MSDIS Update – November 2019

New and Updated Data

- 2019 Ambulatory Surgical Centers (November Update)
- 2019 Dialysis Centers (November Update)
- 2019 Hospitals (November Update)
- 2019 Adult Daycare (November Update)
- 2019 WIC Satellite Offices (November Update)
- 2019 Federally Qualified Health Center Locations (November Update)
- 2019 Rural Health Clinics (November Update)
- 2019 Sales Tax Jurisdiction Boundaries (November Update)

MSDIS General News

During the Image Server Outage during the week of 18 November (see below and Appendix I) we took stock of the traffic of each individual imagery service. In order to reduce some unnecessary, albeit minimal, strain on the server, we took several of the older, situation-specific imagery services offline that, to be honest, weren't being used anymore anyway. The majority of these services were isolated to older natural disaster imagery such as the Joplin tornado. Other services removed were duplicates of services that were being housed in multiple Imager Server folders.

As our users took time off for the Thanksgiving holiday, we dissected some of the usage statistics for our download applications. As expected, the LIDAR download tools and The Missouri Map have been used significantly more than the many individual imagery download tools that we initially developed before deploying The Missouri Map. Owing to their lack of use, we have taken the individual imagery download tools offline. All downloadable imagery are still available via The Missouri Map, the LIDAR download tools, and the MSDIS Data Library.

MSDIS Downtime

The MSDIS imagery server was restarted on 18 November due to lost HTTPS capability. Through help from ESRI Customer Service, the security credentials were restored by restarting the server in HTTP Only mode, then restarting in HTTP and HTTPS mode. The initial problem was likely caused by an unexpected server restart over the preceding weekend for a Windows update.

After the above-mentioned outage, several of the 2015 DOQQ imagery services were disabled during due to an inability to publish image mosaics developed in ArcGIS 10.6 through ArcGIS Server 10.4. The services were disabled for approximately one week while MSDIS conducted various tests to isolate the cause of the publication problems.

For more information about the incidents, please refer to the Appendix I, which contains the email updates distributed during the downtime.

Listserv Subscriptions

KCAIUG - 194
MGISAC – 188
MISSOURIMAPPERSASSOC - 39
MOGISCON – 976
MOGIS_ADVISORY_COUNCIL - 29
MSDIS News – 186
STLGIS – 387

MSDIS Data Wish List

While MSDIS is always happy to distribute any new data, based on requests from our users, GRC map requests, and the overall state of the data catalog, acquisition of new or updated versions of the following datasets are of particular interest:
Missouri School Districts (latest Missouri version: 2013, latest TIGER/Line version: 2018)
Missouri Voting Districts (latest version: 2010)
Missouri Contour Lines (no previous version)
Missouri Higher Education Facilities (previous Missouri version: 2010)
Missouri Library Districts (previous version: 2013)
Missouri Enhanced Enterprise Zones (previous version: 2012)

Image Server November 2019 Usage Stats

Hits by Month

Month	Hits	Page views	Visitors
July-19	3840931	3837770	39749
Aug-19	3967536	3963578	36447
Sept-19	3646012	3640711	34208
Nov-19	7926110	7921363	35212
Dec-19	3372185	3367077	34385

Top Ten Hits by City

City	Hits	Hits (%)	Page views
United States/MO/Jefferson City	862,955	25.60%	859,543
United States/(unknown city)	582,772	17.30%	582,653
United States/MO/Saint Louis	277,622	8.20%	277,421
United States/MO/Lohman	248,260	7.40%	248,191
(unknown country)/(unknown city)	153,874	4.60%	153,748
United States/MO/Columbia	102,231	3.00%	101,981
United States/CO/Fort Collins	97,542	2.90%	97,538
United States/AR/Russellville	67,319	2.00%	67,297
United States/MO/Springfield	59,314	1.80%	59,255
Canada/ON/Ottawa	45,641	1.40%	45,625

Top Ten Hits by Referrer

Referrer	Hits	Hits (%)	Page views
(no referrer)	1,462,013	43.40%	1,461,383
https://semorpc.maps.arcgis.com/	527,382	15.60%	527,382
http://traveler.modot.mo.gov/	285,626	8.50%	285,626
http://tmsmaps/	141,606	4.20%	141,606
https://msdis.maps.arcgis.com/	97,372	2.90%	97,372
http://batesgis.integritygis.com/	88,821	2.60%	88,821
https://apps5.mo.gov/	67,779	2.00%	64,559
http://mmsuat/	63,174	1.90%	63,174
https://www.arcgis.com/	59,542	1.80%	59,542
http://rallsgis.integritygis.com/	57,209	1.70%	57,209

Map Server November 2019 Usage Stats

Hits by Month

Month	Hits	Page views	Visitors
July-19	437430	432572	5747
Aug-19	955657	949138	5301
Sept-19	370928	364591	63006
Nov-19	476142	472193	4933
Dec-19	334212	331535	4143

Top Ten Hits by City

City	Hits	Hits (%)	Page views
United States/MO/Columbia	36,995	11.10%	36,829
United States/VT/Waterbury	24,540	7.30%	24,540
United States/(unknown city)	22,924	6.90%	22,811
United States/MO/Saint Louis	16,424	4.90%	16,199
United States/FL/Brandon	14,817	4.40%	14,749
United States/NJ/Mount Laurel	13,758	4.10%	13,742
United States/MO/Cape Girardeau	12,889	3.90%	12,826
United States/WI/Oak Creek	12,033	3.60%	12,033
(unknown country)/(unknown city)	10,186	3.00%	10,057
United States/NJ/Woodbridge	9,760	2.90%	9,760

Top Ten Hits by Referrer

Referrer	Hits	Hits (%)	Page views
https://msdis.maps.arcgis.com/	124,088	37.10%	124,088
(no referrer)	120,494	36.10%	119,620
https://semorpc.maps.arcgis.com/	43,003	12.90%	43,003
https://www.arcgis.com/	11,293	3.40%	11,293
https://data-msdis.opendata.arcgis.com/	6,921	2.10%	6,921
http://stlcogis.maps.arcgis.com/	5,027	1.50%	5,027
https://mdcgis.maps.arcgis.com/	3,978	1.20%	3,978
http://msdisweb.missouri.edu/	3,558	1.10%	1,986
http://www.arcgis.com/	2,835	0.80%	2,835
https://usacelittlerock.maps.arcgis.com/	2,701	0.80%	2,701

MSDIS Data Archive November 2019 Usage Stats

Hits by Month

Month	Hits	Page views	Visitors
July-19	28359	27008	4035
Aug-19	35449	34063	2111
Sept-19	44193	42598	2590
Nov-19	51296	49655	5552
Dec-19	29648	28197	5948

Top Ten Hits by City

City	Hits	Hits (%)	Page views
(unknown country)/(unknown city)	3,757	12.70%	3,640
United States/CA/Mountain View	3,173	10.70%	3,099
United States/CA/Palo Alto	2,825	9.50%	2,820
Ukraine/(unknown city)	2,654	9.00%	2,652
United States/MO/Springfield	2,230	7.50%	2,172
China/Beijing/Beijing	2,210	7.50%	2,210
China/Hebei/Hebei	1,643	5.50%	1,642
United States/NJ/Woodbridge	1,209	4.10%	1,202
Switzerland/(unknown city)	1,057	3.60%	1,057
United States/CT/Fairfield	1,011	3.40%	1,011

Top Ten Hits by Referrer

Referrer	Hits	Hits (%)	Page views
(no referrer)	23,101	77.90%	22,532
http://msdis-archive.missouri.edu/	5,500	18.60%	4,618
http://www.msdis.missouri.edu/	530	1.80%	530
http://msdis.missouri.edu/	403	1.40%	403
https://www.google.com/	43	0.10%	43
http://data-msdis.opendata.arcgis.com/	17	0.10%	17
http://msdis.missouri.edu	12	0.00%	12
http://lewisclark.geog.missouri.edu/	11	0.00%	11
http://www.msdis.missouri.edu	10	0.00%	10
http://progressive-seo.com	9	0.00%	9

APPENDIX I

MSDIS Imagery Outage Update #1

All

I wanted to take a moment to update everyone on the problems that we saw with the MSDIS imagery server yesterday.

At approximately 9:15 AM, I received a call that imagery services were offline. After accessing the server and noting that no warnings had popped up, I decided to restart the server. Once the server came back online, the services appeared to be restored. The whole process took roughly 20-30 minutes.

Shortly after that, I received another call that MSDIS imagery servers were no longer compatible with ArcGIS Online. The services, it seemed, had lost their HTTPS credentials. At that point, I tried to examine our web adaptor settings, but was unable to access the function. I called ESRI customer support and a very nice, very helpful gentleman named Dennis took a look at our setup. It was at that point that, being unable to connect to the imagery server via https, Dennis instructed me to set the server to HTTP only. That required the server to restart itself, which would have caused a second outage. After that was complete, I was instructed to set the server back to HTTP and HTTPS, which necessitated another server restart, causing another outage. If I understand the process correctly, it was the HTTPS equivalent of "turn it off and then turn it back on again". At that point, our access to sever manager, web adapter, and https was restored.

Because server restarts are notoriously sketchy, I waited for a little while to see if all of our imagery services came back online on their own. When it became evident that they were not restoring themselves, I decided to restart the entire server for the second time that day, which would have caused the fourth major outage.

When the server came back online, it not only were all of our services not restored, but we appeared to have lost our https connection again. I called Dennis back up and he kindly walked me back through the process from earlier (I'll point out, too, that I took several screenshots this time in case I need to do this again). That process, as you can imagine, caused two more outages. One when we set the server to HTTP only and another when we set it to HTTP and HTTPS.

At that point, I decided to leave everything alone. HTTPS access was restored and the overwhelming majority of our services were running and running correctly. To my knowledge, the only services that appeared to still be faulty were those related to the 2015 DOQQs – and not even all of those were experiencing problems. I spent much of the afternoon and evening checking on services from my home. Other than the 2015 DOQQ services, I couldn't find a single service that displayed aberrant behavior. In other words, as far as I could tell, everything (other than the 2015 DOQQs) was working exactly as intended. I checked again this morning and, again, I could find no faulty services.

This is where I would like to point out that, while I am the de facto manager of all things MSDIS, I have no background in IT or server management. I am, like so many of you, a GIS person. The duty of managing the IT side of the clearinghouse has simply fallen to me as the only full-time MSDIS staffer. I say this not as an excuse, or as an attempt to dodge any fault for the outages, merely to let you know that I am not as familiar with IT solutions as I would like to be. Please believe me when I say that, as

soon as I was alerted to a problem, I made every attempt to resolve the issue and, when it became clear that I couldn't fix it on my own, I immediately reached out to the experts at ESRI.

I'm taking the time to explain my technical background to you so that you have a better understanding of why we do not yet have a solid answer for what, exactly, happened yesterday. There are a handful of problems that could have been the cause. My primary suspicion is that the server, after many years of adding new services on top of one another, is simple getting too full. To this end, I have stopped several services this morning. All of the 2015 DOQQ services are currently suspended. Additionally, several other services that don't see much use have also been suspended. Throughout the week, I will be examining our server logs to identify other unused services that we can shut down. While I would like nothing more than to distribute every image that we've ever been given, I believe that this particular situation calls for a different approach, at least for now. I will attempt to restart the 2015 DOQQ services later this week. For the time being, though, they will remain offline.

In addition to paring down our active services, I will also get together with Mizzou IT this week to discuss a couple of things. First, I've already asked them to check to see if there is any peculiar behavior on the server itself or within the network. Next, I will speak with them about whether or not we need to reexamine the HTTPS capabilities of the MSDIS servers. Finally, I believe this is as good a catalyst as any to start discussing upgrading our ArcGIS Server installation. It is no secret that we're running on older software and I would not be surprised if that played a part in the problems.

While everything appears to be working properly at the moment, I will not promise you that the problems from yesterday will not recur, especially as we poke under the proverbial hood. I will ask you to please understand that everything we do to both diagnose and resolve the underlying cause of yesterday's problems is meant to build you a better GIS data clearinghouse. Nobody hates data outages more than me and I am genuinely sorry for whatever disruptions that the outages may have caused your workflows. Regardless of what happened yesterday, though, MSDIS is still committed to providing reliable access to Missouri's GIS data and that is exactly what I am going to start working on once I finish this email.

As always, I thank all of our MSDIS users and partners for their continued support.

-Tom

MSDIS Imagery Outage Update #2

Happy Friday, all.

In the interest of transparency, wanted to give you another update on the status of repairing the final bits of damage to the MSDIS Imagery server.

I want to start by saying that, as I'm typing this, the overwhelming majority of our image services are up and running. I'm looking at the Server Manager graphs right now and maximum response time is well within the normal range, timeouts are nonexistent, and overall traffic is making its morning climb. Looking at the same graphs, yesterday's traffic was only just a hair off of what we see on a normal day. Additionally, as an immediate response to the outage on Monday, our colleagues at Mizzou IT have added an additional 10GB of memory to the imagery server. I'm not sure if you're seeing any improvements on your side of the equation from this boost, but I can confirm that I'm seeing vastly fewer instances of the server's memory getting maxed out.

Now, given all of the above, we are still missing four services from our regular line up*. At present, DOQQ 2015, DOQQ 2015 East West Gateway, DOQQ 2015 MidMissouri, and DOQQ 2015 Western Missouri are still down. These services could not be restarted after the Monday outage and, in an unexpected development, I couldn't even interact with the image mosaics feeding them. The raw data are still intact and just fine, but the mosaics simply aren't functioning. I am (very) slowly deleting these corrupted mosaics as I'm able to do so. I can (and have) been able to rebuild the mosaics from the raw imagery data. Everything on that front works exactly as intended. When it comes to publishing them, however, I continue to get errors from ArcCatalog/ArcServer. What is interesting is that, while the mosaics won't publish, the raw images will (as seen by the sudden appearance of an imagery service of just Boone county that is currently available in the LGov directory). The inability to publish mosaics is not limited to just DOQQs. I tried mosaicking a newer set of images together to test the limitations and, sure enough, the same error kicked back. At this point, the inability to publish imagery mosaics is the only problem that I am aware of.

So, what am I doing to resolve the issue? Since the issue seems to be decidedly ESRI-related, I have opened another help ticket. I was on the phone with another customer support specialist yesterday who walked me through a number of steps to test the issue. When we were unable to fix the issue, he agreed with me that the problem was, in fact, "pretty strange". I provided him with the relevant information about our server setup so he could test the problems on his own. I have also reached out to ESRI to seek guidance relating to upgrading our ArcGIS Server install to 10.6 and expect to know more about that next week. In other words, I have already invoked the experts to find a fix. I'm not just waiting around for ESRI to save the day, though. I am currently in the process of exporting the new MidMissouri DOQQ mosaic to a single image to test if, since mosaics won't publish, maybe a single big image will. Because the error kicking back seems to indicate that either Catalog or Server simply can't find the mosaic data, I've also begun the process of resetting the security settings on all of the MSDIS data directories to ensure that the ArcGIS server account does have all of the permissions it needs to access the data I want to publish. As you can imagine, setting the permissions on 40+ TB of data is a not-insignificant ask, so this process is taking a long time.

At this point, beyond what I'm already trying to do as outlined above, the only other actions that I can take on my end that I have any experience with are resetting the machine that our image server lives, reinstalling ArcGIS, or reinstalling our current version of ArcServer. If the tests I'm running right now do

not resolve the problem, I will attempt to restart the machine this weekend. I will take no intentional action to restart the server during business hours since, as mentioned above, most of our services are still up and we're still seeing the overwhelming majority of traffic that we usually do. Reinstalling ArcGIS will be the next step after that. I'm not totally unconvinced that this problem isn't due to a mismatch between the version of ArcGIS that we're using and the version of Server that we're using. There are a couple of options with that action. I can do a reinstall of 10.6 or I can try to downgrade back to 10.4. I won't take that action until sometime next week to give ESRI some more time to test the situation on their end. The nice thing about it being a holiday week is that that shouldn't cause too much disruption (he says, optimistically). Doing anything to the Server installation is the last line of attack that I have and is the most extreme. Unlike reinstalling ArcGIS, this would cause some disruption. I won't take this course of action unless we are unable to upgrade our Server installation for some reason AND A) ESRI tells me to or B) ESRI cannot find a solution to the problem.

To reiterate, I am sincerely sorry for whatever interruptions this trouble has caused. I am the last person in the world who wants to disrupt any workflows. As I've outlined above, I am calling in everyone I can think of to resolve the situation while simultaneously doing everything I can think of to fix it on my own. I'd also like to give a heartfelt thanks to everyone who replied to my earlier email with words of support. One way or another, we will get through this. In the meantime, MSDIS continues to do the work of Missouri's GIS clearinghouse. I'm happy to announce that we have recently published the November updates to Missouri Hospitals, WIC Satellite Office, and Sales Tax Jurisdiction Boundaries. Additionally, we have recently posted three new job searches (two from the City of Columbia and one from Conexon) and we've received a salary update to the Seiler MGIS Solutions expert, so please be sure to check all of those out.

As always, I thank you all for your patience and support.
-Tom

*As a point of clarification, as promised in my earlier email, I have taken several image services offline that simply weren't being used.

MSDIS Imagery Outage Update #3

All

For those of you still with us on this Tuesday-Before-A-Holiday, the missing 2015 DOQQ services have been restored. Mid-Missouri, East West Gateway, and Western Missouri are back in the LGov folder and the statewide service is back in the MSDIS folder. I ***believe*** they all have the same names as before (at least, that was my intention. if there is a difference in any of the names, please let me know ASAP). There are a few subtle difference with the new Western Missouri service and, as a result, the statewide service. The previous version of the Western MO service was built out of the SID files that we received. THIS version is built out of the TIF files, which is consistent with all of the other 2015-era mosaics. As a result, there are a few no data spots around the edges of the mosaic, but I've checked those against a Missouri boundary shapefile and they all either fall outside of the state or are overlapped by live pixels of a different 2015 image service.

In addition to the restored 2015 services, the MidwestFlood2019_12inch service that was previously in the LGov folder can now be found in the Emergency Imagery folder here: http://moimagery.missouri.edu/arcgis/rest/services/EmergencyImagery/MidwestFlood2019_12inch/ImageServer

I've also taken most of the Joplin image services offline, but the Joplin2011_3inch service can now also be found in the Emergency Imagery folder here: http://moimagery.missouri.edu/arcgis/rest/services/EmergencyImagery/Joplin2011_3inch/ImageServer

I'll prepare a more detailed write-up after the holiday, but for now, the big ticket items are that the DOQQ services are back. I've confirmed with some of our partners that they have been able to connect to and use the new East West Gateway and Mid Missouri services, but the Western MO service was propped up too late last night for me to get any outside confirmation and the statewide mosaic was just propped back up a few minutes ago, so if there are any issues with those two (or any of them) please let me know.

-Tom

MSDIS Imagery Outage Update #4

All

After sorting through emails and to-dos that piled up over the holiday, I wanted to send out one final email detailing (what I hope is) the conclusion of the Imagery server problems from two weeks ago.

First, as I mentioned in my email last week, all of the 2015 DOQQ services have been restored. I have been keeping an eye on these services (and all of our other services) over the holiday and have found no evidence of instability. Double-checking against the server logs, I have no records indicating any outages or unexpected downtime since the services were restored. As anticipated, our daily traffic has been restored to pre-outage levels across all of our primary imagery folders. Of course, if anyone sees any instances of instability of the new services, please let me know as soon as possible.

Next, the cause of the problem. While there may have been a more specific underlying issue that I could have resolved with more investigation, ultimately, I've attributed the inability to restore the handful of 2015 DOQQ services to a mismatch between our ArcGIS Server and ArcGIS Desktop Installations. While I have noticed no problems using ArcGIS Desktop to publish map documents or individual images to our older ArcGIS Server installation, what I had never tested (before this outage, at least) was whether or not an image mosaic created in ArcGIS Desktop 10.6 could be published to our Server. That's where things fell apart during this particular situation. Owing to some kind of data corruption of the four DOQQ 2105 mosaics, which I suspect was caused by a server restart caused by a Windows update, those files needed to be rebuilt from scratch. Because of the version mismatch, the mosaics could be built, but could not be published. As soon as I downgraded back to ArcGIS Desktop 10.4, I was able to build another new version of the mosaics and they published without any problems whatsoever.

The most significant takeaway from this, in my opinion, is that it is now clearer than ever that we must upgrade our ArcServer installation. Our current server setup has performed its job admirably for many years, but that setup is now just too old to leave alone. I have already talked to a few very helpful folks at ESRI and we will hopefully soon be able to start assessing where our server specs are now vs where our server specs need to be in order to initiate that upgrade. Because our licenses, service contracts, and AGOL subscriptions are all tied to the University of Missouri, the most likely scenario is that we first ensure that our current agreements and contracts are renewed (which are scheduled to take place in the coming days and weeks) and, once we've confirmed that the current setup is all properly licensed and stable, THEN we'll start the work of upgrading.

On a personal note, I'd like to reiterate how absolutely blown away I was at the many emails of support that I received during this unfortunate situation. Many of you reached out to offer help, to compare server notes, or to just say thanks even though things weren't working right. I've long believed that Missouri's GIS community is a really fantastic group of people and I can think of no better evidence of that than the notes of support that I received over the past few weeks.

In other words, you guys are awesome and, as always, I genuinely thank you for your continued patience and support.

-Tom