

GIS Use Innovations (Remote Desktop to Run Complex GIS Functions)

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Abstract

Problem:

Cloud based GIS had a rough start and is unreliable option for GIS users, both in academia and industry. Complex functions like cloud-based network analysis is yet to be reliably performed. Location Allocation models, that are often NP-Hard (non-polynomial time hard) end up crashing due to the unstable cloud environment. Finally, fast mouse movement is still a problem in graphically intensive GIS assignments.

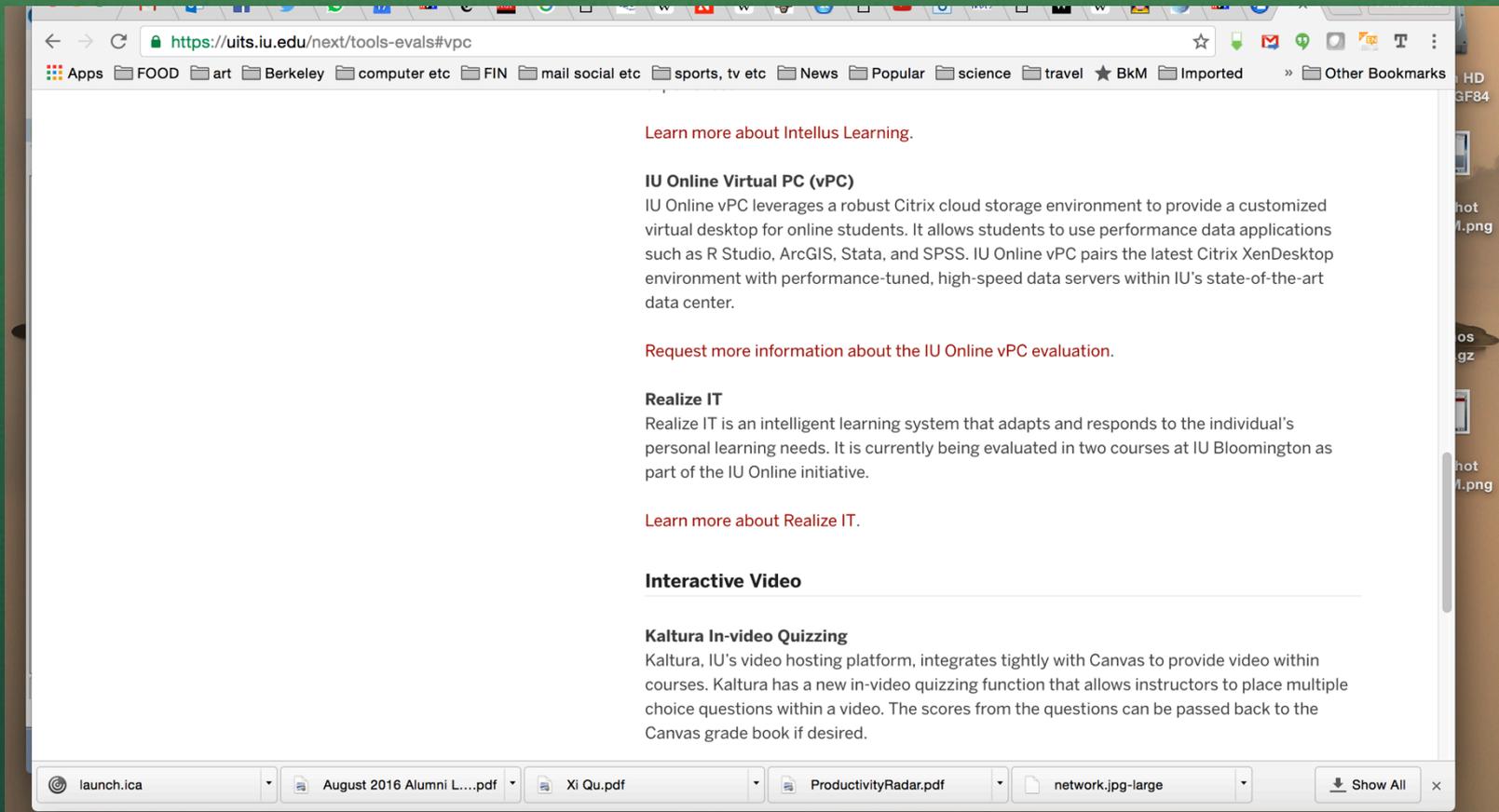
Solution:

Indiana University is at the forefront of computing, especially cloud computing with its cloud based software delivery. IU has several supercomputers that help tens of thousands of students, faculty, staff and guests access IU software. Similar to AWS™ (Amazon Web Services) IU provides virtual PC windows that can be accessed by any browser like Google Chrome™ with a readily downloadable add-on from Citric™ Corporation. While ArcGIS Online™ etc are still trying to tame cloud computing, IU has done it!

Cloud Based GISc?

- Cloud based GIS had a rough start and is yet to be a reliable option for GIS users, both in academia and industry
- Complex functions like network analysis is yet to be proven reliable
- Location Allocation models, that are often NP-Hard (non-polynomial time hard algorithms) end up crashing due to the unstable cloud environment
- Finally, fast mouse movement is still a problem in graphically intensive GIS assignments

A Solution



The screenshot shows a web browser window with the address bar displaying <https://uits.iu.edu/next/tools-evals#vpc>. The browser's bookmark bar contains various folders such as 'FOOD', 'art', 'Berkeley', 'computer etc', 'FIN', 'mail social etc', 'sports, tv etc', 'News', 'Popular', 'science', 'travel', 'BkM', 'Imported', and 'Other Bookmarks'. The main content area of the page features several sections:

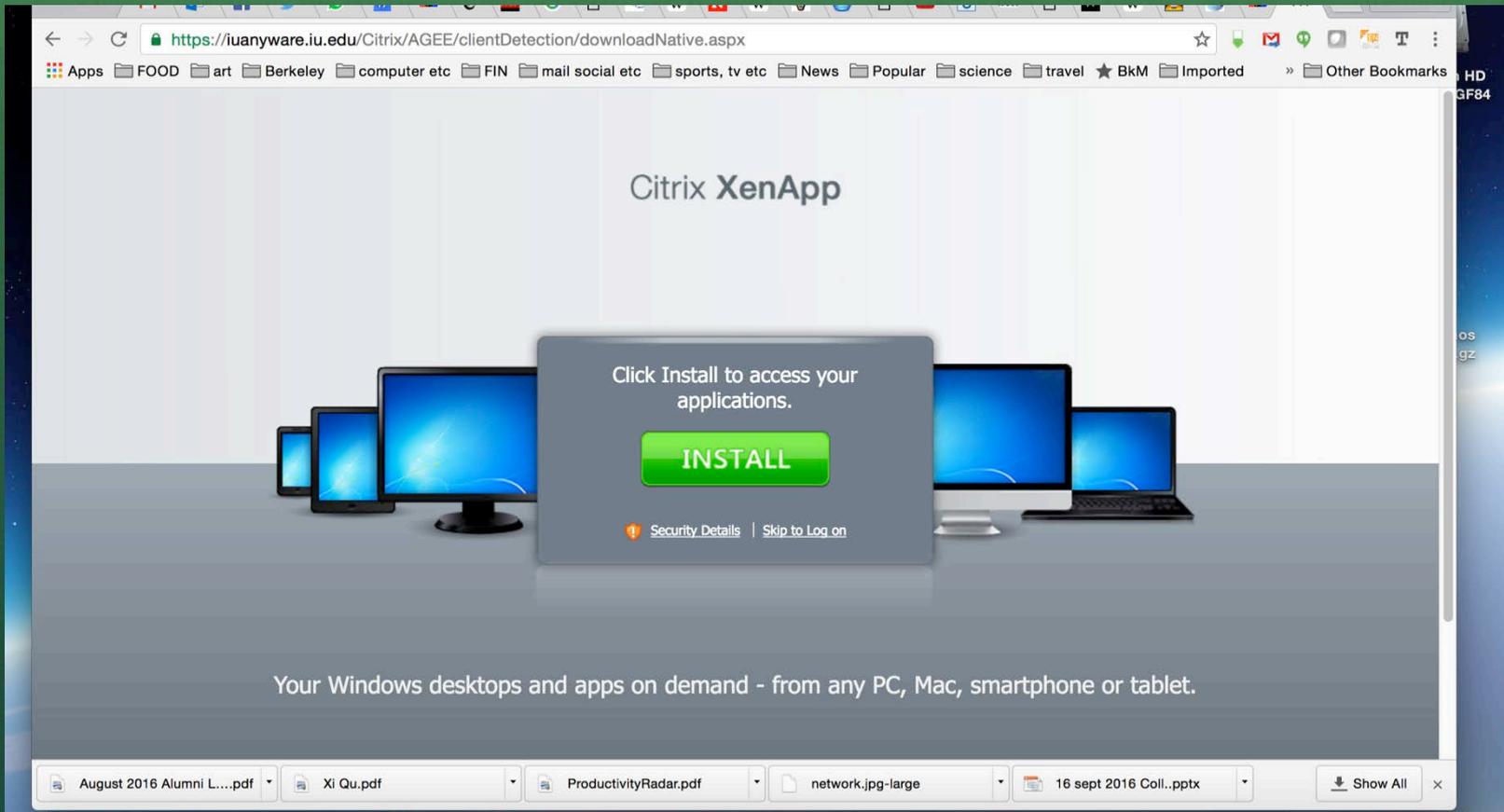
- A red link: [Learn more about Intellus Learning.](#)
- IU Online Virtual PC (vPC)**
IU Online vPC leverages a robust Citrix cloud storage environment to provide a customized virtual desktop for online students. It allows students to use performance data applications such as R Studio, ArcGIS, Stata, and SPSS. IU Online vPC pairs the latest Citrix XenDesktop environment with performance-tuned, high-speed data servers within IU's state-of-the-art data center.
- A red link: [Request more information about the IU Online vPC evaluation.](#)
- Realize IT**
Realize IT is an intelligent learning system that adapts and responds to the individual's personal learning needs. It is currently being evaluated in two courses at IU Bloomington as part of the IU Online initiative.
- A red link: [Learn more about Realize IT.](#)
- Interactive Video**
- Kaltura In-video Quizzing**
Kaltura, IU's video hosting platform, integrates tightly with Canvas to provide video within courses. Kaltura has a new in-video quizzing function that allows instructors to place multiple choice questions within a video. The scores from the questions can be passed back to the Canvas grade book if desired.

The taskbar at the bottom shows several open applications: 'launch.ica', 'August 2016 Alumni L...', 'Xi Qu.pdf', 'ProductivityRadar.pdf', and 'network.jpg-large'. A 'Show All' button is visible on the right side of the taskbar.

A Solution (contd.)

- Indiana University is at the forefront of computing, especially cloud computing with its cloud based software delivery
- IU has several supercomputers that help tens of thousands of students, faculty, staff and guests access IU software
- Similar to AWS (Amazon Web Services) IU provides virtual PC windows that can be accessed by any browser like Chrome with a readily downloadable add-on from Citric™ Corporaation

Screenshots ...



https://iuanyware.iu.edu/Citrix/AGEE/site/default.aspx?CTX_CurrentTab=Desktops

Apps FOOD art Berkeley computer etc FIN mail social etc sports, tv etc News Popular science travel BkM Imported Other Bookmarks

Search

Logged on as: rbanerje

Messages

Settings

Log Off



Applications

Desktops

Adobe CC 2014 NVIDIA Pilot



AT Desktop



IU Online vPC



IUB



IUPUI



Regional





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August 2016 Alumni L....pdf

Xi Qu.pdf

ProductivityRadar.pdf

network.jpg-large

16 sept 2016 Coll..pptx

Show All

https://iuanyware.iu.edu/Citrix/AGEE/site/default.aspx?CTX_CurrentTab=Desktops

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AT Desktop



IU Online vPC



IUB



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launch.ica August 2016 Alumni L...pdf Xi Qu.pdf ProductivityRadar.pdf network.jpg-large Show All

Welcome

Windows 7 Enterprise

launch.ica

August 2016 Alumni L....pdf

Xi Qu.pdf

ProductivityRadar.pdf

network.jpg-large

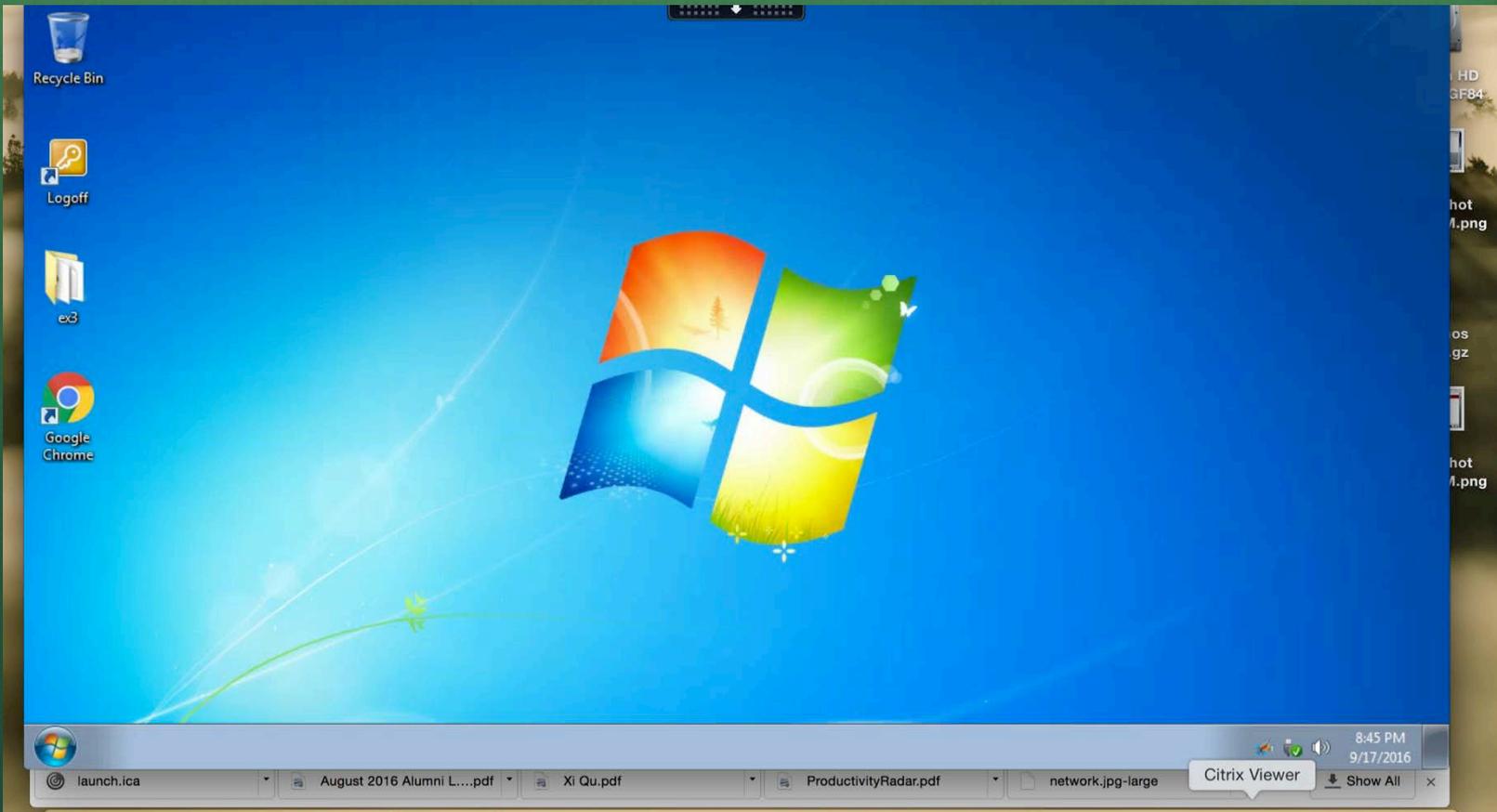
Show All

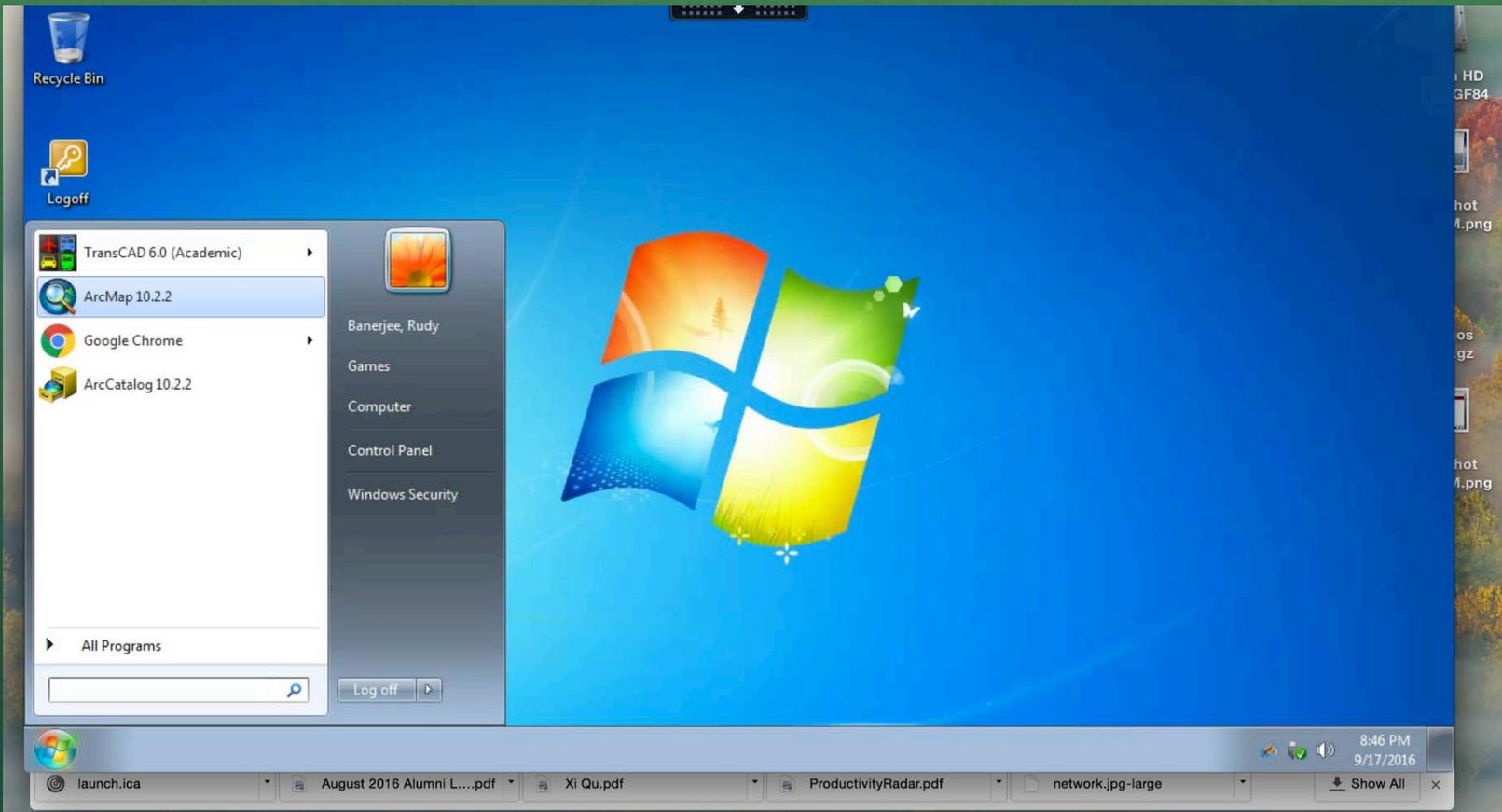
HD
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Recycle Bin



Logoff



ex3



Google Chrome

ArcGIS® ArcMap™
10.2.2
Initializing Application...



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launch.ica

August 2016 Alumni L....pdf

Xi Qu.pdf

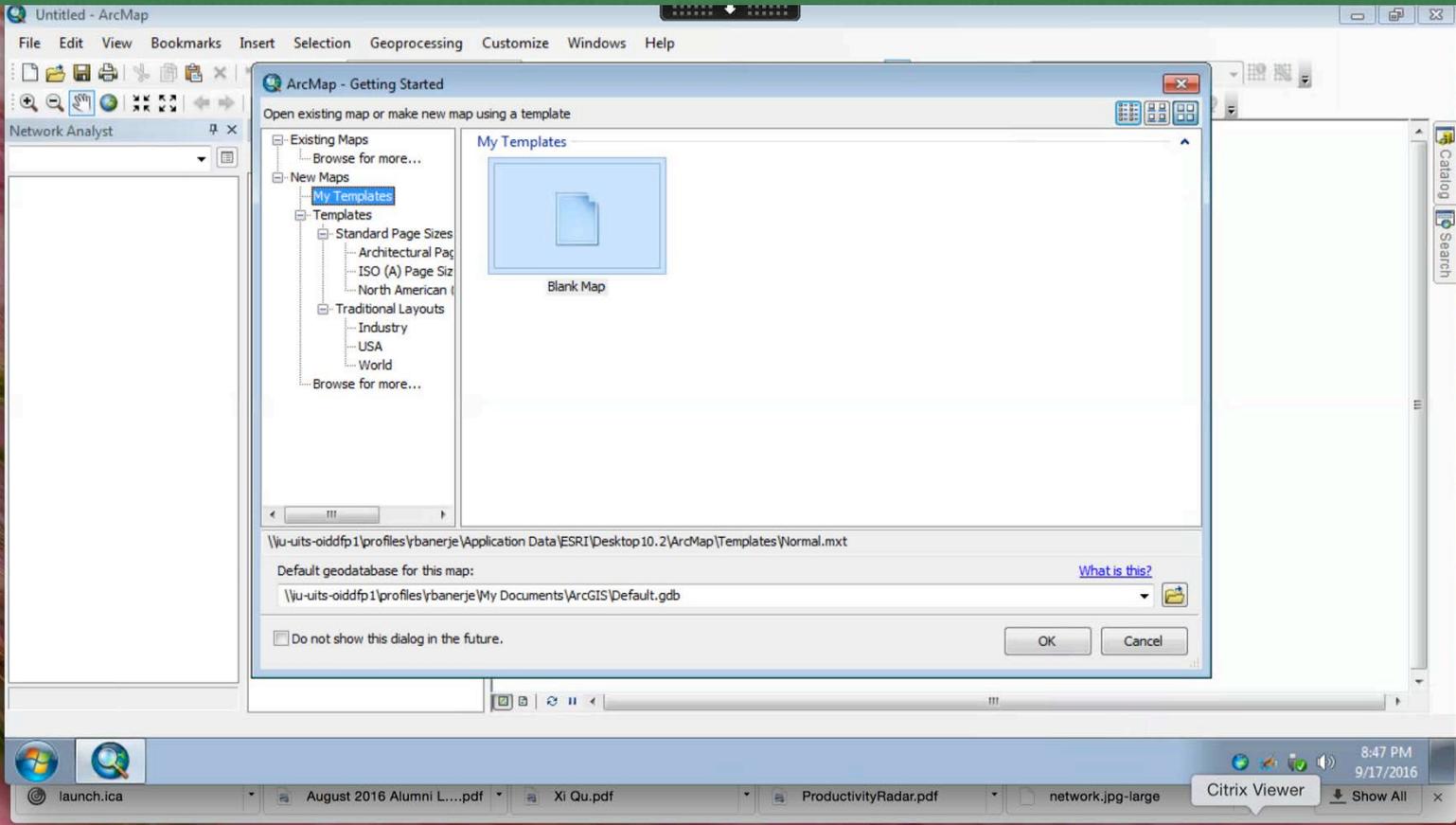
ProductivityRadar.pdf

network.jpg-large

Show All



8:46 PM
9/17/2016



stackoverflow.com/questions/1857244/what-are-the-differences-between-np-np-complete-and-np-hard

Apps FOOD art Berkeley computer etc FIN mail social etc sports, tv etc News Popular science travel ★ BkM Imported » Other Bookmarks

Problem Type	Verifiable in P time	Solvable in P time	Increasing Difficulty
P	Yes	Yes	↓ V
NP	Yes	Yes or No *	
NP-Complete	Yes	Unknown	
NP-Hard	Yes or No **	Unknown ***	

Notes on Verifiable or not:

- * An NP problem that is also P is solvable in P time.
- ** An NP-Hard problem that is also NP-Complete is verifiable in P time.
- *** NP-Complete problems (all of which form a subset of NP-hard) might be. The rest of NP hard is not.

I also found [this diagram](#) quite useful in seeing how all these types correspond to each other (pay more attention to the left half of the diagram).

share improve this answer

edited Jul 23 '15 at 14:35

answered Oct 22 '13 at 6:08

 nbro

 Johnson Wong

file_show (2).xlsx

file_show (1).xlsx

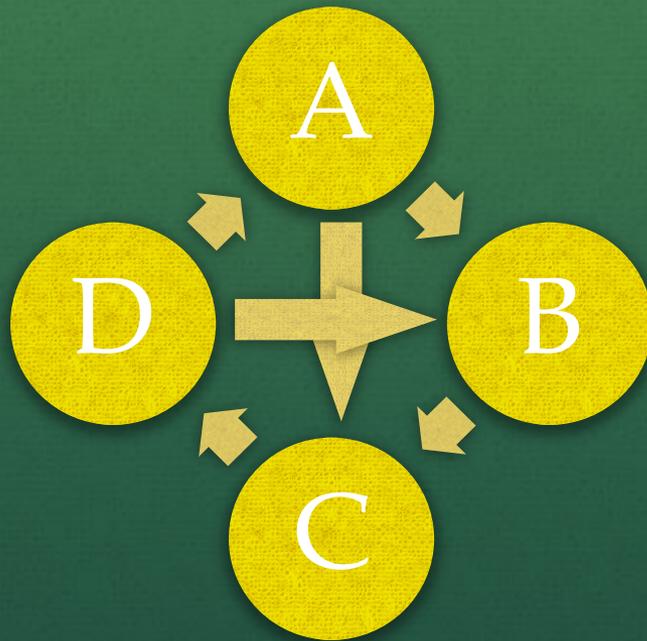
file_show.xlsx

launch.ica

August 2016 Alumni L...pdf

Show All

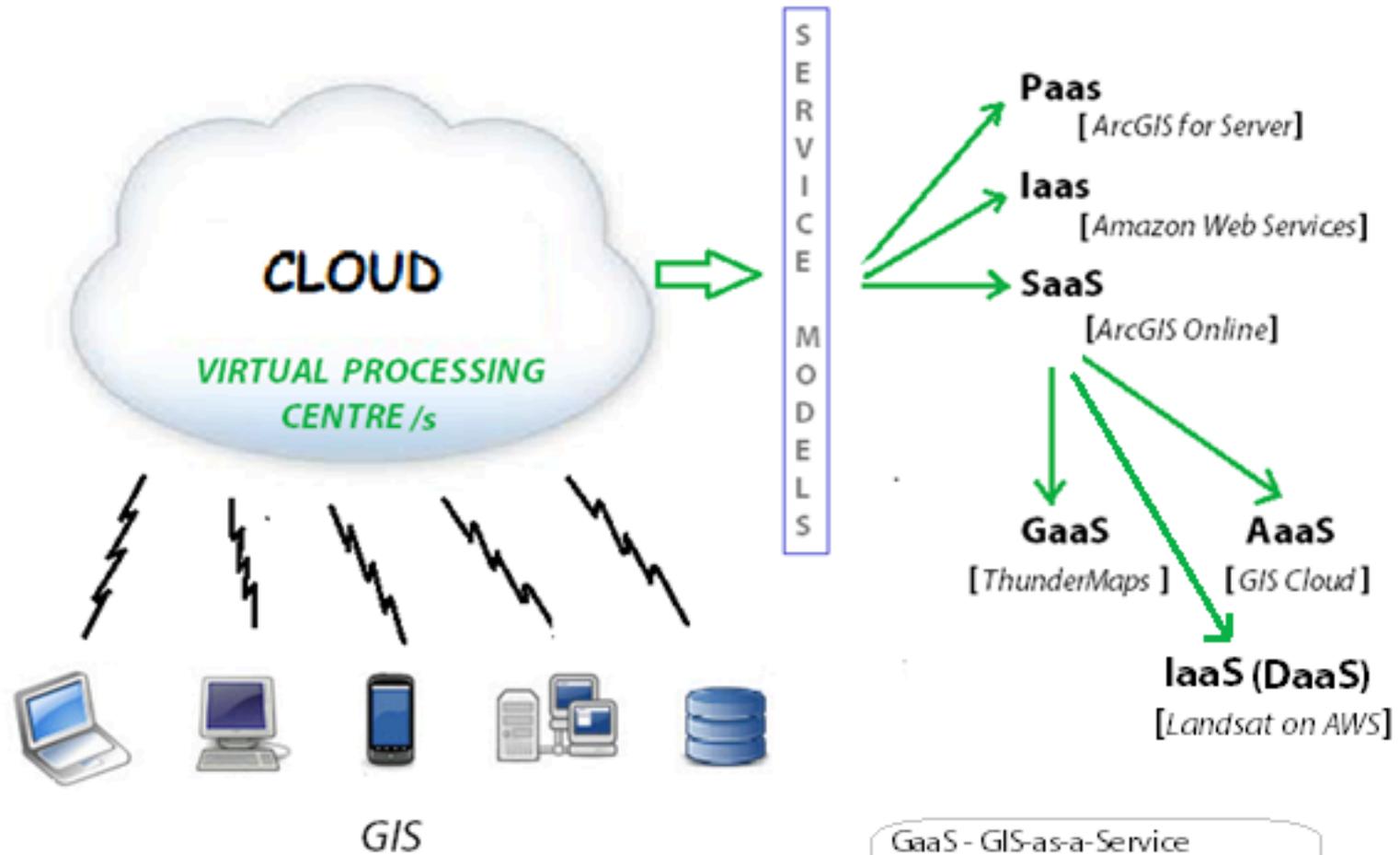
Explosive growth?



1	1
2	2
3	6
4	24
5	120
6	720
7	5,040
8	40,320
9	362,880
10	3,628,800
11	39,916,800
12	479,001,600
13	6,227,020,800
14	87,178,291,200
15	1,307,674,368,000
16	20,922,789,888,000
17	355,687,428,096,000
18	6,402,373,705,728,000
19	121,645,100,408,832,000
20	2,432,902,008,176,640,000
21	51,090,942,171,709,400,000
22	1,124,000,727,777,610,000,000
23	25,852,016,738,885,000,000,000
24	620,448,401,733,239,000,000,000
25	15,511,210,043,331,000,000,000,000
26	403,291,461,126,606,000,000,000,000
27	10,888,869,450,418,400,000,000,000,000
28	304,888,344,611,714,000,000,000,000,000
29	8,841,761,993,739,700,000,000,000,000,000
30	265,252,859,812,191,000,000,000,000,000,000
31	8,222,838,654,177,920,000,000,000,000,000,000
32	263,130,836,933,694,000,000,000,000,000,000,000
33	8,683,317,618,811,890,000,000,000,000,000,000,000
34	295,232,799,039,604,000,000,000,000,000,000,000,000
35	10,333,147,966,386,100,000,000,000,000,000,000,000,000
36	371,993,326,789,901,000,000,000,000,000,000,000,000,000
37	13,763,753,091,226,300,000,000,000,000,000,000,000,000,000
38	523,022,617,466,601,000,000,000,000,000,000,000,000,000,000
39	20,397,882,081,197,400,000,000,000,000,000,000,000,000,000,000
40	815,915,283,247,898,000,000,000,000,000,000,000,000,000,000,000

Quathordecillion

The cloud computing environment offers three base service models – Software-as-a-Service (SaaS); Platform-as-a-Service (PaaS); and Infrastructure-as-a-Service (IaaS).



HARDWARE + SOFTWARE + PEOPLE + DATA + APPLICATIONS

GaaS - GIS-as-a-Service
AaaS - Applications-as-a-Service
IaaS - Imagery-as-a-Service

*We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.*

(T. S. Eliot)

End