Update of the CERSER TeraScan Cataloguing System and the TeraScan Image Processing Scripts

2013-2014 Multimedia Team :: Derek Morris Jr., Jefferson Ridgeway, Tori Wilbon :: Center of Excellence in Remote Sensing Education and Research :: Elizabeth City State University :: Elizabeth City, North Carolina, USA

Abstract

The Center of Excellence in Remote Sensing Education and Research (CERSER) on the campus of Elizabeth City State University is currently tasked with the responsibility of receiving remotely sensed data from National Oceanic and Atmospheric Administration (NOAA) Polar Operational Environmental Satellites (POES) and Geostationary Operational Environmental Satellites (GOES). This data is collected by SeaSpace TeraScan systems installed in the CERSER labs in Dixon-Patterson Hall.

In 2005, the processing system underwent a major update due to a migration to a new operating system. A minor update was needed at this time to deal with a second operating system migration and display of the processed images on the CERSER web site. Since then, a second transfer to a new server was made in 2013. The cataloguing system went down at this time and was not repaired due to technical issues with the TeraScan system. The 2014 team corrected issues within the current server directory system and updated the data script to process images from the GOES-13 satellite received by the TeraScan system. Software and languages utilized for this task included ImageMagick, PHP, HTML, Dreamweaver, phpMyAdmin, and MySQL.

Along with this operating system update, a major script development was needed on the TeraScan processing equipment due to an upgrade in hardware. The ground station upgrades included a 3.7m X/L band, a 3.6m C band, and a 5.0m L band dishes, along with accompanying computing hardware.

This project implemented new script on the TeraScan and CERSER servers. This new script processes both infrared and visible light images received from the GOES-13 satellite into the Tagged Image File (TIFF) Format.

Keywords- GOES, TeraScan, ImageMagick, Macintosh OSX, MySQL, PHP, Remote Sensing

This research project had three goals for this academic year tasking: Determine and repair the cause of the script failures on the **CERSER** server.



An Area of Interest made using the GUI TeraMaster

🖲 🖯 🕜 🏠 jdridgeway7	'87 — jridgeway
aquadb.global.fog	hirid.pgs
aquadb.global.skewt	hirid.rgb
aquadb.image	hrit.archive
aquadb.local	hrit.clouds
aquadb.local.composite	hrit.export
aquadb.local.fog	hrit.export.e
aquadb.local.skewt	hrit.global
aquadb.modis	hrit.image
aquadb.modis.laads	hrit.local
aquadb.rgb	hrit.lowcloud
aquadb.rgb.transfer	hrit.olrpwa
aquadb.vulcan	hrit.pgs
batch.ingest	hrit.rgb
chrpt.global	hrit.sst
chrpt.local	hrpt.archive
chrpt.mvisr	hrpt.atovs
fyhirid.archive	hrpt.atovs.g
fyhirid.clouds	hrpt.atovs.lo
fyhirid.export	hrpt.avhrr
fyhirid.global	hrpt.export
fyhirid.image	hrpt.global
[jridgeway@ecsu-goes-ea	ast configproc
/opt/terascan/pass/cont	figproc
[iridgeway@ecsu-goes-ea	ast configproc

In the terminal window, under the configproc directory

NOAA POES Receiving antenna on top of Dixon-Patterson Hall, ECSU

Characters	Data
1-4	Year
6-7	Month
8-9	Day
11-14	Time (Z)
16-22	Satellite N
24-31	Product (b
32-36	File Extens

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Goals

2. Develop TeraScan script that will process the satellite data into an image, provide overlay information, and place the completed image onto the server.

Rewrite the PHP processing script on the CERSER server to parse Geostationary Operational Environmental Satellite (GOES) information into a database and to execute commands to convert and resize the same image.

	-Projection-		
the particular	Orthographic	(S)	
	-Map		
	Center Lat	[38 6.83 N	
	Center Lon	[69 57.95 W	
	Pixel Width] 1.875	4
	Pixel Height] 1.875	4
	-View		
	Center Lat	[38 6.83 N	
	Center Lon	[69 57.95 W	
	Area Width] 1024	4
	Area Height] 1024	4
	Rotation	Io	A
	Information —		
e Density	Width	1925.43 km	
+ -	Height	1925.43 km	
+-	Apply	Undo	
W X 62	Y 113		2





Creating a new Data Shelf in TeraVision

🖲 🔿 🔿 Processing 🛛 Capture 🗋 Documen	X TeraScan Launchpad
TeraVision	TeraMaster
TeraVision II	TeraNav
Pulse	TeraScan XVU
TeraPGS	

TeraScan Launchpad Server which includes all of the TeraScan GUIs



Option Text String

- Channel 1 Visible 0.52-0.72 mm
- Channel 2 Infrared 3.78-4.03 mm
- "၃" Channel 3 Vapor 6.47-7.02 mm
- Channel 4 Upper Vapor 10.2-11.2 mm "4"
- "ς"





NOAA GOES Receiving antenna on top of Dixon-Patterson Hall, ECSU

- TeraScan Modification Script
- > Modified the configproc file parameters
- Enter Configproc then go to gvar.local
- CERSER Server Script Failures 2011 script needed to be updated
- Serverside Script

 - Upgrade of TeraScan equipment 2013
- Parse Title to Database

 - Time is in Zulu
- Resize/Rename/Copy IMG
 - Change TIFF to JPEG formats
 - Uses graphic program ImageMagick

67	//CHECK and Process GOES Satellit
68	<pre>if (substr(\$satName, 15, 4)=='goe</pre>
69	{
70	<pre>\$sat= substr(\$satName, 15, 7)</pre>
71	<pre>\$cnvrtDate= substr(\$satName,</pre>
72	<pre>\$cnvrtTime= substr(\$satName,</pre>
73	<pre>if(substr (\$satName, 30, 1)==</pre>
74	<pre>\$product='Channel 1 Visib</pre>
75	<pre>else if (substr(\$satName, 30,</pre>
76	<pre>\$product='Channel 2 Infra</pre>
	<pre>else if (substr(\$satName, 30,</pre>
78	<pre>\$product='Channel 3 Vapor</pre>
79	<pre>else if (substr(\$satName, 30,</pre>
80	<pre>\$product='Channel 4 Upper</pre>
81	<pre>else if (substr(\$satName, 30,</pre>
82	<pre>\$product='Sea Surface Tem</pre>
83	}
-	
Pr	ocess GOES Satellite In
.05	//Perform Insert Record Ouerv <<<
.06	//Place SOL Ouerv into the Squerv
	Contract of the second second second second

esult = mysql query(\$query);

		•	•	,		
116	//Obtain	ТD	Number	for	this	record

Transfer record id to the variable \$lastID

astID = mysql_insert_id();

1	//>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
	<pre>//\$imageMagick = 'C:\\Applications</pre>
	//COPY original file and rename us
	<pre>\$orgFile = \$dir . \$satName;</pre>
	<pre>\$newfile = 'Actual/' . \$lastID . '</pre>
	//>>>>>>>TESTING ONLY<<<<<<
	echo "Original File: " . \$orgFile
	<pre>if (!copy(\$orgFile, \$newfile))</pre>
0	{
	echo "failed to copy \$file\:
	}
	//Copy original tiff to Tiff
	<pre>\$cnvrt = '/opt/local/bin/convert '</pre>
	exec(\$cnvrt);
	//Convert original tiff to medium
	<pre>\$cnvrt = '/opt/local/bin/convert '</pre>
0	exec(\$cnvrt);
	//Convert original tiff to low jpg
	<pre>\$cnvrt = '/opt/local/bin/convert '</pre>
	exec(\$cnvrt);
	//Convert original tiff to thumbna
	<pre>Scnvrt = '/opt/local/bin/convert '</pre>

exec(\$cnvrt);

ame band) sion (.tiff)

Methodology

• Used GUI TeraMaster to make a master Area of Interest (AOI) Binary is converted to the TeraScan Data Format(TDF)

Change directory permissions to READ & WRITE

> PHP, MySQL, HTML (1st developed in 2006 as ASP script) Process images received from GOES imager by TeraScan

Title holds information need for database > Date, time, type of satellite, channel, extension ➢ GOES file titles have 36 characters Use variables use substr commands

Mysql_insert_id() retrieves the record id > Used to rename the image by using only the keyid name

es')

5, 2).'/'.substr(\$satName, 7, 2).'/'.substr(\$satName, 0, 4); 10, 4).'Z'; ='1') ole 0.52-0.72 mm' ; 1) == '2')ared 3.78-4.03 mm' 1) == '3')6.47-7.02 mm' 1) == '4')Vapor 10.2-11.2 mm' ; 1)=='s') mperature' ;

variable uery = "INSERT INTO images (imgdate, time, satellite, product, description, event) VALUES (\$cnvrtDate . "', '". \$cnvrtTime . "', '" . \$sat . "', '". \$product."', '', 0)";

erform Query and place result into \$result for troubleshooting

Place SQL Query into the \$query variable

\\ImageMagick-6.6.7\\bin\\convert.exe': ing lastID variable .tiff';

<<<<<<<COMMENT OUT WHEN TESTING COMPLETH</pre> "
> New File: " . \$newfile . "

"

n

";

\$orgFile . ' Actual/' . \$lastID . '.TIFF';

. \$orgFile . ' medium/' . \$lastID . '.jpg';

. \$orgFile . ' -resize 50% low/' . \$lastID . '.jpg';

il -resize 15% \$orgFile . ' -resize 15% Thumbs/' . \$lastID . '.jpg';

Copy original file, rename using lastID variable

-TS

Results

Images are able to be processed using both TeraVision and the UNIX script. In TeraVision, the user is able to let the images are able to have borders, layers, Grid Overlays, etc. In the script, each time a pass comes in and is converted into data, the batch.ingest takes the pass and cleaves it to match the parameters of the picture in the gvar.local directory, which includes the cover area, input files, the save directory, and etc.

- Server/ Script

After changing the permissions of the picture archives directories on the CERSER server in E.V. Wilkins Computing Center, the images can now be modify to be used in the database. The images are now able to process and to be displayed on the database. The information from parsing the title of the images are now being put into the database. The code in the script for resizing/ renaming/ copying the image is still working and the images are able to be viewed closer when clicked on in the database.

Conclusion

Images can be successfully processed however, there are other goals that were not met. After changing the parameters in the script to modify the images to match the AOI, there needs to be a way to let the images be sent to the CERSER server in order so that CERSER can get the images automatically from the TeraScan server, instead of having to manually send the files from the TeraScan server to the CERSER server. There needs to be a daily automated process written the script to receive processed and finalized images from the TeraScan server to send to the CERSER server. Also, there needs to be an increase of image size with the images being received and processed through the script in TeraScan.

Overall the database is a success and there have not been anymore problems with the images transition from the satellite to E.V. Wilkins Computing Center to the database. All the problems have been fixed and the goals have been completed. The images are coming in and the information that was taken from the title are all correct. The next time working on this project; it would be nifty to use Java.

Future Work

- To accomplish a daily automated process of images from the TeraScan server to the CERSER server
- To increase the image size of the pictures in the script and have a script that will connect from the TeraScan server to the CERSER server.
- To rewriting Script to re add the NOAA satellite information.
- When other channels are added to the GOES.



NOAA GOES Channel 3 Vapor, ECSU



NOAA GOES Channel 1 Visible, ECSU



NOAA GOES Channel 4 Upper Vapor, ECSU



NOAA GOES Channel 1 Vapor, ECSU

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