



Data Services

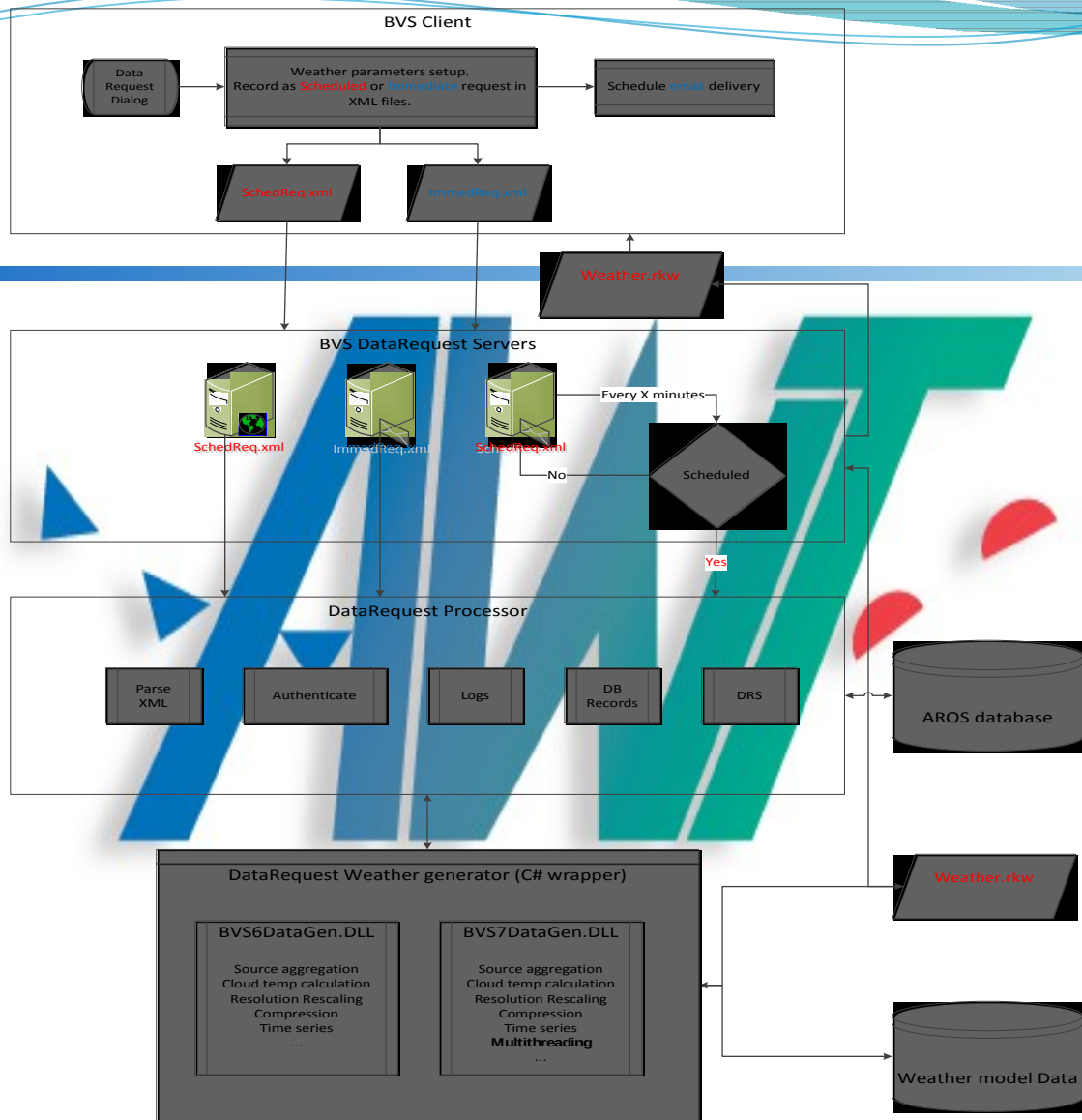
Mikhail Arov

The Fleet Optimization Experts

Between rock (**software**) and hard place (**data**).

- Data team prepares the weather data.
- Other data feeds (piracy, marine bulletins etc.)
- Software consumes it.
 - Bon Voyage System
 - AROS
 - Third party products (through API).

This presentation describes the infrastructure of **delivery** of this data per software **request**.

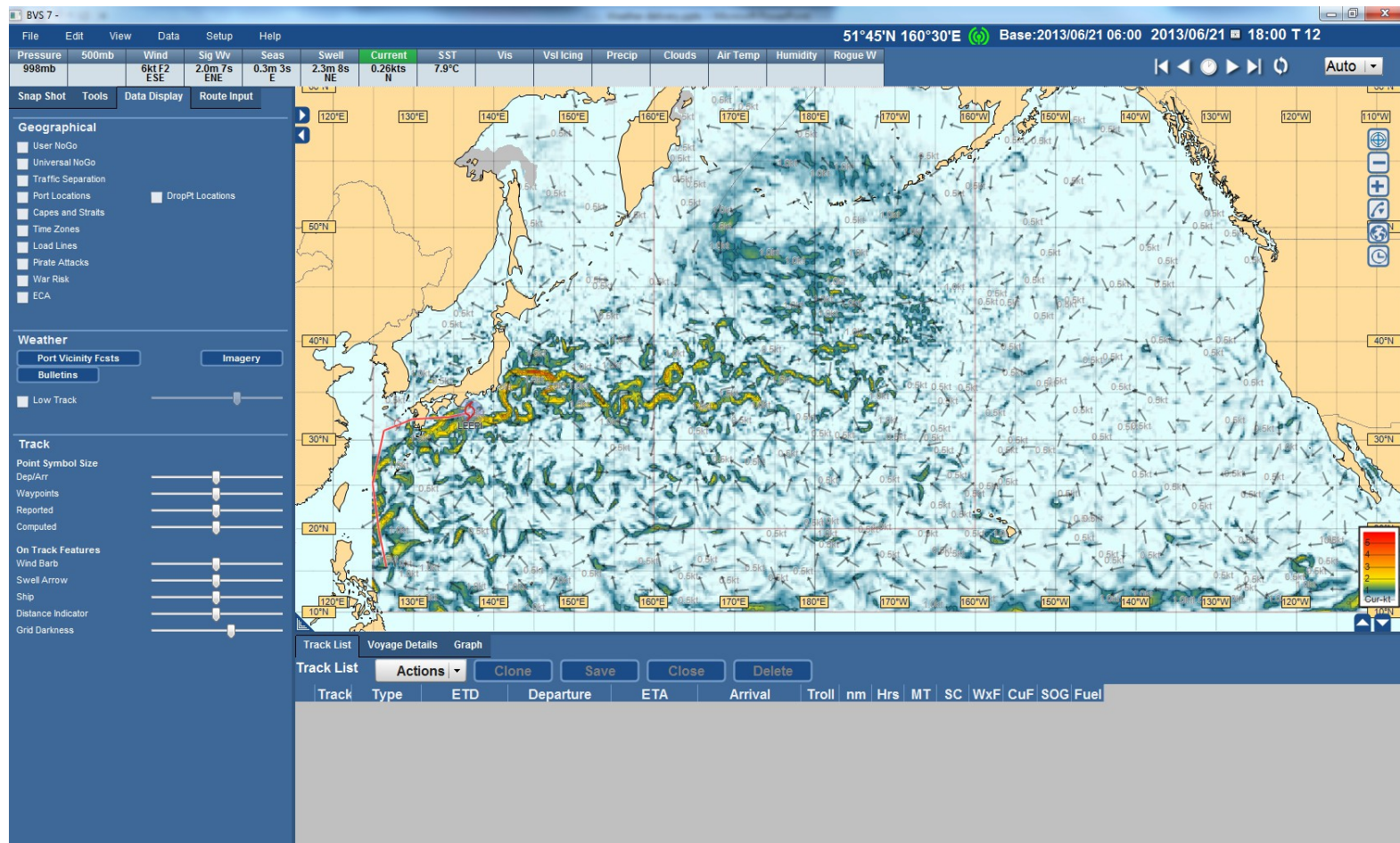


What is in the request XML?

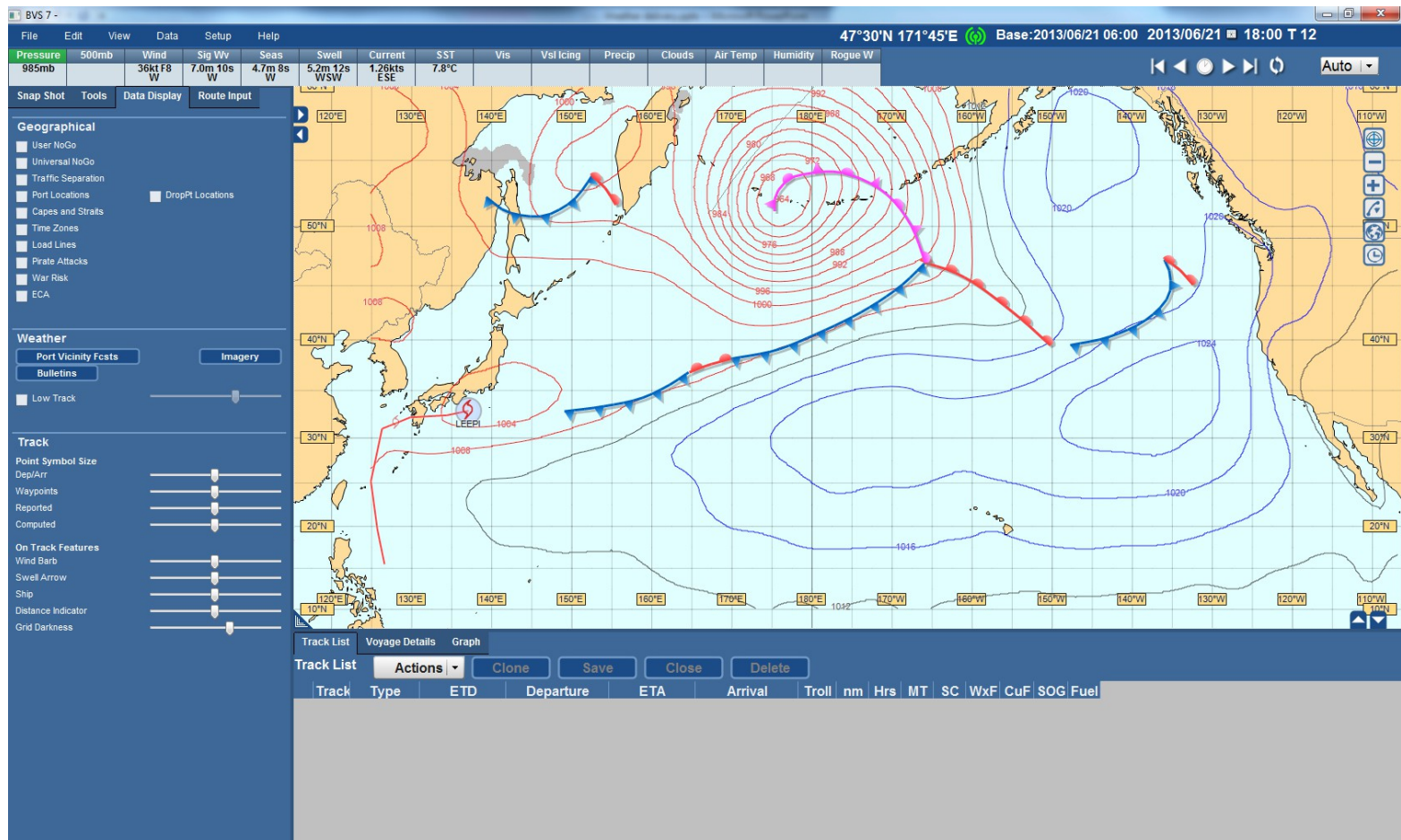


```
<?xml version="1.0" encoding="UTF-8" standalone="yes" type="text/xml">
  <request ship="000000" product="000000" shipname="000000" ship" bvs="7.0.0.41" decoder="1.0" />
  <WEATHER forecast="10" piracyhistory="14" interval="H3" ulat="65" llat="10" llon="125" rlon="105" update_tropicals="0" update_piracy="0" update_bulletins="0" piracyhistory="14">
    <PRESSURE>
      <P>1013.25</P>
    </PRESSURE>
    <WIND>
      <W>10</W>
    </WIND>
    <WAVE>
      <W>10</W>
    </WAVE>
    <SWELL>
      <S>10</S>
    </SWELL>
    <SEAS>
      <S>10</S>
    </SEAS>
  </WEATHER>
  <WEATHER llon="160" rlon="160" ulat="50" llat="20" hiresinterval="H3">
    <CURRENT>1</CURRENT>
    <WIND>1</WIND>
    <WAVE>1</WAVE>
    <SWELL>1</SWELL>
    <SEAS>1</SEAS>
  </WEATHER>
  <WEATHER llon="170" rlon="155" ulat="50" llat="35" hiresinterval="H3">
    <IMAGE>1</IMAGE>
  </WEATHER>
</NESTED>
</WEATHER>
```

An example of Weather display



Another example



AROS Watches You

BVS Data Request

Company: Status: -- Any -- Trial: -- Any --
 Email: Active Schd: -- Any -- Days w/out data:
 Mac ID: BVS Version: -- Any -- Blacklisted: -- Any --
 ECA: -- Any -- 50 records Search Add New To Excel Clear

☐ Forecast ☐ Pricing ☐ Track Options
☐ Owner ☐ Note ☐ Service Level

Showing 1 to 30 of 30 entries

Code	Vessel	Data Request	Pricing	Statistics	Alerts	Inquiries
Y00917	ANDRI	BVS				
ASTRO	ASTRO REI					
ZCAW3	AURORA B					
AWT4	BPS DEMO 4					
PPVY	FLUMAR BRASIL					
DSNX7	HANJIN PORTKEMBLA					
JOHN	JOHN SINGAPORE					
PNJU	MOROTAI					
H8JD	ROSELLA					
MMTCPH	MAERSK OFFICE TRIAL	A.P. MOLLER - MAERSK A/S				
ADM	ADM STAMFORD	ADM INTERNATIONAL SARL				
V7SQ7	HARVEST FESTIVAL	ADM INTERNATIONAL SARL				
V7UV8	HARVEST PLAINS	ADM INTERNATIONAL SARL				
V7UB9	HARVEST RISING	ADM INTERNATIONAL SARL				
ADMAN	ADMANTHOS	ADMANTHOS SHIPPING AGENCY				

AROS Watches You

From: 2013/05/22 To: 2013/06/21

View

Print

History

BVS Data Delivery history for AETHOUSTON (2013/05/22 - 2013/06/21)

Date/Time (UTC)	Size (KB)	Trial	Fcst	Interval	Upper Lat	Lower Lat	Left Lon	Right Lon	Trop.	Marine Bull.	Press.	Front	Hght 500mb	Wind	Swell	Wave	Ice	SST	Image	Port	Gulf Stream	Kuro-shio	Move-ment	NCOM	Visibility	Highs/Lows	Wx. Type	Vsl. Icing	Ice Density	Clouds	Tem-perature	Nested Grid	Service Level
2013/06/21 09:05	923.5	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/20 09:05	935.2	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/19 09:05	933.7	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/18 09:05	937.1	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/17 09:05	930.2	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/16 09:05	929.3	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/15 09:05	931.5	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/14 09:05	927.9	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/13 09:05	918.6	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/12 09:05	907.9	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/11 09:05	910.0	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/10 09:05	904.5	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/09 09:05	902.6	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/08 09:05	911.5	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/07 09:05	913.2	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/06 09:05	913.7	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/05 09:05	922.5	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/04 09:05	925.2	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/03 09:05	922.9	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/02 09:05	934.1	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/06/01 09:05	934.3	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/31 09:05	933.0	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/30 09:05	936.3	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/29 09:05	943.8	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/28 09:05	943.2	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/27 09:05	946.2	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/26 09:05	942.3	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/25 09:05	936.9	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/24 09:05	930.7	No	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/23 09:05	932.8	Yes	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner
2013/05/22 09:05	927.8	Yes	10	H12	60.00	-60.00	50.00	50.00	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1	1	Ultra Planner

Adding new ship to DB

-- Webpage Dialog

Add New Ship

Name:	<input type="text"/>	Call Sign:	<input type="text"/>	IMO:	<input type="text"/>	MMSI:	<input type="text"/>	Save
Type:	<input type="text"/>	Class:	<input type="text"/>	Year Build:	<input type="text"/>	Status:	Active <input type="text"/>	Close
Rated Spd:	<input type="text"/>	Max Spd:	<input type="text"/>	Min Spd:	<input type="text"/>	Flag:	<input type="text"/>	Comm.
LOA:	<input type="text"/>	Draft:	<input type="text"/>	DWT:	<input type="text"/>	Beam:	<input type="text"/>	C/P Terms
Client Code:	<input type="text"/>	Owner:	<input type="text"/>	Hull Clean.:	<input type="text"/>	Dry Dock:	<input type="text"/>	BVS 4.5 / Up
MCR POW:	<input type="text"/> ->HP	NCR POW:	<input type="text"/> ->HP	MCR RPM:	<input type="text"/>	NCR RPM:	<input type="text"/>	Edit MCR
Capacity:	<input type="text"/>	TEU #:	<input type="text"/>	Cars #:	<input type="text"/>			Event
<input type="checkbox"/> Is Liner		<input type="checkbox"/> No Suppl.Msg.						

Motion Thresholds [Calculate](#)

Wave:	<input type="text"/>	Parametric:	<input type="text"/>	Synch:	<input type="text"/>	Broach:	<input type="text"/>
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Black List [Edit](#)

Reason:	<input type="text"/>	Note:	<input type="text"/>	Date:	<input type="text"/>
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Laiden Properties

DR Adjust %:	<input type="text"/>
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Ballast Properties

DR Adjust %:	<input type="text"/>
--------------	----------------------

Met Manager

Installed:	<input type="checkbox"/>	BVS Track:	None <input type="text"/>	Company:	<input type="text"/>
Note:	<input type="text"/>				

Alpha Factor:

Created On: Created By: Modified On: Modified By:

Adding new ship to DB

-- Webpage Dialog

Edit Bvs Request

Ship: ABEILLE B Enabled: ☒ 9/4/12 put: iloban@telaurus.net in accept only since no response from master 9/4/12 JC Save
Company: V.SHIPS MONACO D Trial: ☐ 2011/12/2: Took off Trial Per Marie Close
Department: Modif.On: 2013/03/21 12:51 Lite Service Started on 3/15/2011
Office: Modif.By: Baxter,Marie V Ships Monaco
Run Server: CREESY2 - 1255 Max.Fcst: 10 days Default Fcst: NOT SET

BVS Onboard
BVS Version: 6.0 Full Version: 6.0.1.68 Decoder: 1.0.2.17
Original PID: Telaurus Current PID: BVS Required PID: BVS

Setup
Charge: Billed On: ☒ No Invoice ☐ Prorate Next invoice

Email Options
Send/Accept: master.abeille@telaurus.net;
Accept Only: seaweather.files.abeille@telaurus.net; iloban@telaurus.net Cc:
Opt.Body: Opt.Subj:
Attachment: ☐ Continuous Attach.Dir: \\AWTCOMBINED\winapp\AROS\Documents\BVS6\SpecialFiles
ECA Enabled: ☐
Track: None Track Send: Active Schedules Only

BVS 6
Serv.Change Fee:
Serv.Interrupt.Fee:
Service Level: Planner Default Level: NOT SET
Temp.Lvl: Temp.Planner
☐ Disallow Unknown MAC Edit MAC Ids

Mac ID	Known	Blocked	Note
CKNOVOR	Yes	No	From master.abe...
LEQJHWF	Yes	No	from master.abe...

Schedules Current and Future Add New

Schedule	Fcst.	Region	Created				
Start	End	Days	ULat	LLat	LLon	RLon	On

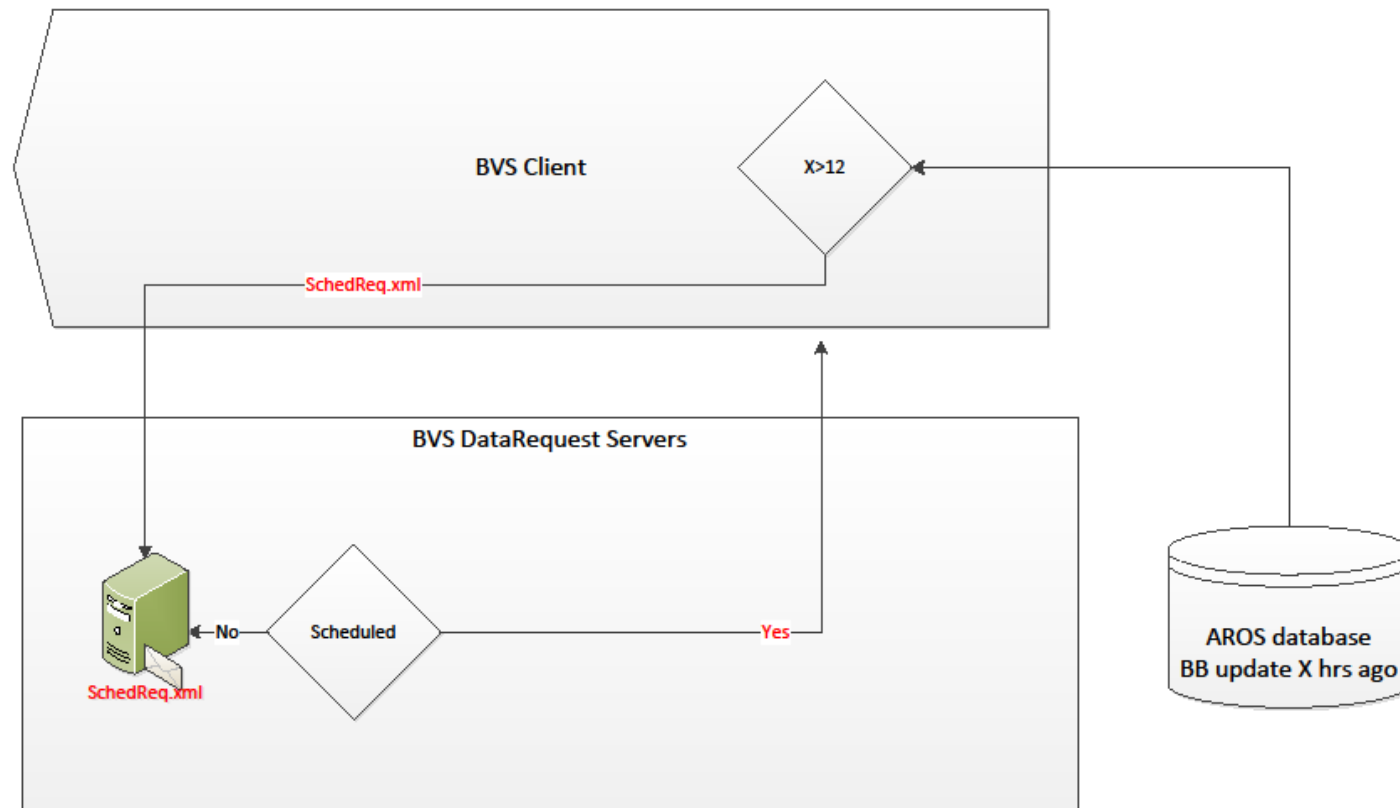
Service Dates Current and Future Add New

Service	End	Trial	On	Modified
Start				By
2011/03/15		Yes	2011/08/19	Eugene Zilberleyb

Email Delivery vs. Broadband

- Email Delivery
 - Should open email account
 - Sends an email with new data after, also by email
- Internet
 - No action required to send data request
 - Just need to set Data Request and turn on the system
 - The data is periodically updated over HTTP
- Scheduled Email Delivery
 - Sends data at specified times

Scheduled update as “a broadband plan B” - backup option



Cost of the email data

Data Request X

Estimated Forecast Size: **~400.1KB**

Main Area High-Res **Item Select** Satellite Image Port Vicinity Fcst Delivery Schedule Summary

Atmospheric Weather

☒ Pressure, Tropicals and Fronts are always included ~10.0 KB

☒ Wind ~50.8 KB

☐ 500MB Height

☐ Visibility

☐ Precipitation

☐ Cloud Cover

☐ Air Temperature

☐ Humidity

Ice

☒ Pack Ice & Bergs are always included ~5.4 KB

☐ Vessel Icing

Waves

☒ Significant Wave **~27.9 KB**

☒ Swell ~37.6 KB

☒ Seas ~104.4 KB

☐ Rogue Wave

Ocean

☒ Current ~23.3 KB

☒ Sea Surface Temperature ~1.6 KB

Others

☐ Marine Bulletins

☐ Piracy Reports

Cancel << Back Next >> Finish

Pressure, tropical storms, high-low tracks, fronts

In order to reduce the file size

Wavelet compression [\[edit\]](#)

Wavelet compression is a form of [data compression](#) well suited for [image compression](#) (sometimes also [video compression](#) and [audio compression](#)). Notable implementations are [JPEG 2000](#), [DjVu](#) and [ECW](#) for still images, [REDCODE](#), [CineForm](#), the BBC's [Dirac](#), and [Ogg Tarkin](#) for video. The goal is to store image data in as little space as possible in a [file](#). Wavelet compression can be either [lossless](#) or [lossy](#).^[1]

Using a wavelet transform, the wavelet compression methods are adequate for representing [transients](#), such as percussion sounds in audio, or high-frequency components in two-dimensional images, for example an image of stars on a night sky. This means that the transient elements of a data signal can be represented by a smaller amount of information than would be the case if some other transform, such as the more widespread [discrete cosine transform](#), had been used.

Wavelet compression is not good for all kinds of data: transient signal characteristics mean good wavelet compression, while smooth, periodic signals are better compressed by other methods, particularly traditional harmonic compression (frequency domain, as by Fourier transforms and related).

See [Diary Of An x264 Developer: The problems with wavelets](#) [\[2\]](#) (2010) for discussion of practical issues of current methods using wavelets for video compression.

Method [\[edit\]](#)

First a wavelet transform is applied. This produces as many [coefficients](#) as there are [pixels](#) in the image (i.e., there is no compression yet since it is only a transform). These [coefficients](#) can then be compressed more easily because the information is statistically concentrated in just a few coefficients. This principle is called [transform coding](#). After that, the [coefficients](#) are [quantized](#) and the quantized values are [entropy encoded](#) and/or [run length encoded](#).

A few 1D and 2D applications of wavelet compression use a technique called "wavelet footprints".^{[2][3]}

Comparison with wavelet transformation, Fourier transformation and time-frequency analysis [\[edit\]](#)

Transformation	Representation	Output
Fourier transform	$f(\xi) = \int_{-\infty}^{\infty} f(x) e^{-2\pi i x \xi} dx$	ξ , frequency
Time-frequency analysis	$X(t, f)$	t , time; f , frequency
Wavelet transform	$X(a, b) = \frac{1}{\sqrt{a}} \int_{-\infty}^{\infty} \overline{\Psi\left(\frac{t-b}{a}\right)} x(t) dt$	a , scaling; b , time

Conclusions and “live demo”

- Weather data for specified region(s) and date(s) has to be prepared.
- Additional data feeds (such as piracy and marine bulletins) have to be integrated.
- Broadband server has can handle many simultaneous requests.
- Failover, logs and security.