

MODULE: Real Time Geospatial Applications

LESSON: Node Red – Exercise II + III + IV

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Contents / Learning Objectives

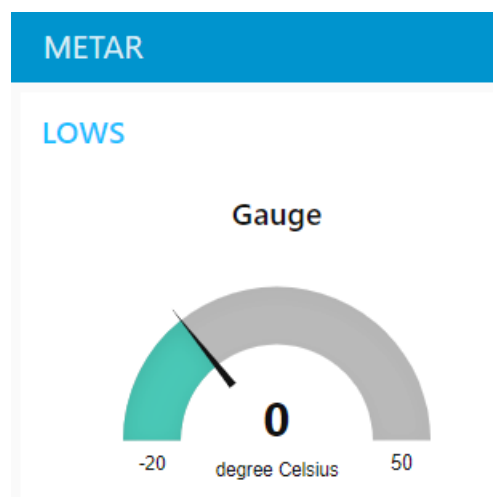
- Node-Red Dashboard
- Node-Red & Github
- Node-Red and Postgres
- Exercise Node-Red

Node-Red Node Dashboard

- Node-Red Dashboard UI
 - Install Node-red dashboard UI



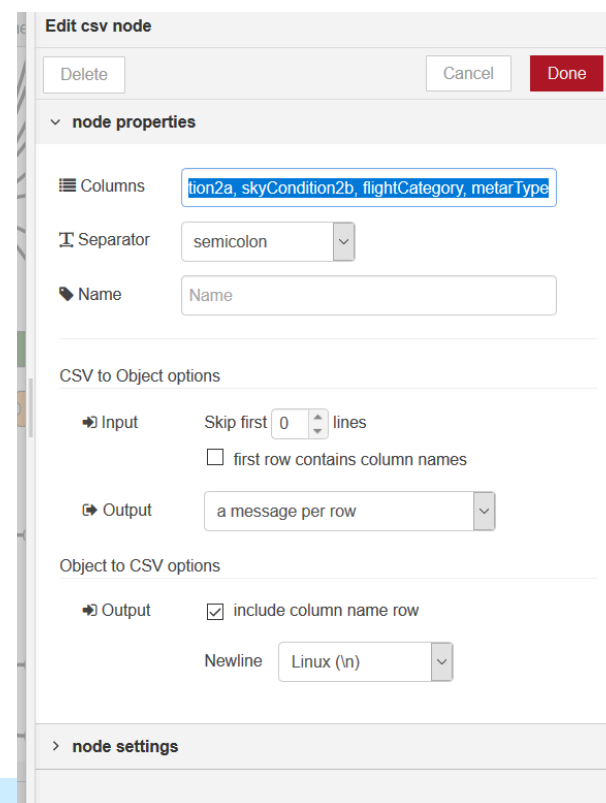
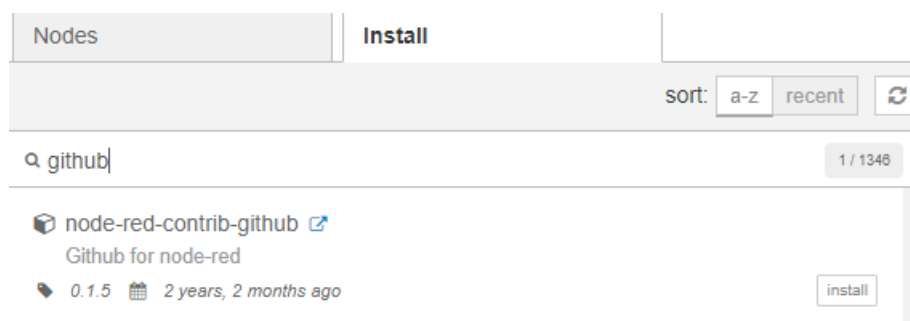
- Create Dashboard



A screenshot of the 'Edit gauge node' configuration panel. It has buttons for 'Delete', 'Cancel', and 'Done'. Under 'node properties', there are several settings: 'Group' is set to 'LOWS [METAR]', 'Size' is 'auto', 'Type' is 'Gauge', 'Label' is 'Gauge', 'Value format' is '{{value}}', 'Units' is 'degree Celsius', 'Range' has 'min' set to '-20' and 'max' set to '50', 'Colour gradient' shows three color swatches (blue, green, red), 'Sectors' are set to '-20', 'optional', 'optional', and '50', and 'Name' is 'Temperature'.

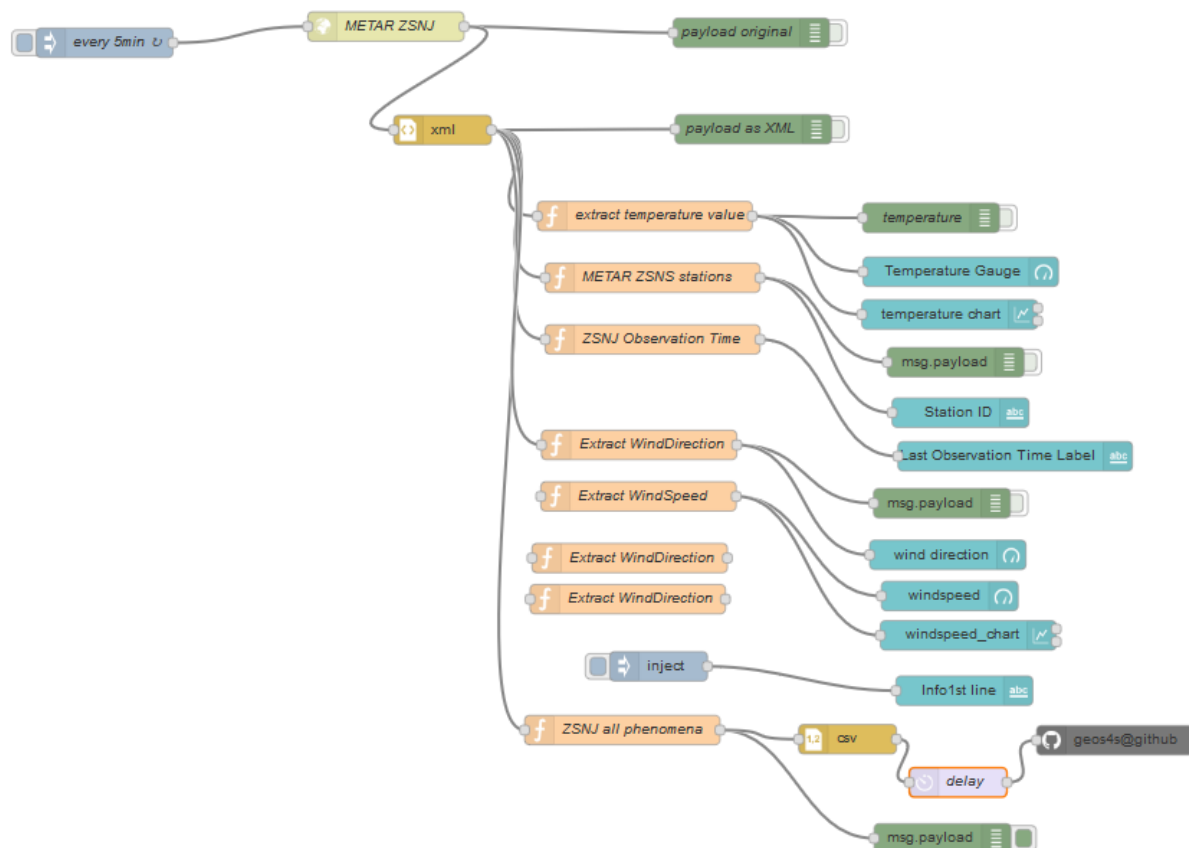
Node-Red Node CSV exercise

- Node-Red Github
 - Install Node-Red GitHub to store e.g. .csv files on the network



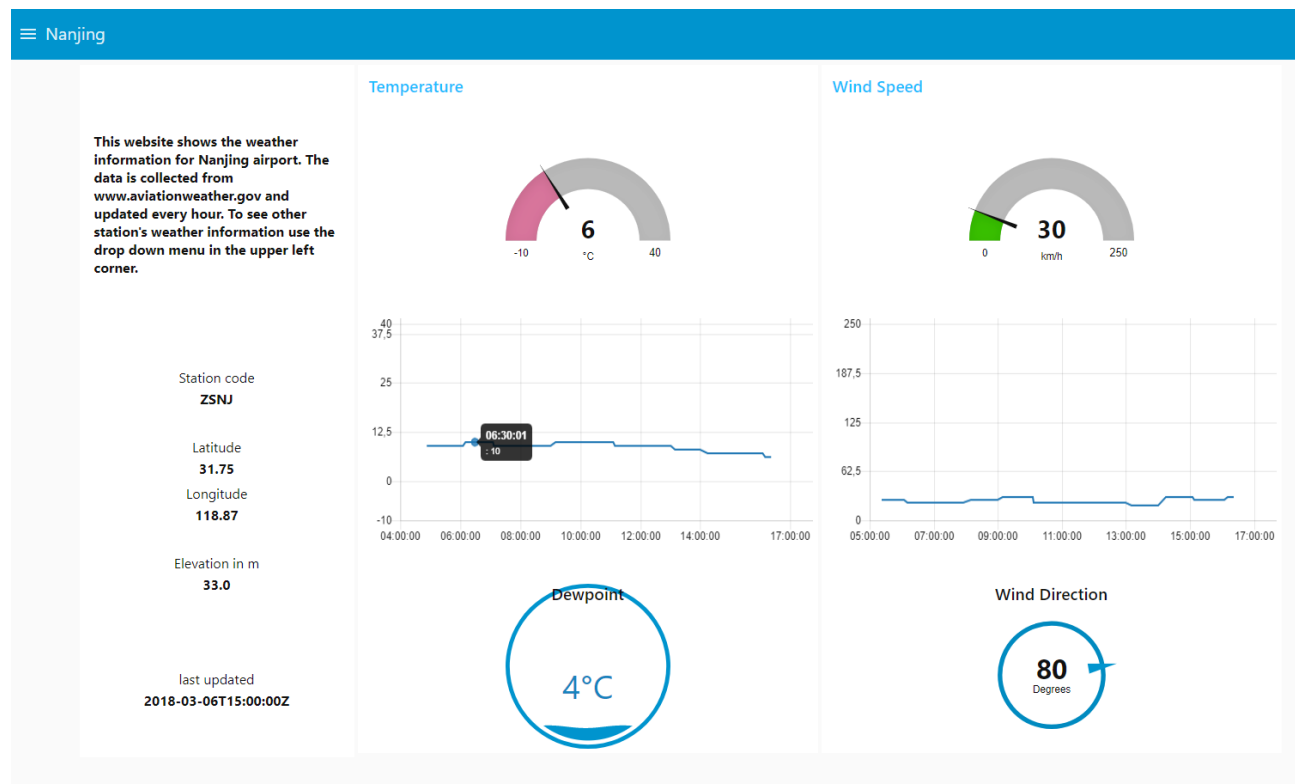
Node-Red Node METAR exercise

- Node-Red Sample METAR flow:



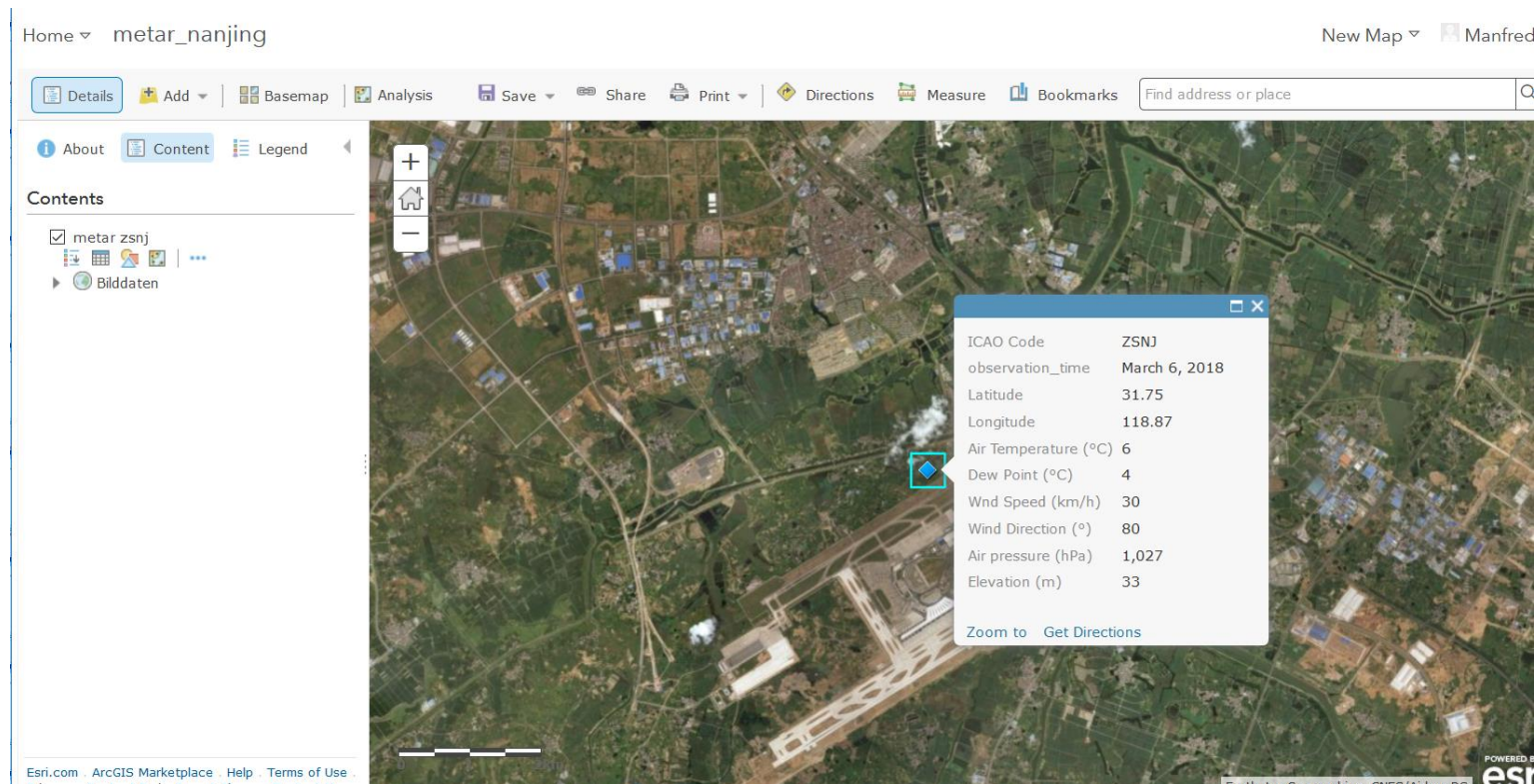
Node-Red Node METAR exercise

- Node-Red Example Flow (Nanjing)



Node-Red Node METAR exercise

- Node-Red Example METAR real-time application (Nanjing)



Node-Red Node Postgres

- Node-Red Postgres
 - Install Postgres Node to work with Postgres using SQL
 - Install prerequisite Postgres/PostGIS tables

Node-Red Node Postgres

- Create Metar PostGIS - Table

```
1 CREATE TABLE simple.metar
2 (
3     id integer NOT NULL DEFAULT nextval('lows_id_seq'::regclass),
4     stationid character varying(20),
5     observationtime character varying(50),
6     resultTime timestamp with time zone DEFAULT NOW(),
7     latitude double precision,
8     longitude double precision,
9     elevation double precision,
10    temp double precision,
11    dewpoint double precision,
12    winddirection double precision,
13    windspeed_kmh double precision,
14    visibility double precision,
15    altim double precision,
16    geom geometry
17 )
18 WITH (
19     OIDS=FALSE
20 );
21 ALTER TABLE simple.metar
22     OWNER TO sgroupXX;
23
```

Real-Time GI Survey integration - ODK



- Open Data Kit (ODK)
 - is a tool to author, field, and manage mobile data collection
 - data collection is also available using offline mode
 - is a free and open-source set of tools providing solutions to
 - **Build** a data collection form or survey (XLSForm is recommended for larger forms);
 - XForms is an XML markup for a new generation of forms and form-like applications on the Web.
 - More information: <https://www.w3.org/TR/xforms11/>

Real-Time GI Survey integration - ODK



- Open Data Kit (ODK)
 - is a free and open-source set of tools providing solutions to
 - **Collect** the data on a mobile device and send it to a server; and
 - **Aggregate** the collected data on a server and extract it in useful formats.
 - ODK's core developers are researchers at the University of Washington's Department of Computer Science and Engineering (started as sponsored google.org project)
 - <https://opendatakit.org>

Real-Time GI Survey integration – ODK Aggregate



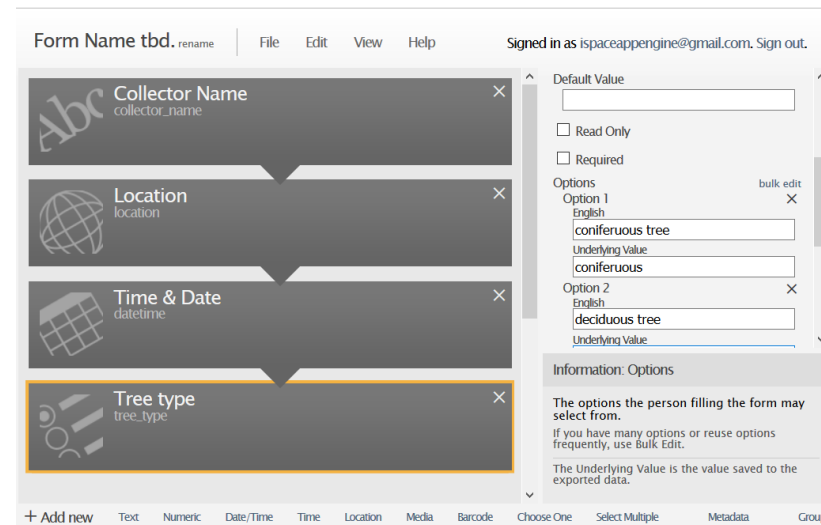
- Manage collected data using ODK Aggregate
 - Credentials
 - <https://collect.geo.sbg.ac.at>
- Discover collected data using submission tab
- Manage Form data using
 - Publish (e.g. Google fusion tables, custom OGC WFS webservice)
 - Export (CSV & KML to link with GIS)

The screenshot displays the ODK Aggregate web interface. The top navigation bar includes 'Submissions', 'Form Management', and 'Site Admin'. The 'Submissions' tab is active, showing a 'Filter Submissions' section with a dropdown for 'Form' (set to 'bangkok_4D_trees_image') and a 'Filter' dropdown (set to 'none'). Below this are buttons for 'Save', 'Save As', and 'Delete', and a 'Submissions per page' selector set to '100'. A table of submissions is visible, with columns for 'meta instanceID', 'name', 'location', 'Latitude', and 'location'. One submission is listed with a red 'X' icon. The 'Form Management' tab is also shown, with a 'Forms List' and a 'Published Data' section. A 'Form' entry is selected, showing details like 'Form: build_bangkok-4D-trees-image_1509282946' and 'Type: CSV file'. A 'Publish' button is visible, and a dropdown menu for 'Data to Publish:' is open, showing options like 'BOTH Upload Existing & Stream New Submission Data'.

Real-Time GI Survey integration – ODK Build



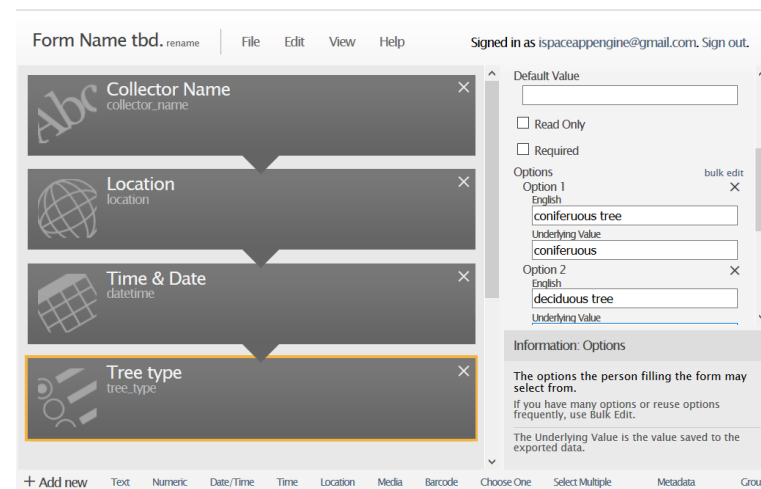
- ODK Build
 - ODK Build is a form designer with a drag-and-drop user interface.
 - Build is an HTML5 web application and works best for designing simple forms
 - Use <https://build.opendatakit.org>

The screenshot shows the ODK Build web application interface. At the top, there's a header with 'Form Name tbd. rename', a menu (File, Edit, View, Help), and a user status 'Signed in as ispaceappengine@gmail.com. Sign out.'. The main area displays a form design with four fields: 'Collector Name' (text input), 'Location' (location picker), 'Time & Date' (datetime picker), and 'Tree type' (dropdown menu). The 'Tree type' field is highlighted with an orange border. To the right of the form fields is a configuration panel for the selected 'Tree type' field. It includes a 'Default Value' input, checkboxes for 'Read Only' and 'Required', and a list of 'Options' with 'Underlying Value' inputs for each. The 'Options' list includes 'Option 1' with 'coniferous tree' and 'Option 2' with 'deciduous tree'. At the bottom, there's a toolbar with '+ Add new' and various field types: Text, Numeric, Date/Time, Time, Location, Media, Barcode, Choose One, Select Multiple, Metadata, and Group.

Real-Time GI Survey integration – ODK Build



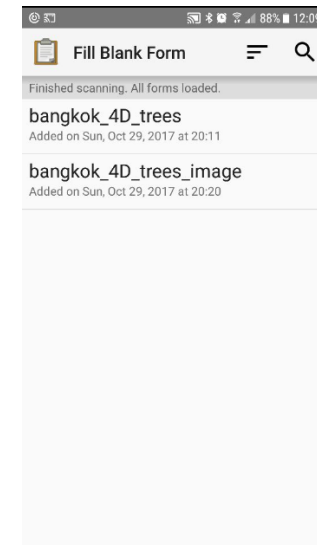
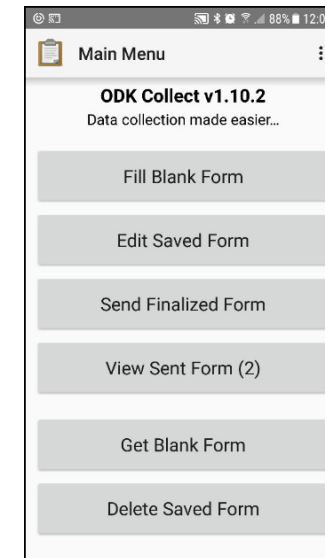
- ODK XLSForm
 - lets you design forms in Excel.
 - ODK Validate validates forms against the ODK XForms specification
 - See: <https://www.w3.org/TR/xforms11/>
- create an account and
 - sign in to start building a simple form
 - <https://build.opendatakit.org>

A screenshot of the ODK Build web application. The interface shows a form being built with four fields: 'Collector Name' (text), 'Location' (location), 'Time & Date' (datetime), and 'Tree type' (select one). The 'Tree type' field is highlighted with an orange border. On the right, a configuration panel for the 'Tree type' field is visible, showing options for 'Default Value', 'Read Only', 'Required', and 'Options'. The 'Options' section lists 'Option 1' with values 'coniferous tree' and 'deciduous tree', and 'Option 2' with values 'coniferous' and 'deciduous tree'. The 'Underlying Value' is set to 'coniferous'. At the bottom, there is a toolbar with buttons for '+ Add new', 'Text', 'Numeric', 'Date/Time', 'Time', 'Location', 'Media', 'Barcode', 'Choose One', 'Select Multiple', 'Metadata', and 'Group'.

Real-Time GI Survey integration – ODK collect



- ODK Collect
 - ODK Collect is an open source Android app
 - <https://opendatakit.org/downloads/download-info/odk-collect-apk/>
 - replaces paper forms used in survey-based data gathering
 - Configure Aggregate at the beginning
 - <https://collect.geo.sbg.ac.at>
- Collect use pattern:
 - Get blank forms from Aggregate
 - Fill out surveys with participants
 - Upload completed surveys to Aggregate



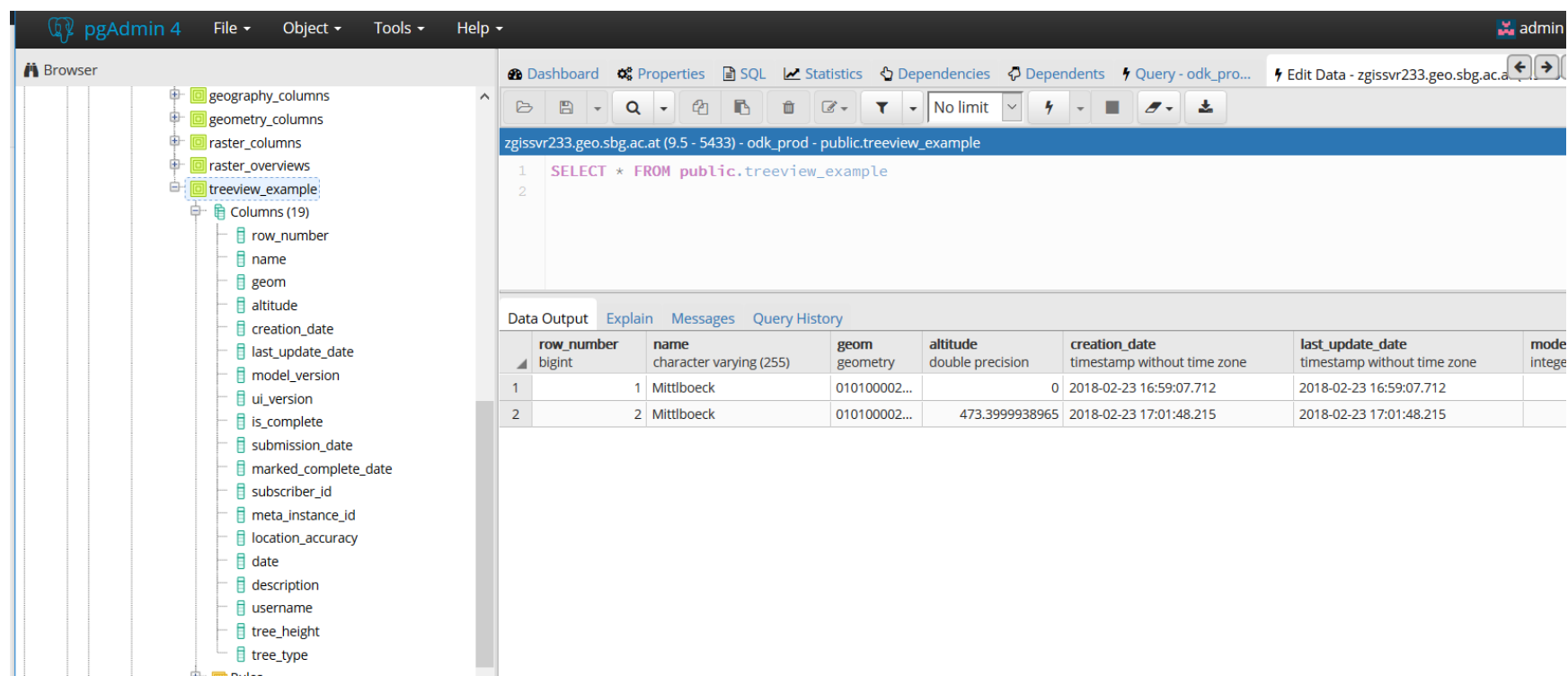
Real-Time GI Survey integration – PostGIS / Geoserver

- Create a Spatial view to spatially enable the survey form created

```
CREATE OR REPLACE VIEW public.treeview_example AS
SELECT row_number() OVER (PARTITION BY true::boolean) AS row_number,
"BUILD_MYFORM_TREES_1519404945_CORE"."NAME" as name,
ST_SetSrid(ST_MakePoint("BUILD_MYFORM_TREES_1519404945_CORE"."LOCATION_LAT"::double precision,
"BUILD_MYFORM_TREES_1519404945_CORE"."LOCATION_LNG"::double precision), 4326) AS geom,
"BUILD_MYFORM_TREES_1519404945_CORE"."LOCATION_ALT"::double precision as Altitude,
"BUILD_MYFORM_TREES_1519404945_CORE"."_CREATION_DATE"::timestamp without time zone as creation_date,
"BUILD_MYFORM_TREES_1519404945_CORE"."_LAST_UPDATE_DATE"::timestamp without time zone as last_update_date,
"BUILD_MYFORM_TREES_1519404945_CORE"."_MODEL_VERSION"::integer as model_version,
"BUILD_MYFORM_TREES_1519404945_CORE"."_UI_VERSION"::integer as ui_version,
"BUILD_MYFORM_TREES_1519404945_CORE"."_IS_COMPLETE"::boolean as is_complete,
"BUILD_MYFORM_TREES_1519404945_CORE"."_SUBMISSION_DATE"::timestamp without time zone as submission_date,
"BUILD_MYFORM_TREES_1519404945_CORE"."_MARKED_AS_COMPLETE_DATE"::timestamp without time zone as marked_complete_date,
"BUILD_MYFORM_TREES_1519404945_CORE"."SUBSCRIBER_ID"::character varying(255) as subscriber_id,
"BUILD_MYFORM_TREES_1519404945_CORE"."META_INSTANCE_ID"::character varying(255) as meta_instance_id,
"BUILD_MYFORM_TREES_1519404945_CORE"."LOCATION_ACC"::numeric(38,10) as location_accuracy,
"BUILD_MYFORM_TREES_1519404945_CORE"."DATE"::timestamp without time zone as date,
"BUILD_MYFORM_TREES_1519404945_CORE"."DESCRIPTION"::character varying(255) as description,
"BUILD_MYFORM_TREES_1519404945_CORE"."USERNAME"::character varying(255) as username,
"BUILD_MYFORM_TREES_1519404945_CORE"."TREE_HEIGHT"::integer as tree_height,
"BUILD_MYFORM_TREES_1519404945_CORE"."TREE_TYPE"::character varying(255) as tree_type
FROM odk."BUILD_MYFORM_TREES_1519404945_CORE";
```


Real-Time GI Survey integration – PostGIS / Geoserver

- Spatial View Result:




The screenshot shows the pgAdmin 4 interface. On the left, the 'treeview_example' table is selected in the 'Columns (19)' list. The main pane displays a SQL query: `SELECT * FROM public.treeview_example`. Below the query, the 'Data Output' tab shows the results of the query. The table has 7 columns: row_number, name, geom, altitude, creation_date, last_update_date, and mode. The results show two rows of data for 'Mittlboeck'.

row_number	name	geom	altitude	creation_date	last_update_date	mode
1	Mittlboeck	010100002...	0	2018-02-23 16:59:07.712	2018-02-23 16:59:07.712	
2	Mittlboeck	010100002...	473.3999938965	2018-02-23 17:01:48.215	2018-02-23 17:01:48.215	

Real-Time GI Survey integration – PostGIS / Geoserver

- Create Geoserver WMS/WFS Service

**GeoServer**

About & Status

- Server Status
- GeoServer Logs
- Contact Information
- About GeoServer
- Process status

Data

- Layer Preview
- Import Data
- Workspaces
- Stores
- Layers
- Layer Groups

New Layer

Add a new layer

You can create a new feature type by manually configuring the attribute names and types. [Create new feature type...](#)

On databases you can also create a new feature type by configuring a native SQL statement. [Configure new SQL view...](#)

Here is a list of resources contained in the store 'postgis_sgroup00'. Click on the layer you wish to configure

<< < 1 > >>

Results 1 to 3 (out of 3 items)

Search

Published	Layer name	Action
	c3po_alive	Publish
	enhanced_view	Publish
	treeview_example	Publish

Layers

Manage the layers being published by GeoServer



+ Add a new layer

- Remove selected layers

<< < 1 > >>

Results 1 to 1 (out of 1 items)

Search

<input type="checkbox"/>	Type	Title	Name	Store	Enabled	Native SRS
<input type="checkbox"/>		treeview_example	testws:treeview_example	postgis_sgroup00		EPSG:4326



<< < 1 > >>

Results 1 to 1 (out of 1 items)

Scale = 1 : 70M

treeview_example

fid	row_number	name	altitude	creation_date	last_update_date	model_version	ui_version	is_on
treeview_example-fid-2ee95390_161614f428_-78e8	1	MintBoeck	0.0	Feb 23, 2018 4:59:07 PM	Feb 23, 2018 4:59:07 PM			true
treeview_example-fid-2ee95390_161614f428_-7fe7	2	MintBoeck	473.3999938965	Feb 23, 2018 5:01:48 PM	Feb 23, 2018 5:01:48 PM			true



Erasmus+

ERASMUS+ Project No. 561716-EPP-1-2015-1-AT-EPPKA2-CB

References

- Partners in ERASMUS+ Project 'GeoServices-4-Sustainability'



Xinjiang Institute of Ecology and Geography
Chinese Academy of Sciences



Palacký University
Olomouc



HNE
Eberswalde
Hochschule für nachhaltige Entwicklung



VRIJE
UNIVERSITEIT
AMSTERDAM



King Mongkut's
University of
Technology
Thonburi



- Please see full list of references in the notes section