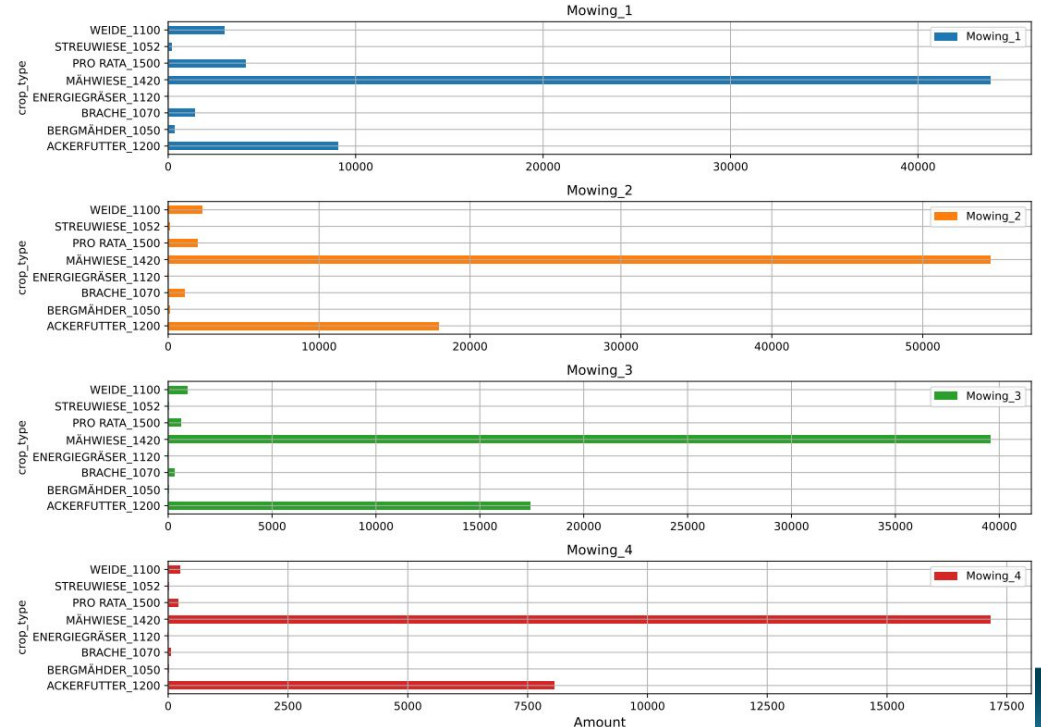


Detected mowing events

Grassland Monitoring - Mowing events

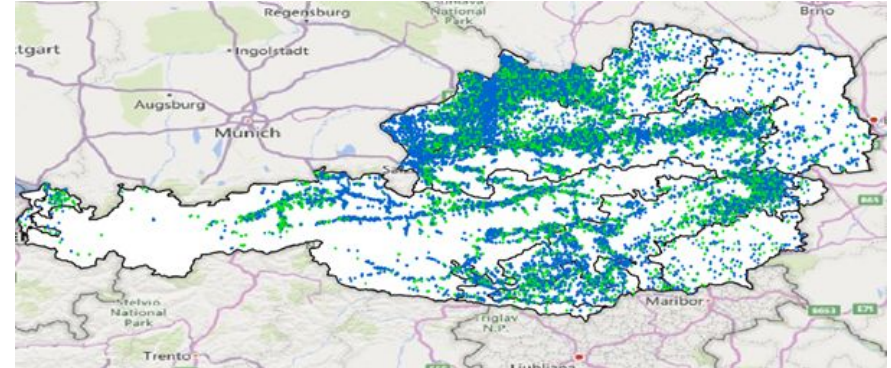
- Identify number of mowing events based on Sentinel-1 and Sentinel-2
- Over **1.1 million parcels** were analysed
- Events between the **first of April and end of August**
- Mowing events per grassland type

Overview of mowing counts per crop type, with confidence higher than 0.7 until 1st of September 2021



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

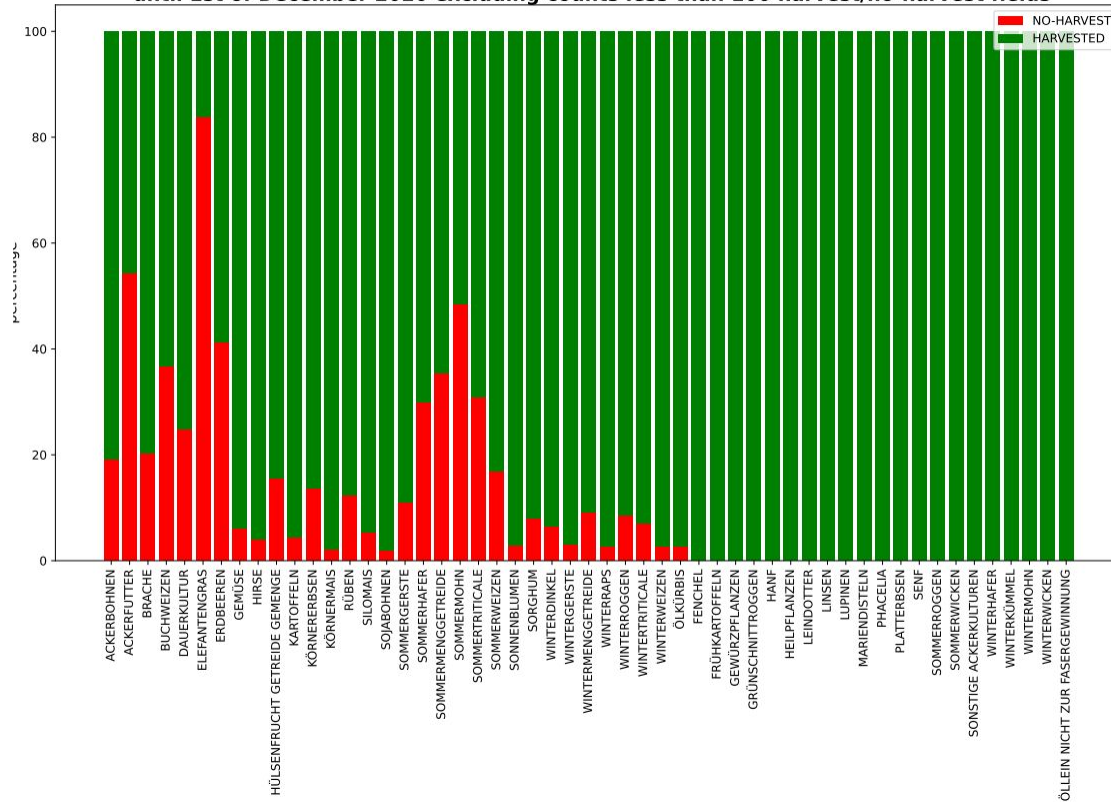


Mowing events distributed in Austria

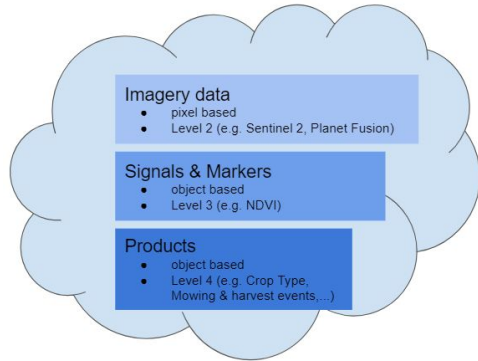
Harvest Detection

- 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

Stacked comparison of harvested vs non harvested fields per grouped crop type in % until 1st of December 2020 excluding counts less than 100 harvest/no-harvest fields



Data Provisioning - Planet HHR EO Data



Planet Fusion Subscription Package

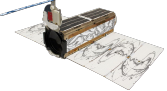
- Level 2 and Level 3
- clipped to inconclusive/small parcels
- Source: Planet Fusion / PlanetScope
- use-case-specific Planet Fusion Licensing costs/model
- Signals: NDVI
- Update frequency: monthly
- Extras:
 - archiving of past seasons

Recommended reading:

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

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





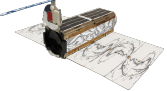
Small Parcels in Austria

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.

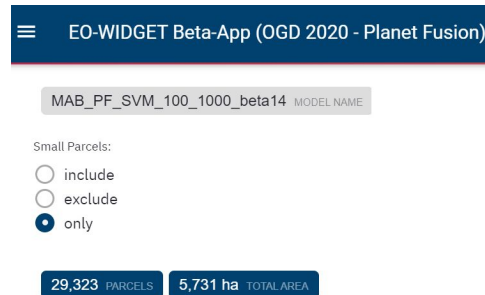
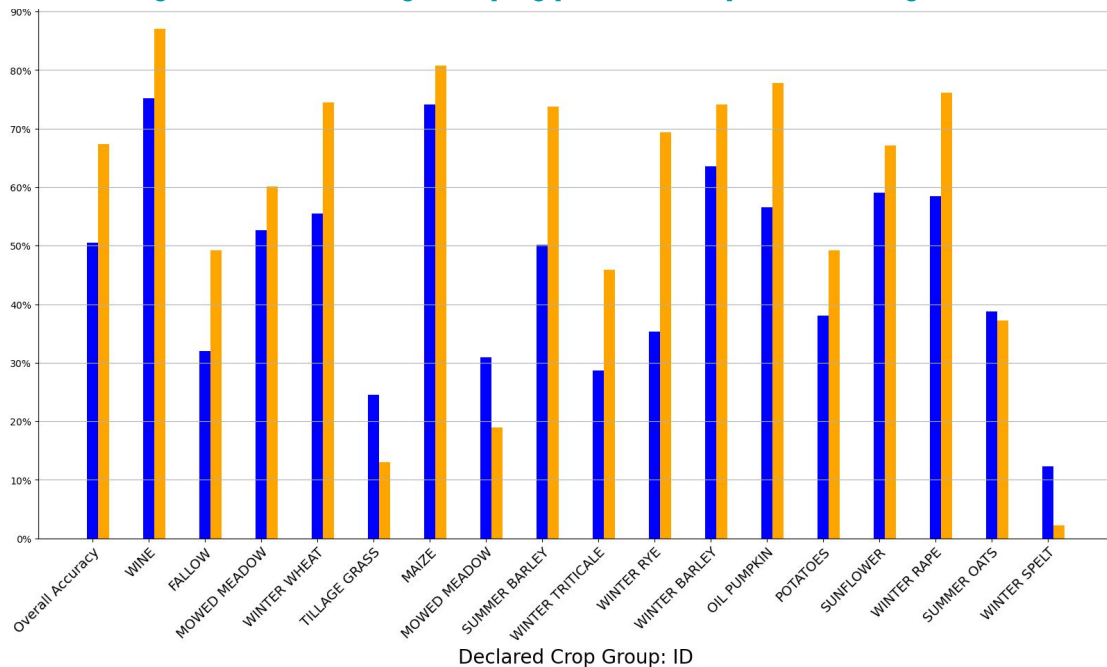




Small Parcels in Austria

Applying a crop classification marker

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



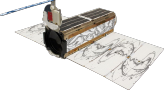
Achieved Crop type prediction quality for Small Parcels with Planet Fusion data enables automated processing within Checks by Monitoring (CbM)



Sentinel 1 + 2

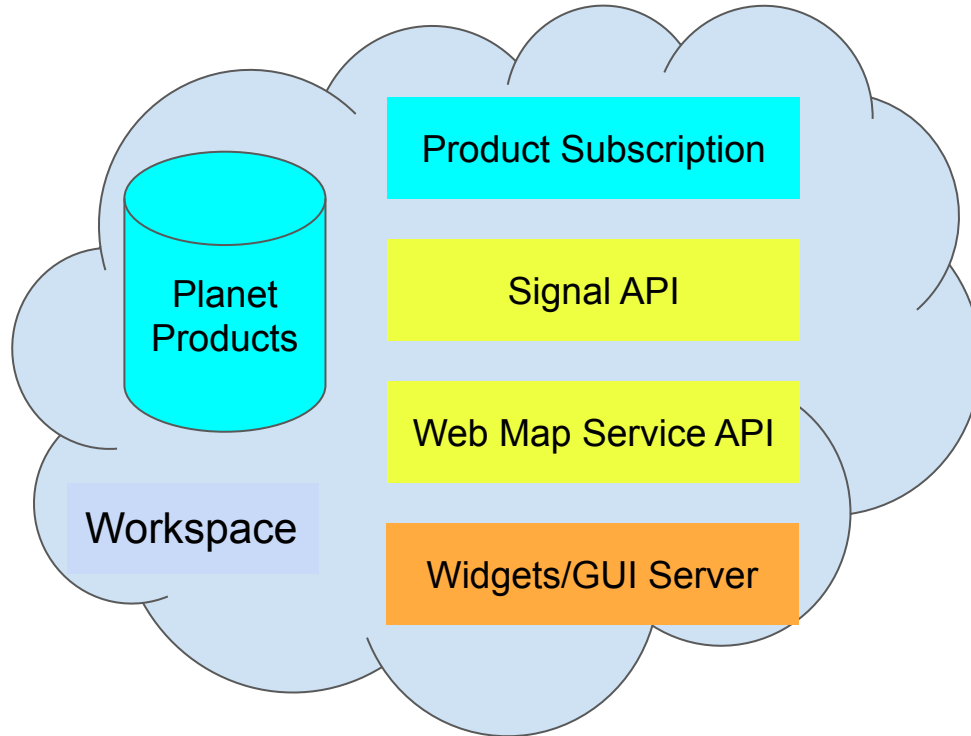


Planet Fusion



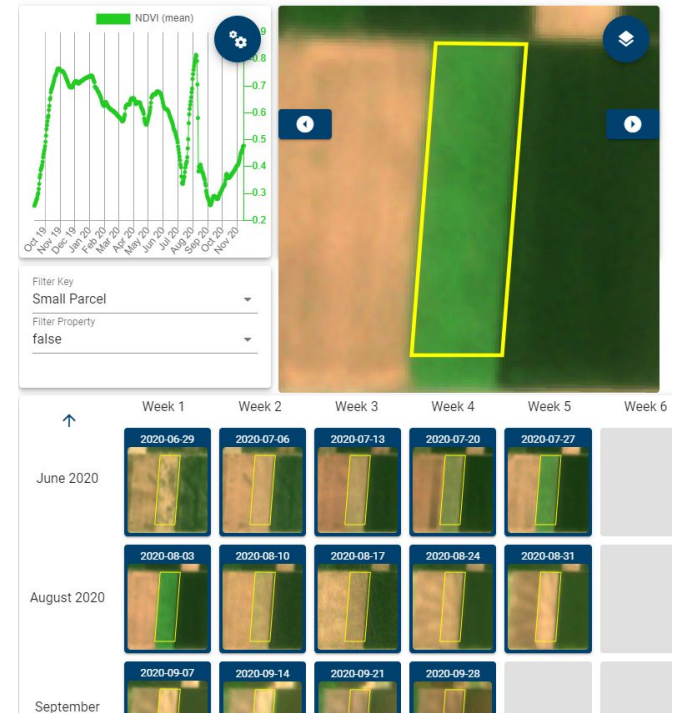
Planet Fusion “Data as a Service” for Agri Parcels

Parcel Data Access Services

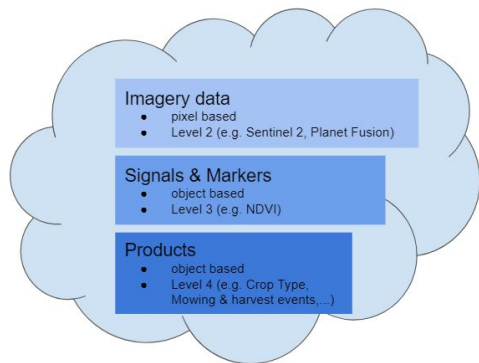


managed by provider

Signals & Portrayals



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

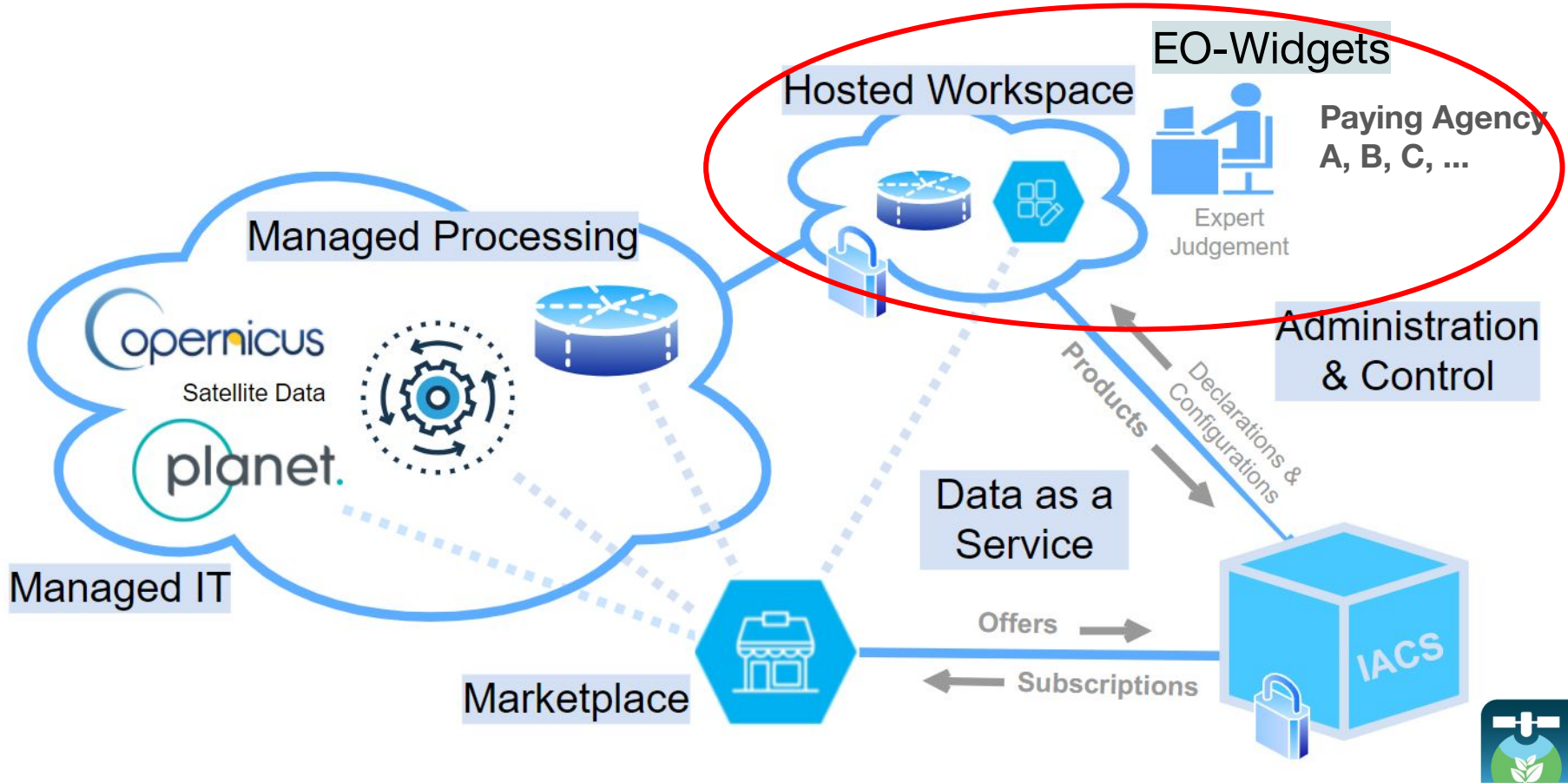


EO-WIDGET Platform Services & Web App

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



Service Architecture



Area Monitoring Workspace

EXAMPLE

Multi-Version Subscription Plan



Data Storage

- GSAA (subset)
- Data Products
- Config & Conformance Rules

Data Processing & Visualization

- Widgets
- Reporting Area
- Agri App (multi-lingual)

Data Management

- Rest API
- Vector Tiles API
- Import/Export Pipeline

- 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



EO Signals

- Rest API
- OAuth2 protected
- by 1 or more parcels

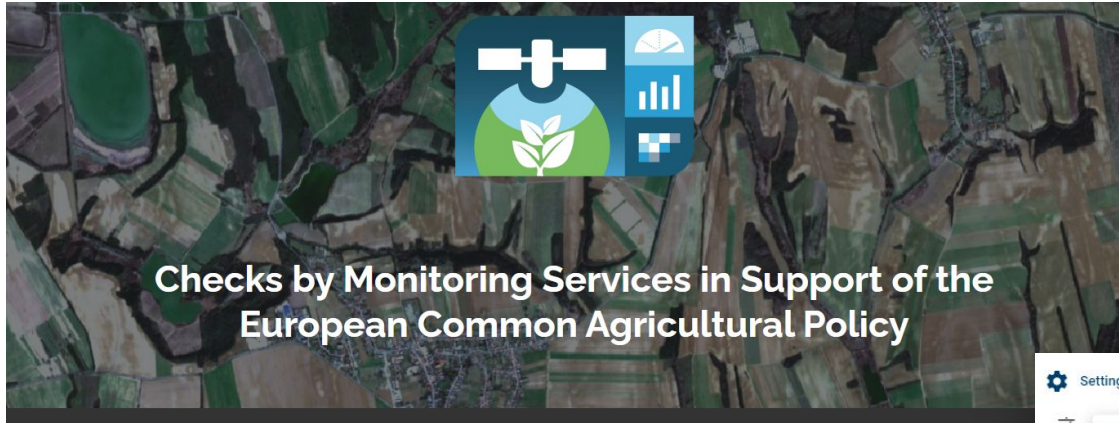
WMS

- OGC compliant
- OAuth2 protected
- by parcel or by bounding box

- 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



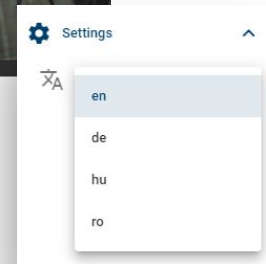
Data Processing & Visualization - Agri App - Expert Judgement Tool



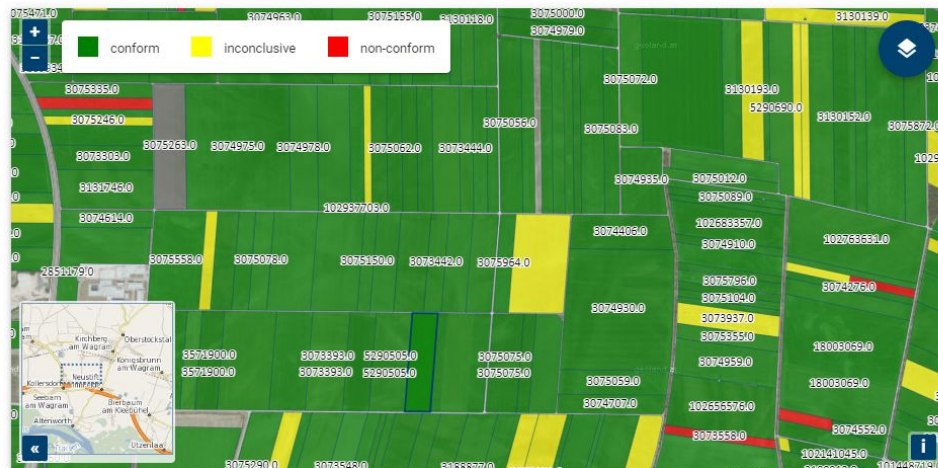
Public Demo

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

(no password required)

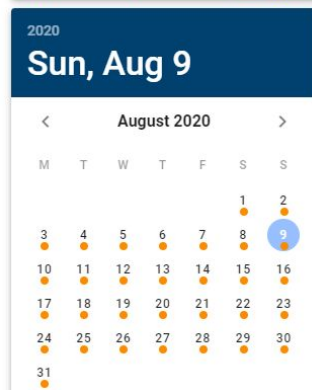


Widgets - Parcel Explorer App



Filter Key
Small Parcel

Filter Property
false



Reference date	Parcel ID	FART_ID	Declared crop code	Declared crop type ↑
2020-06-30	3075877.0	1693.0	301	WINTERRAPS
2020-06-30	102683746.0	1693.0	301	WINTERRAPS
2020-06-30	3074349.0	1693.0	301	WINTERRAPS
2020-06-30	3075872.0	1693.0	142	WINTERROGGEN
2020-06-30	3075149.0	1693.0	138	WINTERWEICHWEIZEN
2020-06-30	3189934.0	1693.0	138	WINTERWEICHWEIZEN
2020-06-30	3074614.0	1693.0	138	WINTERWEICHWEIZEN



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



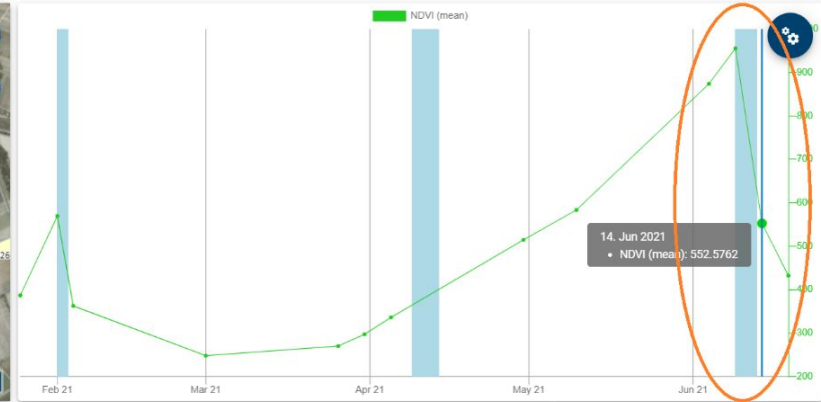
Omission-Agreement-Commission



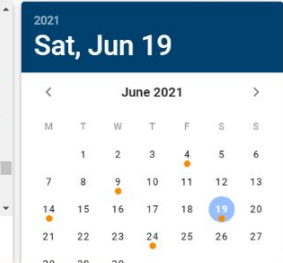
Mowing

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 Compliance	In-Situ Data Available
174213817		5	1339.9721	771	GRÜNBACHE	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

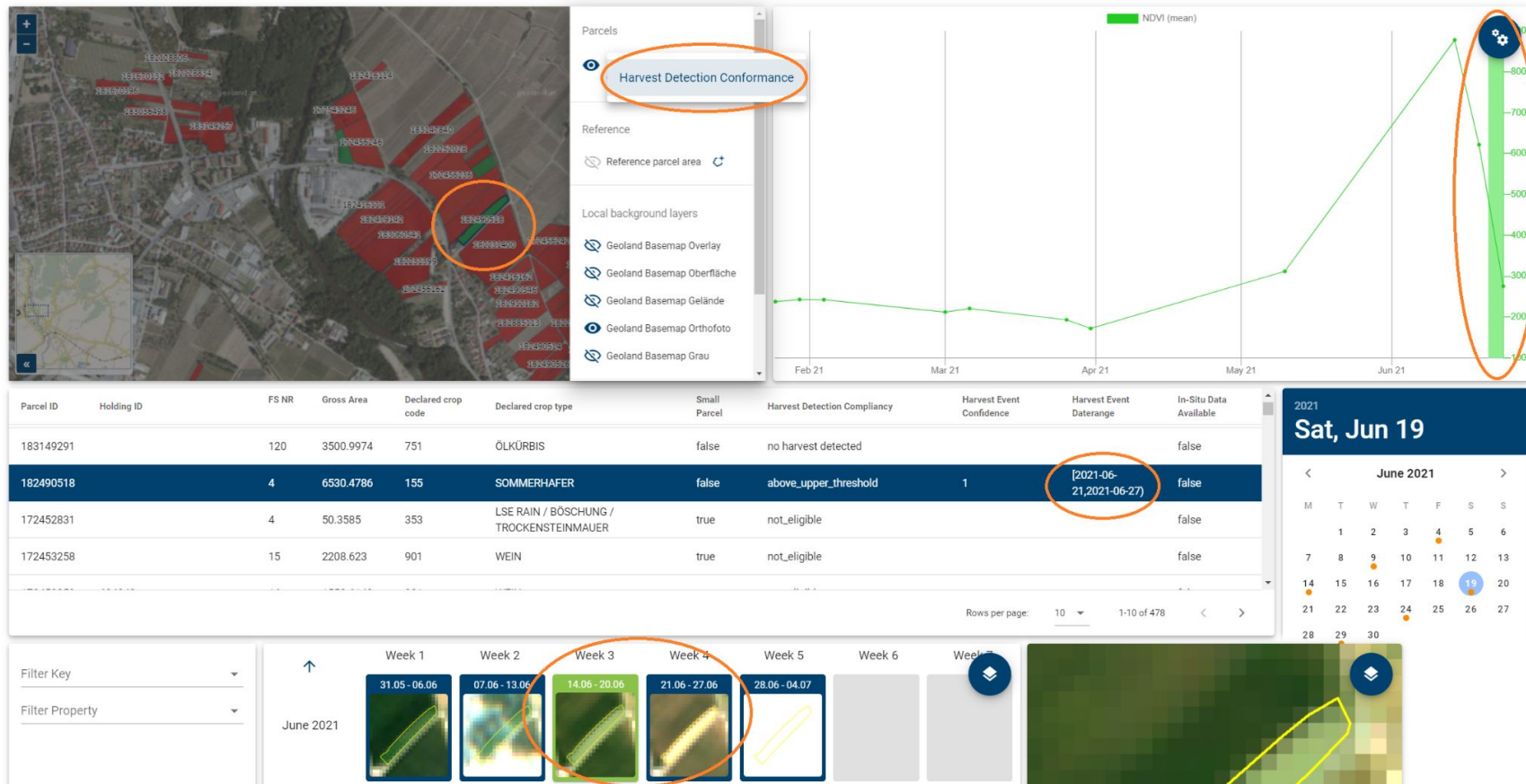


Filter Key

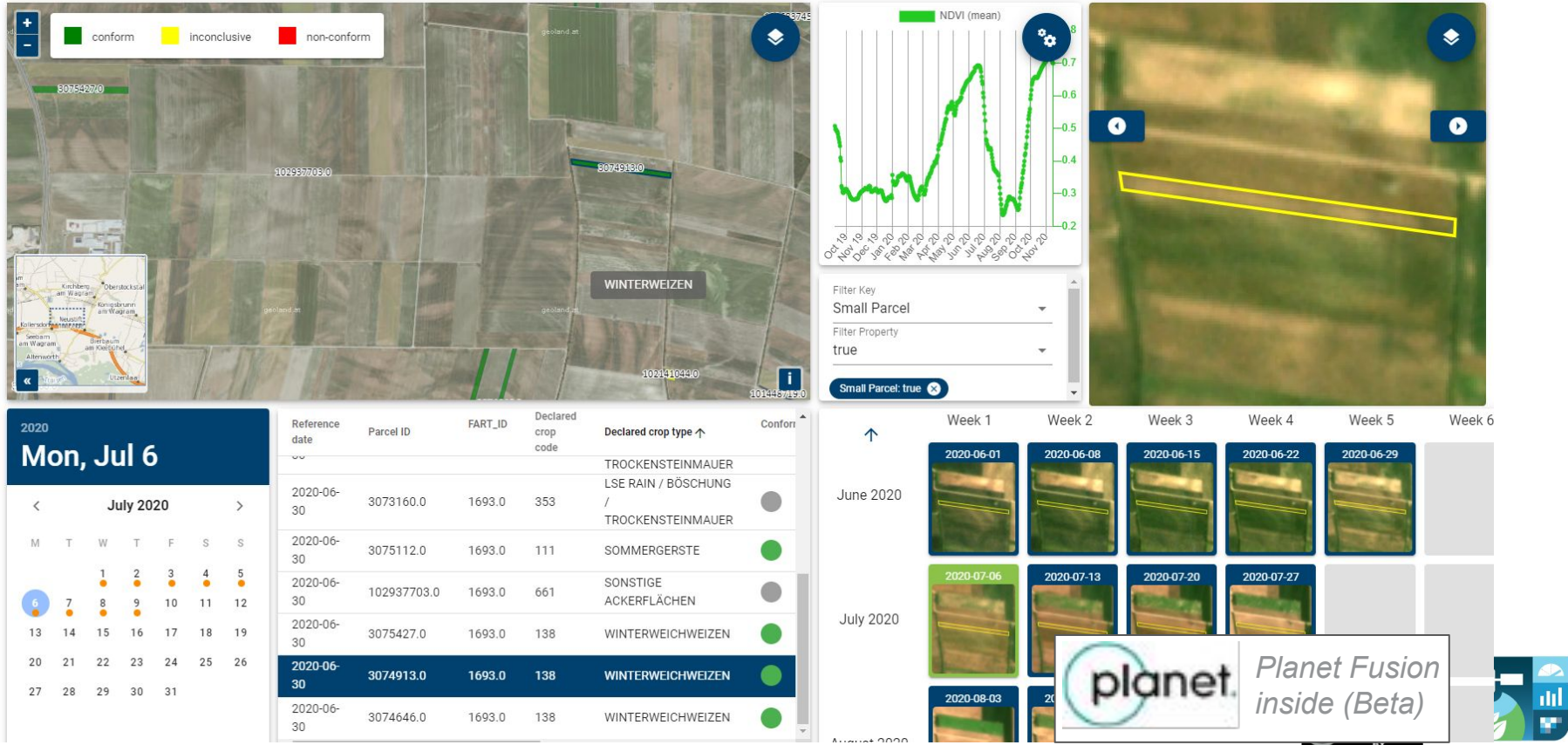
Filter Property



Harvest



Inconclusive / Small Parcels



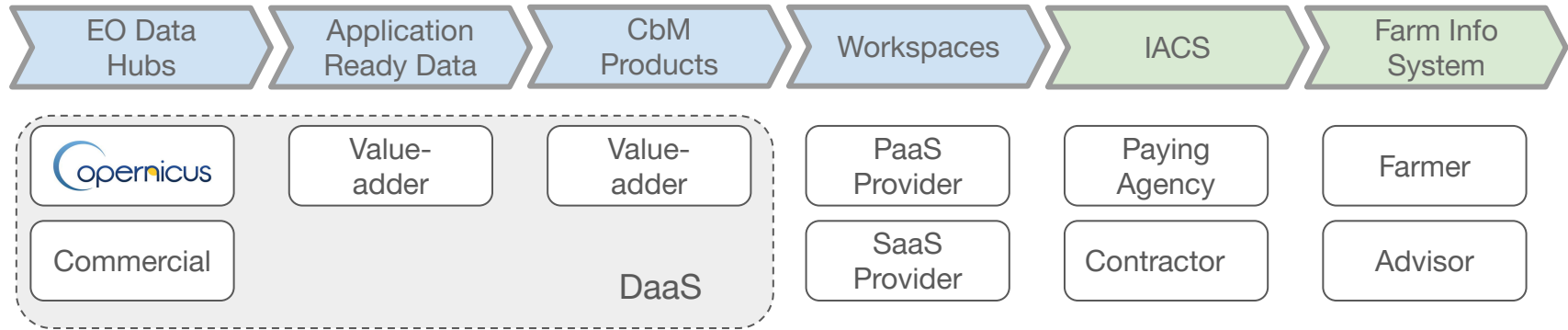
EO-WIDGET Marketplace Concept



- 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

🔔

⋮

Dashboard

EO-WIDGET

Marketplace

Settings

Account

Billing

Marketplace

Types


Data Products (3)

Platform Services (2)


Apps (1)

🔍 Search


Data Products



Monitoring Products
by GeoVill




Planet Fusion
by Planet



EOxHub


Data Provisioning
by EOx

Platform Services



EOxHub


Area Monitoring Workspace
by EOx




EOxHub

EO Signals and Web Map Service (WMS)
by EOx

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Marketplace

Dashboard

EO-WIDGET

Marketplace

Settings

Account

Billing

Credits

EOxHub

Area Monitoring Workspace

by EOX

README

PRICING

Subscription Plans

Plan Name	Parcels	Storage	Price (monthly)
Single Version Plan <ul style="list-style-type: none">- connect your latest LPIs/GSAA data with the EO-WIDGET ecosystem, regularly updated based on an agreed interval (e.g. monthly)- store up to 5mio parcels with arbitrary metainformation- consume parcel information via Vector Tiles API within agreed SLAs- foundation for other Area Monitoring products	<5 mio	<20GB	COMING SOON
Multi Version Plan <ul style="list-style-type: none">- 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 5mio 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	<5 mio	<100GB	COMING SOON

Free trial

Plan Name	Parcels	Storage	Price (monthly)
Demonstrator <ul style="list-style-type: none">- 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	<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:

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