

# Using CARIS to automate bathymetric data management at Rijkswaterstaat

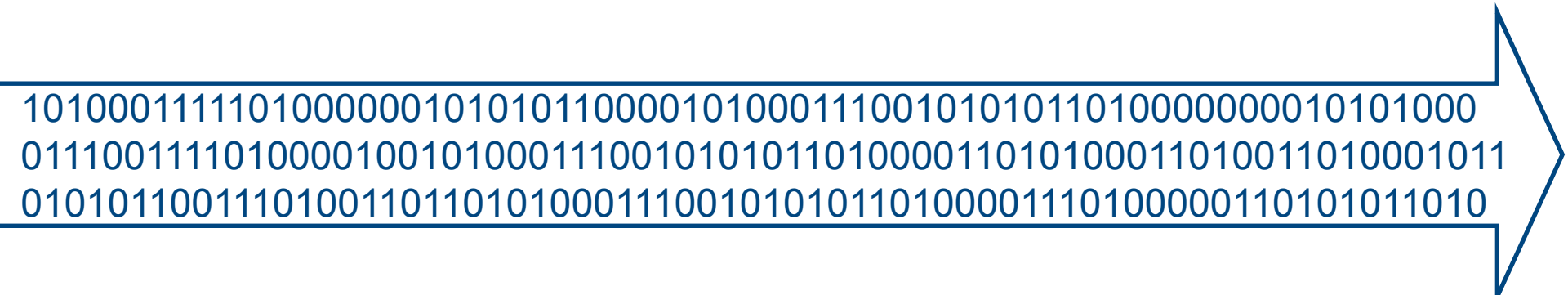
**Charles de Jongh - Teledyne CARIS**  
**Hydro 2016 Rostock-Warnemünde**

```
01100110010010
01101001010110101001
101010101001010011001010001100010
0100100101010101010010110011001010101 01
010101001010010101001010010100101100 10 1
01010111111111111111111110110100110 011 1 10 1
01010101101010010100100101001 1 0 1
011010101001010101010101101 0 0 1 0 1
00101010110101010011010100 0 1 1
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110100110100110100101010
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1101001010101110001100101
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10101011001101010010111010101010101010101010010110011001100110010101
```

- Organisations dealing with hydrographic information hold and acquire massive amounts of spatial data.
- Challenge is to manage all this information in an optimal way.

Organisations have a need to **efficiently** integrate, visualize, access and re-distribute information

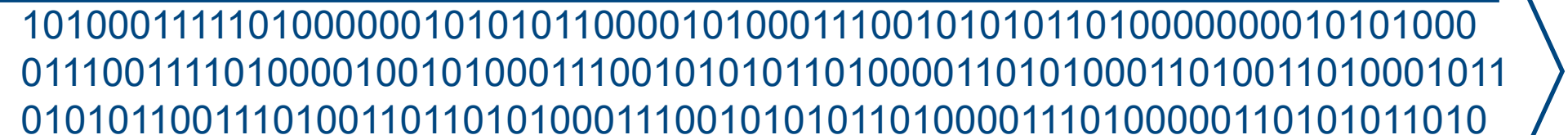
- Make data available and traceable
- Improve data security
- Make optimal use of scarce resources



```
10100011111010000001010101100001010001110010101011010000000010101000  
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```

Organisations have a need to **efficiently** integrate, visualize, access and re-distribute information

- Make data available and traceable
- Improve data security
- Make optimal use of scarce resources
  
- Solution: **Central Information Management & Process Automation**



```
10100011111010000001010101100001010001110010101011010000000010101000  
0111001111010000100101000111001010101101000011010100011010011010001011  
010101100111010011011010100011100101010110100001110100000110101011010
```

## CARIS Batch

```
CA: HIPS and SIPS 10.0 Command Prompt

C:\Users\bfoster\Documents\CARIS\HIPS and SIPS>carisbatch -1
Available process list:

Grouped Processes:
AddToSIPSMosaic
ContourRaster
CreateHIPSGrid
CreateSIPSBeamPattern
CreateSIPSMosaic
CreateVRSurface
ExportCoverageMetadata
ExportRaster
ImportHIPSFromAuxiliary
ImportToHIPS
PopulateVRSurface
ShiftElevationBands
SoundVelocityCorrectHIPS

AddToHIPSGrid - The AddToHIPSGrid process adds the HIPS surface using the create process parameter.
AddToVRSurface - The AddToVRSurface process creates a variable resolution surface using the create process parameter.
ClassifyRasterHolidays - The ClassifyRasterHolidays process...
```

## CARIS Python & API

```
127:11,
131:12,
141:13,
151:14,
161:15)

DATASET_KEYS = ('01:12',          # to transform dataset type keys
                '01:13',
                '01:14',
                '01:15',
                '01:16')

ACRONYMS = 0                      # index for meta data acronyms CSV file
VALUES = 1                         # index for meta data acronyms of CSV file
NAME_EXTENSION = '.PC'            # name extension used for data_type 1a for point cloud
MAX_FILE_SIZE = 4294967296       # in bytes equals 4 GB

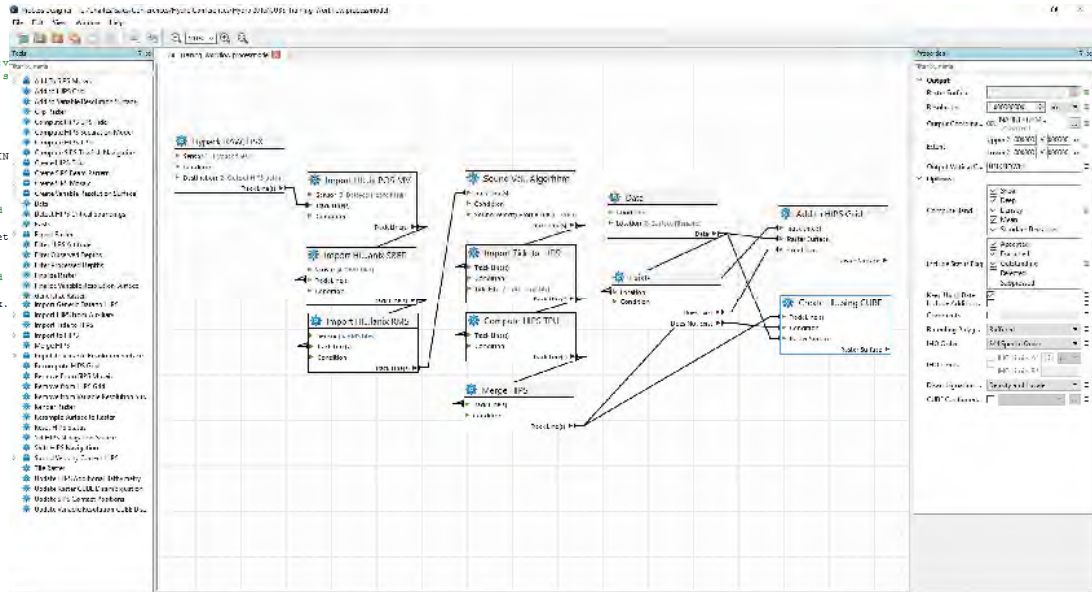
logger = None                      # script logger
dataSetLogger = None              # data set logger

def getSettings():
    # reads the settings.xml
    # returns an array of dictionary attributes (name: value)
    # returns a dictionary of (name:value) for script @
    dbSettings = {}
    scriptParameters = {}

    try:
        __, scriptLocation = FC.getScriptInfo()
        tree = xml.parse(scriptLocation + '\\\\' + SETINI)
        root = tree.getroot()
        for child in root:
            if child.tag == 'DB_Connection':
                xmlAttributes = {} # must be declared
                for x in child.iter():
                    xmlAttributes[x.tag] = x.attrib.get('value')
                dbSettings.append(xmlAttributes)
            if child.tag == 'Script_Parameters':
                xmlAttributes = {} # must be declared
                for x in child.iter():
                    scriptParameters.update(x.tag : x.attrib.get('value'))
```



## CARIS Process Designer



The whole Ping to Chart workflow is automated!





# Some Organisations using CARIS Bathy DataBase



Rijkswaterstaat



Hamburg Port Authority



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE



Australian Government

Geoscience Australia



United Kingdom  
Hydrographic Office





Rijkswaterstaat

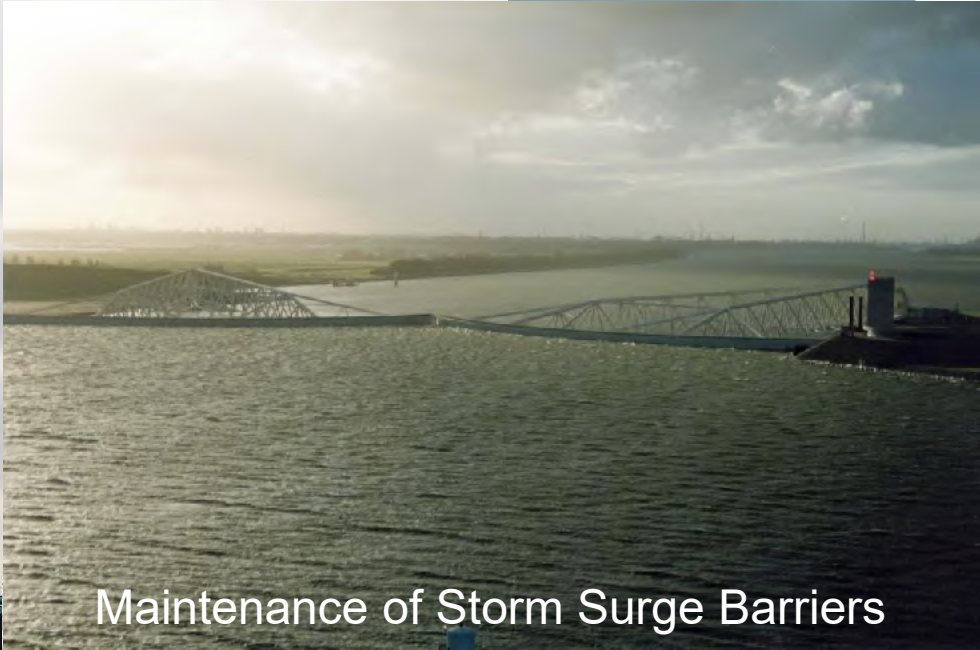
- Responsible for design, construction and maintenance of waterway network in The Netherlands
- Densest network in Europe
- Good management is essential for the economy



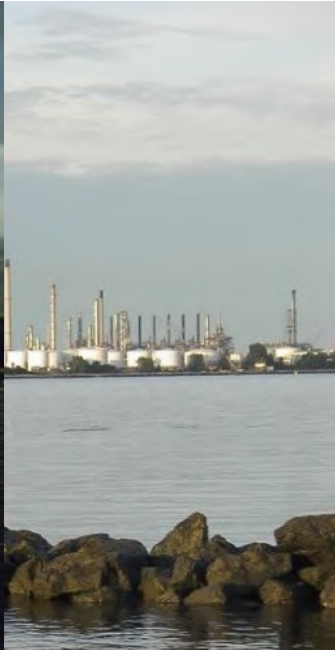




Safety of shipping



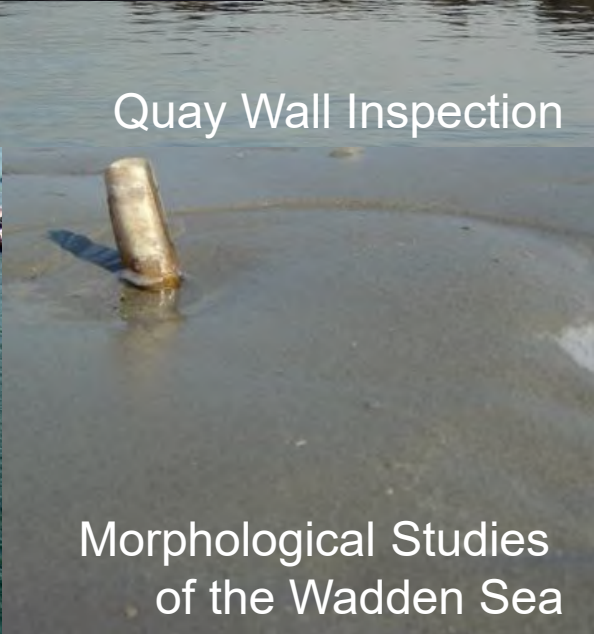
Maintenance of Storm Surge Barriers



Coastal Zone Management

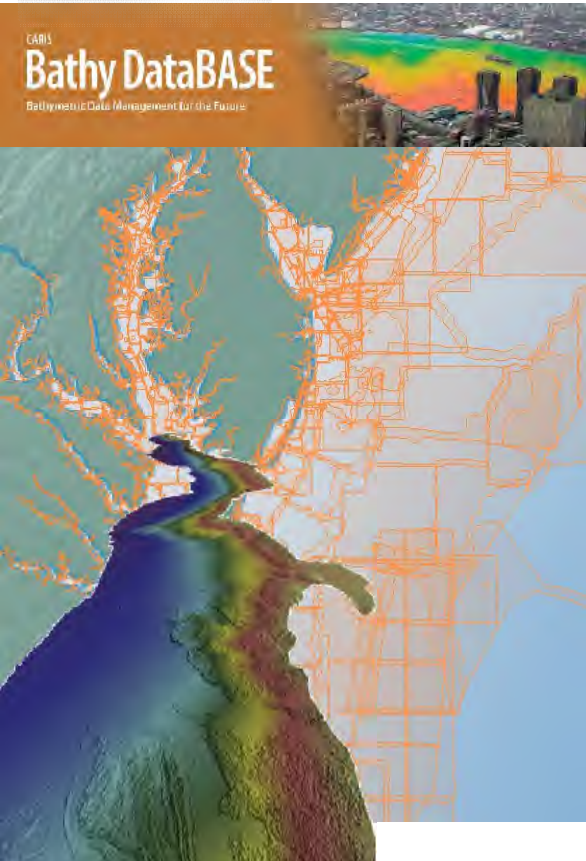


River Maintenance & Inland Shipping



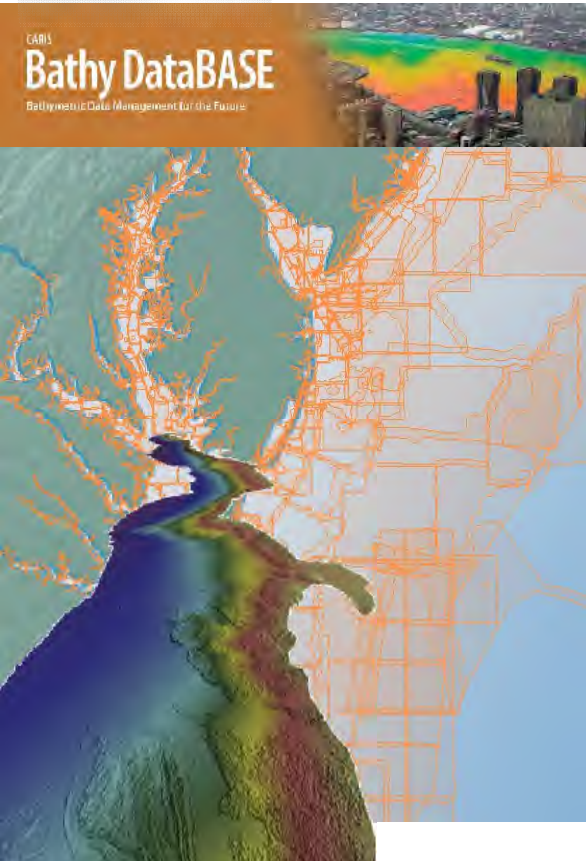
Quay Wall Inspection

Morphological Studies of the Wadden Sea



- CARIS delivered a National Survey Storage system to RWS in 2011.
- Legacy datasets have been converted and imported into CARIS Bathy DataBASE.
- Currently more than 60.000 datasets, growing each year.
- Central & secure storage for all RWS cleaned survey data
- RWS and CARIS have cooperated to automate workflow steps based on RWS specific rules.



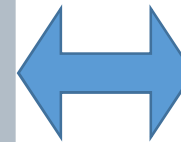


## CARIS Bathy DataBASE

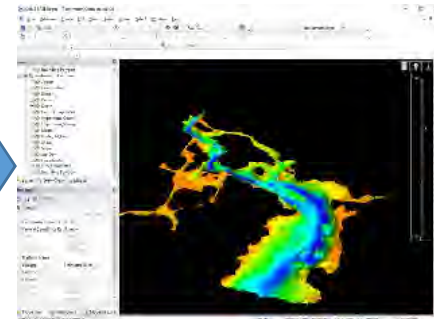
Import  
Database

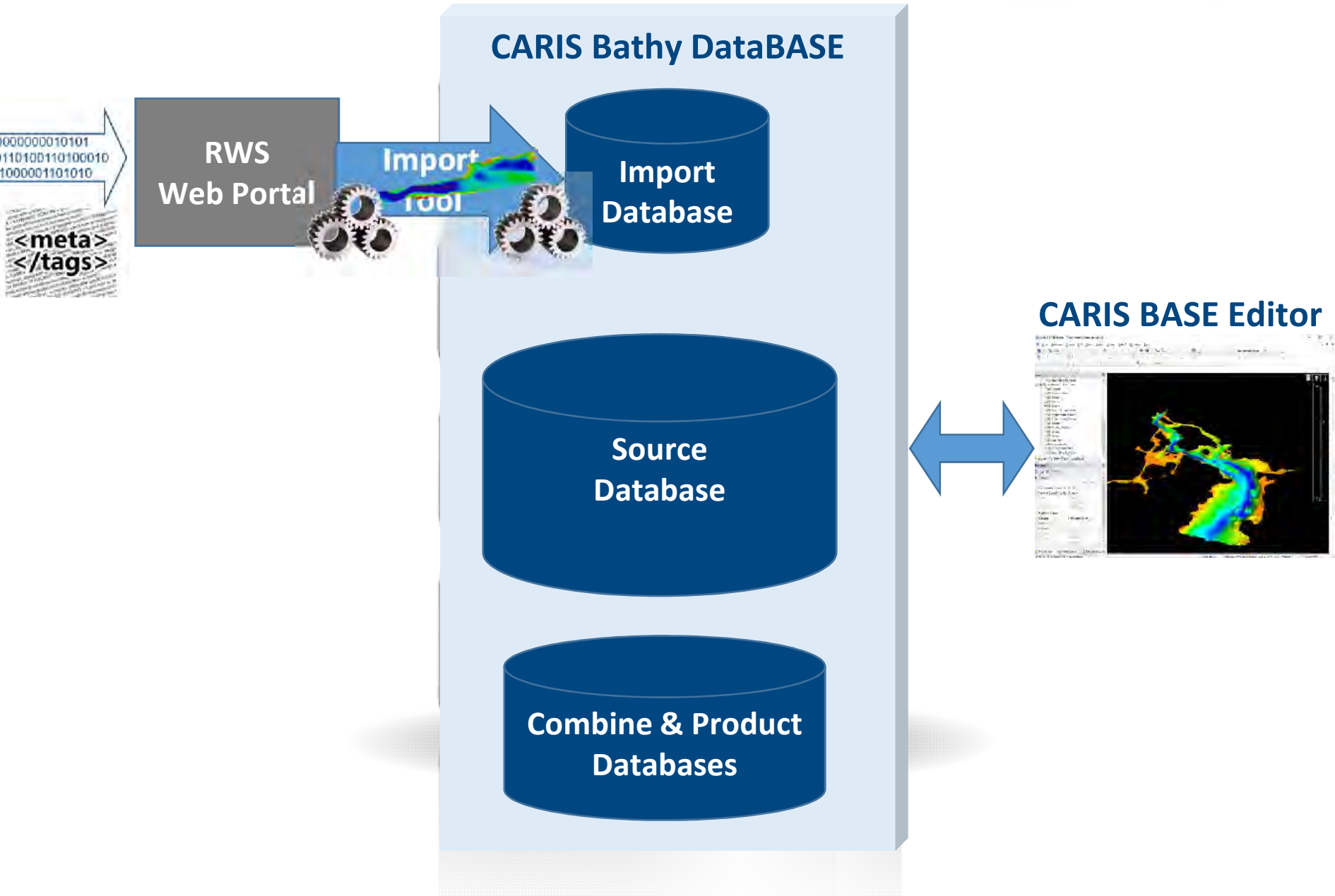
Source  
Database

Combine & Product  
Databases



## CARIS BASE Editor





## CARIS Bathy DataBASE

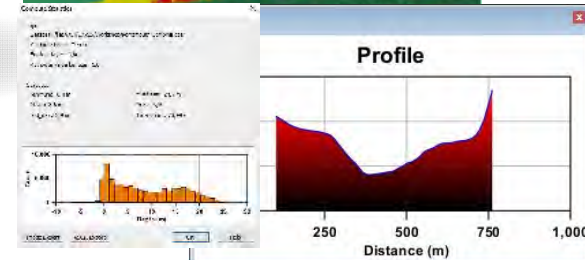
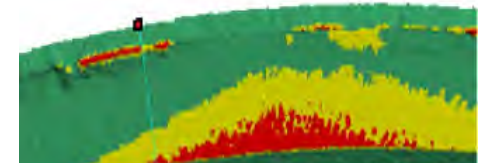
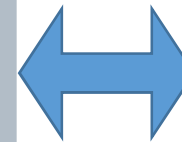
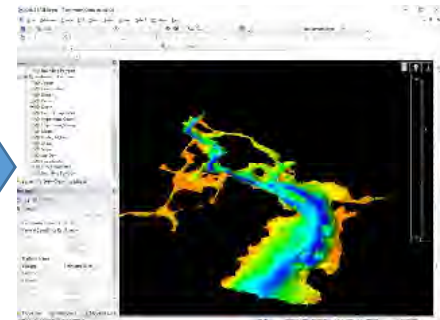
Import  
Database

Source  
Database

Combine & Product  
Databases



## CARIS BASE Editor



- Zeeuwse kust (kustwater)
- Contributor
- Gecorrigeerde SD
- Hellingshoek
- Hellingsrichting
- Hits
- Hoogte
- Loodlijn
- Raainaam
- Raairichting
- Standaard Deviatie
- Status
- Voetmaat
- rcX
- rcY
- Bounding Polygon



## CARIS Bathy DataBASE

Import Database

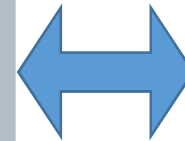
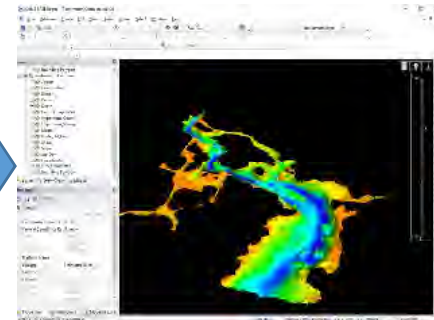


Source Database

Combine & Product Databases



## CARIS BASE Editor



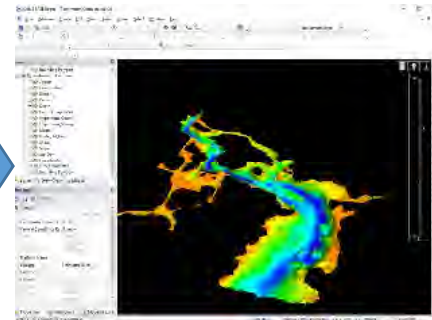
## CARIS Bathy DataBASE

Import  
Database

Source  
Database

Combine & Product  
Databases

## CARIS BASE Editor



### Combine Rules

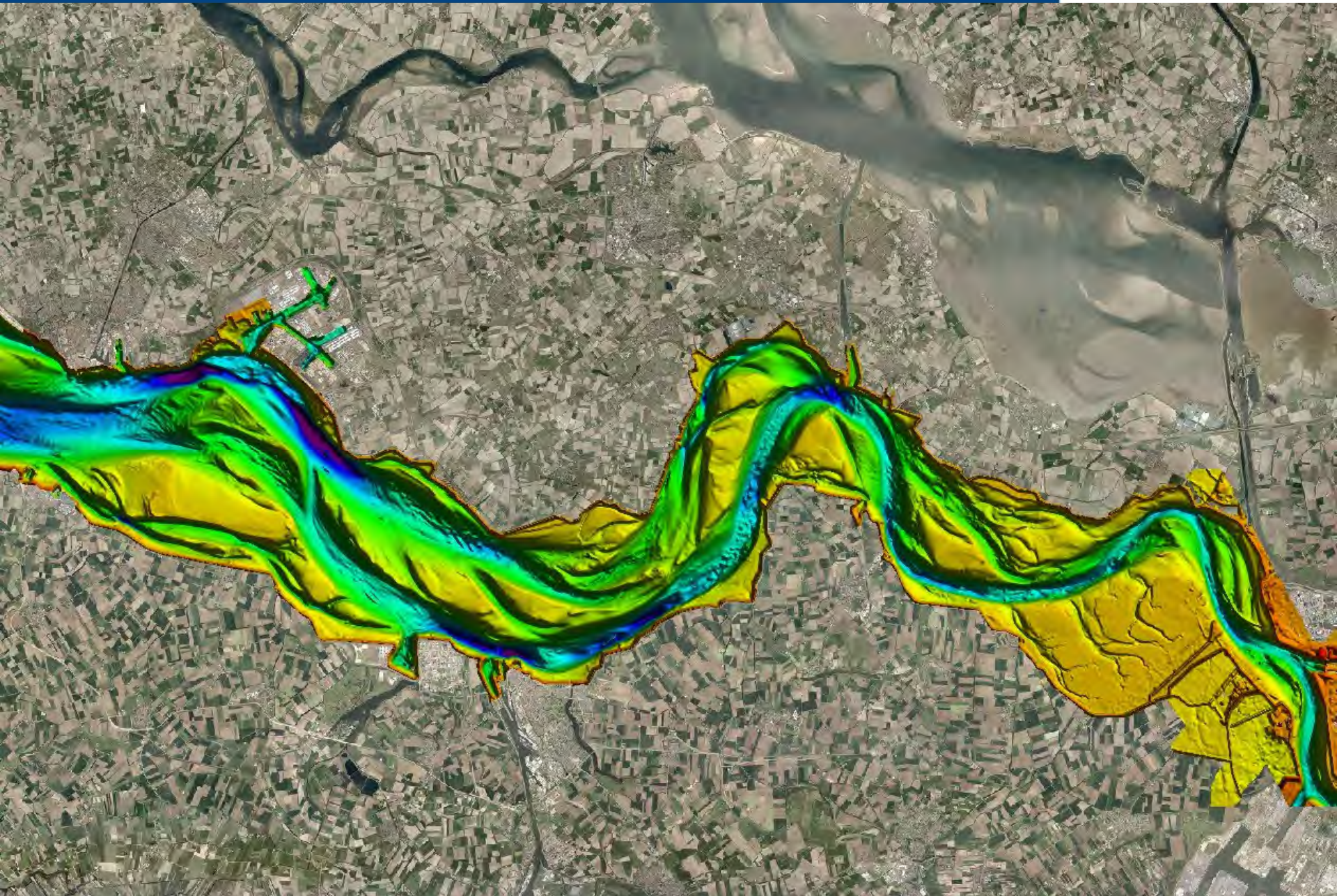
-Select per region:

- ✓ Schelde area 10x10m
- ✓ Wadden 10x10m
- ✓ River Rhine 1x1m
- ✓ River Maas 1x1m

-Most recent dataset 'wins'

-Repeat – Add new datasets







## CARIS Bathy DataBASE

Import  
Database

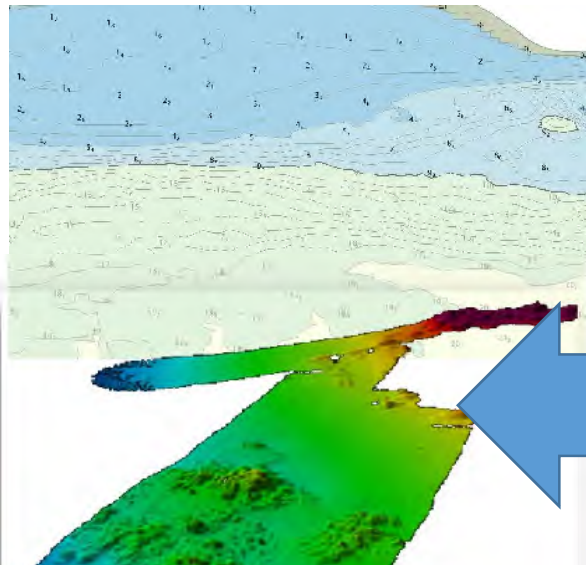
Source  
Database

Combine & Product  
Databases

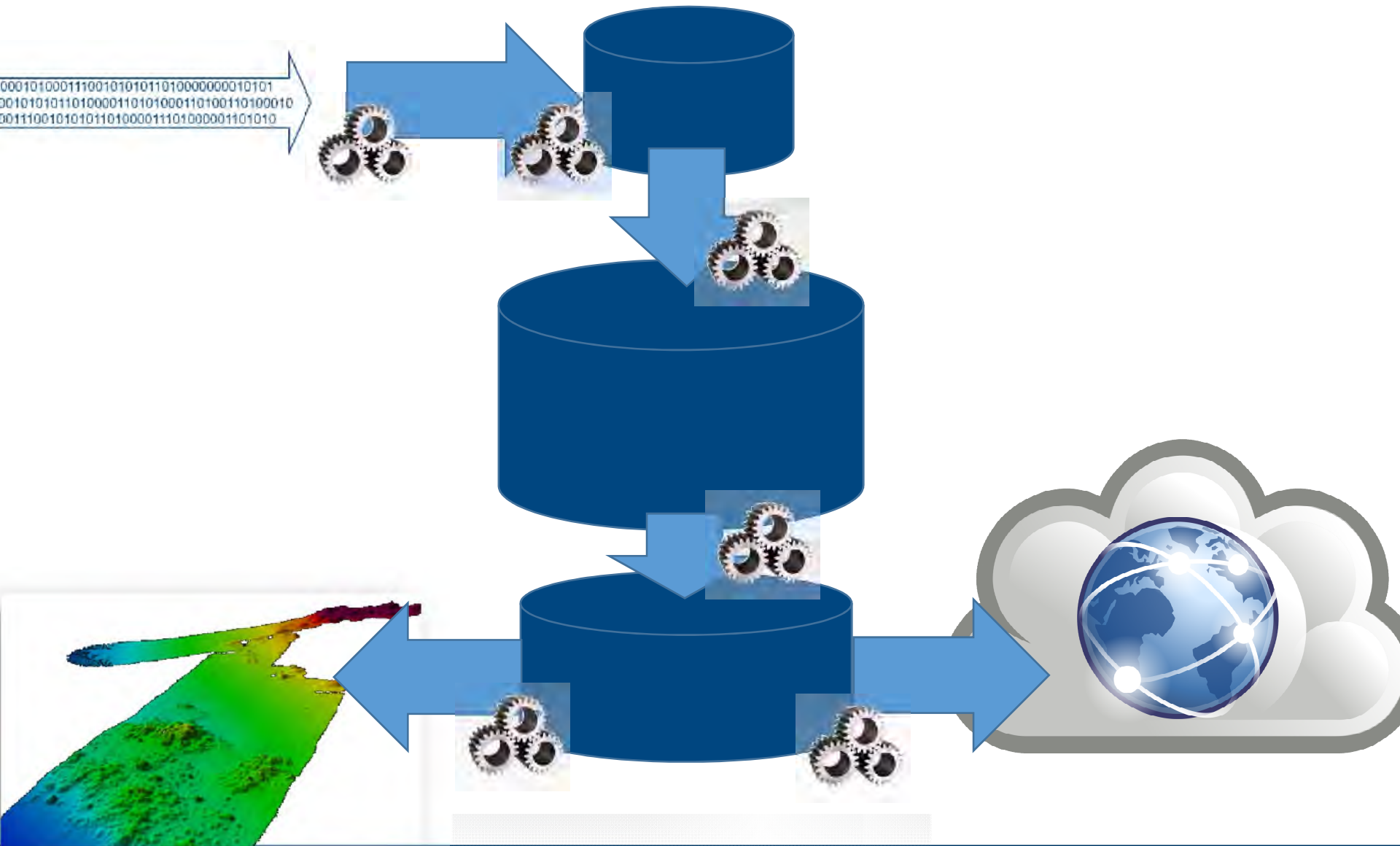
## Web Based Output



## File Based Output



Vector & Gridded datasets



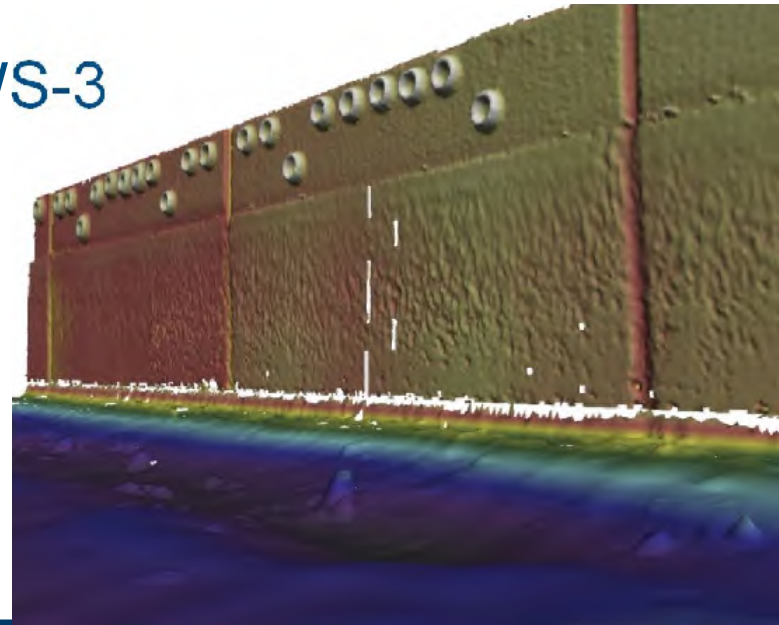


# Summary



# Teledyne CARIS Workshop:

- Bathymetric data management & quay wall deformation Analysis
- Using data from Hamburg Port Authority
- Wednesday - 13.30-15:00 - Room WS-3





**TELEDYNE CARIS**  
Everywhereyoulook™