



Unpacking the 3rd D in 3D

Re-imagining the graph

ESRI USER CONFERENCE

12th July 2017

David Kelly & Milos Pelikan

JACOBS®

www.jacobs.com | worldwide

Why are we here?

fo·cus

/ˈfōkəs/ ⓘ

noun

1. the center of interest or activity.
"this generation has made the environment a focus of attention"
synonyms: center, focal point, central point, center of attention, hub, pivot, nucleus, heart, core, cornerstone, linchpin, cynosure
"schools are a focus of community life"
2. the state or quality of having or producing clear visual definition.
"his face is rather out of focus"
synonyms: focal point, point of convergence [More](#)

verb

1. (of a person or their eyes) adapt to the prevailing level of light and become able to see clearly.
"try to focus on a stationary object"
2. pay particular attention to.
"the study will focus on a number of areas in Wales"

per·cep·tion

/pərˈsepSH(ə)n/ ⓘ

noun

- the ability to see, hear, or become aware of something through the senses.
"the normal limits to human perception"
- the state of being or process of becoming aware of something through the senses.
"the perception of pain"
synonyms: recognition, awareness, consciousness, appreciation, realization, knowledge, grasp, understanding, comprehension, apprehension, formal cognizance
"our perception of our own limitations"
 - a way of regarding, understanding, or interpreting something; a mental impression.
"Hollywood's perception of the tastes of the American public"
synonyms: impression, idea, conception, notion, thought, belief, judgment, estimation
"popular perceptions of old age"

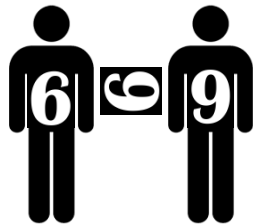
focus
on the
goal...

re·in·ter·pret

/ˌrēɪnˈtɜrpɪt/ ⓘ

verb

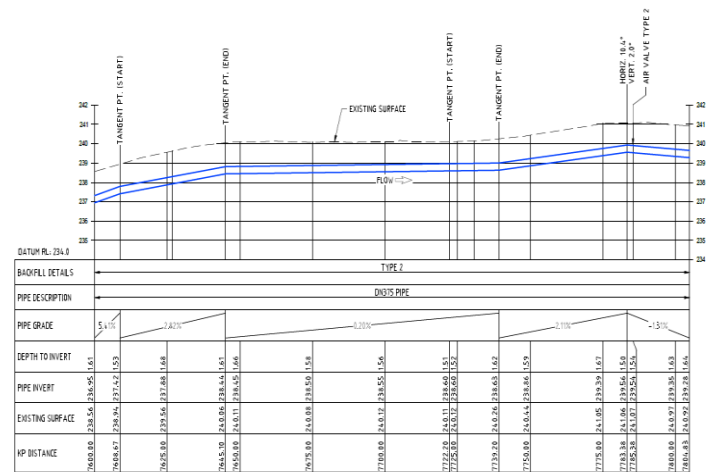
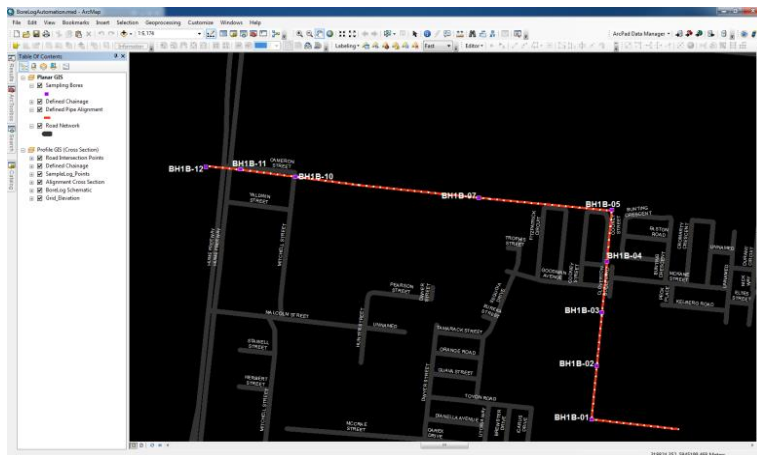
interpret (something) in a new or different way.

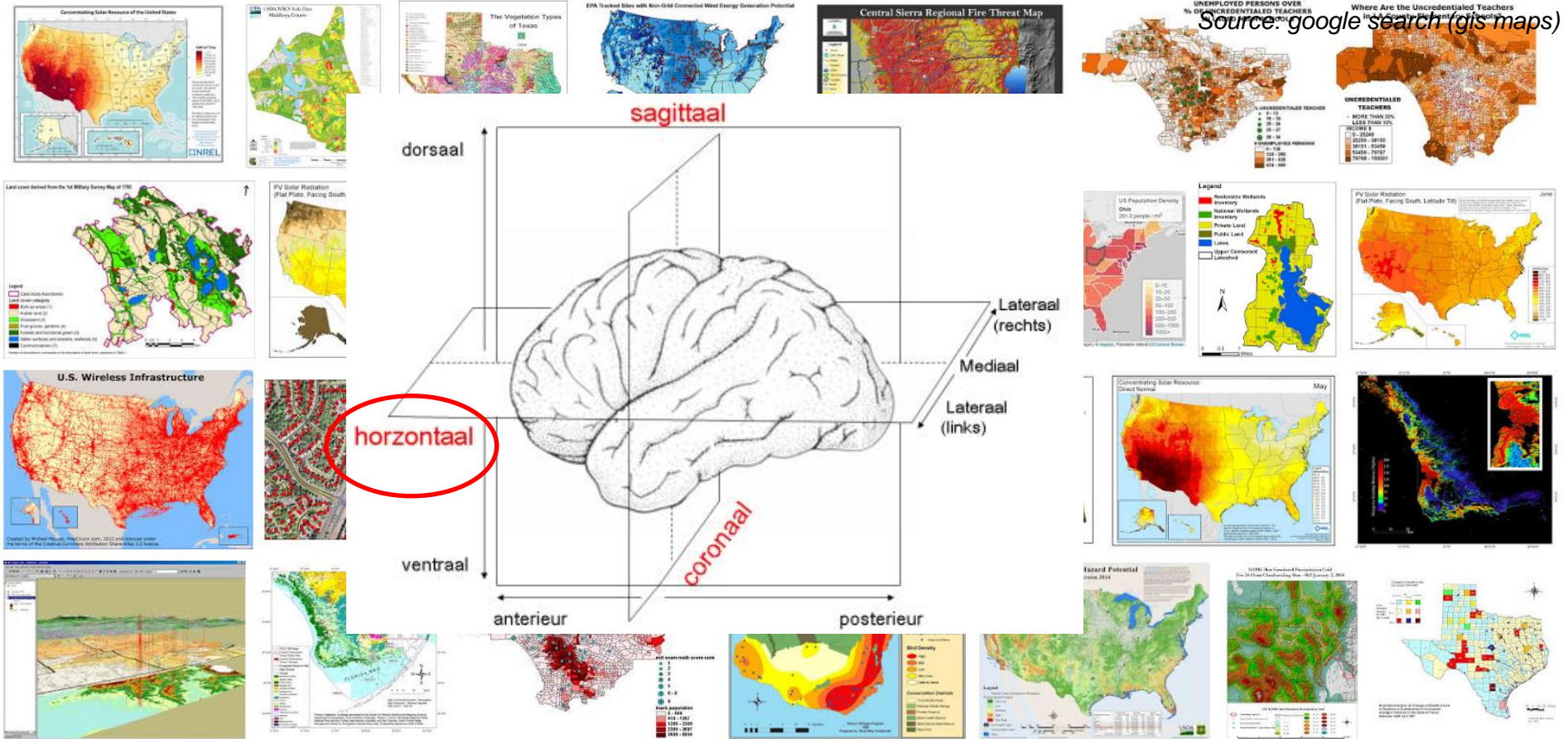
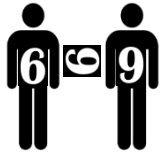


3



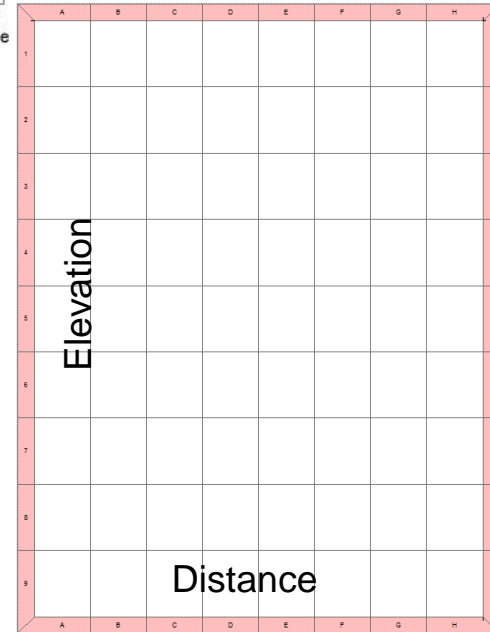
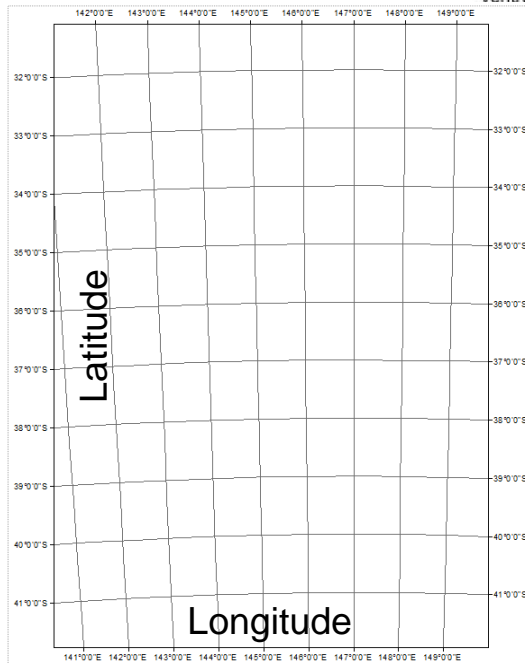
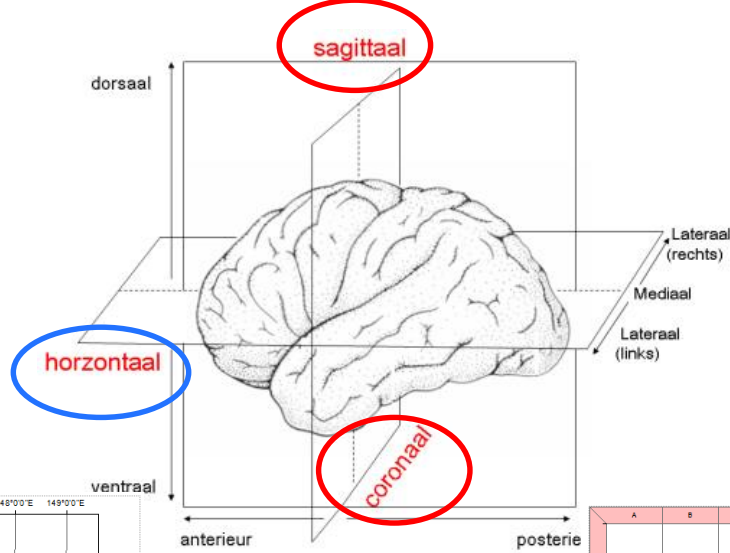
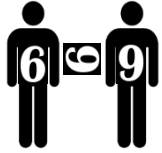
BoreLog									
	PointID	Depth	GEOL_BASE	GEOL_LEG	GEOL_CON	GEOL_ORG	GEOL_ORG	GEOL_OR	GEOL_OR
BH1B-10	0.8	1.9	BASALT	0	SW				
BH1B-10	1.9	2.1	CORE LOSS	0					
BH1B-10	2.1	7.3	BASALT	0	EW	-		SW	
BH1B-10	7.3	7.6	CORE LOSS	0					
BH1B-10	7.6	8.5	BASALT	0	EW	-		SW	
BH1B-10	8.5	8.6	CORE LOSS	0					
BH1B-10	8.6	9.45	BASALT	0	MW	-		HW	
BH1B-10	9.45	9.5	CORE LOSS	0					
BH1B-10	9.5	11.5	BASALT	0	HW	-		RK	
BH1B-10	11.5	11.55	CORE LOSS	0					
BH1B-10	11.55	12.45	BASALT	0	RK				
BH1B-10	12.45	12.7	CORE LOSS	0					
BH1B-10	12.7	13	BASALT	0	MW	-		RK	
BH1B-11	0	0.55	CH	0	F				
BH1B-11	0.55	0.67	CH	0	RS				
BH1B-11	0.67	7.7	BASALT	0	EW	-		RK	
BH1B-11	7.7	7.8	CORE LOSS	0					
BH1B-11	7.8	13	BASALT	0	EW	-		RK	
BH1B-12	0	0.6	CH	0	RS				
BH1B-12	0.6	1.96	BASALT	0	EW	-		SW	
BH1B-12	1.96	2.26	CORE LOSS	0					
BH1B-12	2.26	2.6	BASALT	0	HW	-		MW	
BH1B-12	2.6	2.9	CORE LOSS	0					
BH1B-12	2.9	7.9	BASALT	0	HW	-		SW	
BH1B-12	7.9	8	CORE LOSS	0					
BH1B-12	8	8.3	BASALT	0	MW	-		RK	
BH1B-12	8.3	8.7	CORE LOSS	0					
BH1B-12	8.7	9.3	BASALT	0	EW	-		HW	
BH1B-12	9.3	9.5	CORE LOSS	0					
BH1B-12	9.5	10.2	BASALT	0	EW	-		RK	
BH1B-12	10.2	10.72	CORE LOSS	0					





per·cep·tion

/pər'sepSH(ə)n/ 



Planar GIS

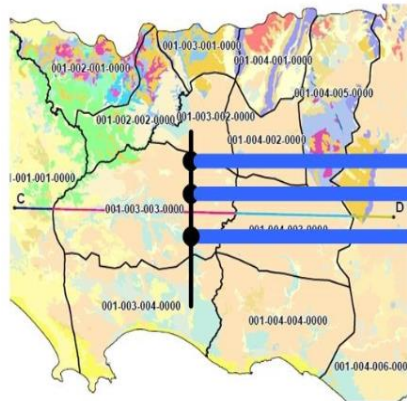
Can we do this?

Yes we can!

Profile GIS

re·in·ter·pret

/ˌrēɪnˈtɜrpɪt/ 



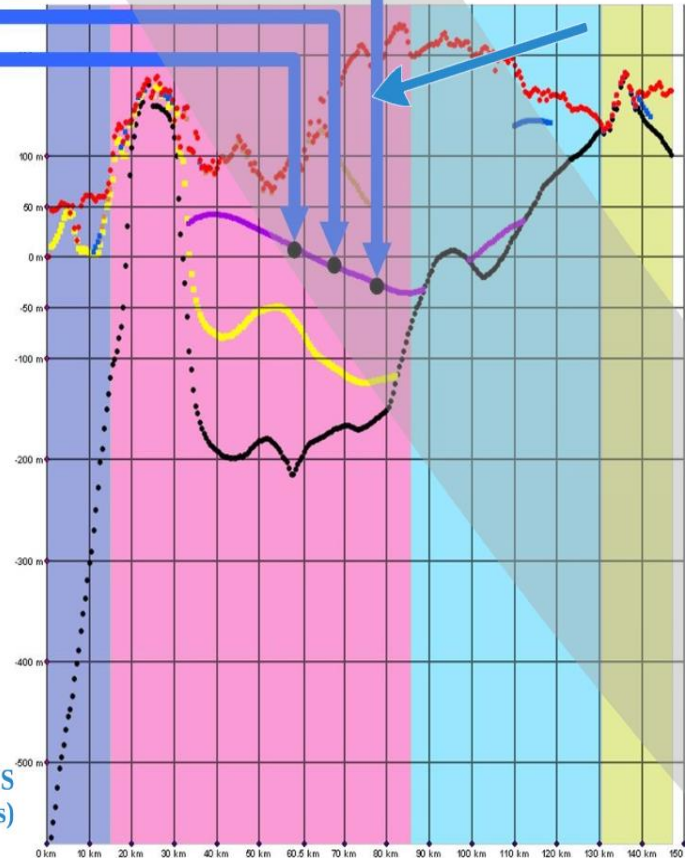
Planar GIS
Multiple datasets (aquifers surfaces)

Transform planar
coordinates to profile
coordinates

Source: ESRI

Legend

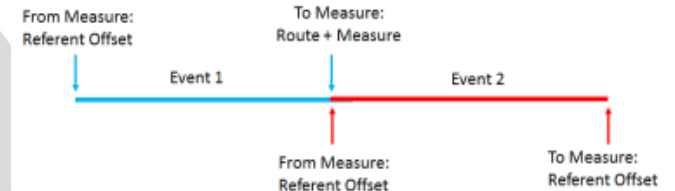
- L00 - Surface
- L01 - Upper Tertiary Aquifer
- L02 - Upper Middle Tertiary Aquifer
- L03 - Lower Middle Tertiary Aquifer
- L04 - Lower Tertiary Aquifer
- L99 - Basement



Profile GIS
One dataset - (aquifer profiles)

Linear Referencing

- Route
- Events
- Measures

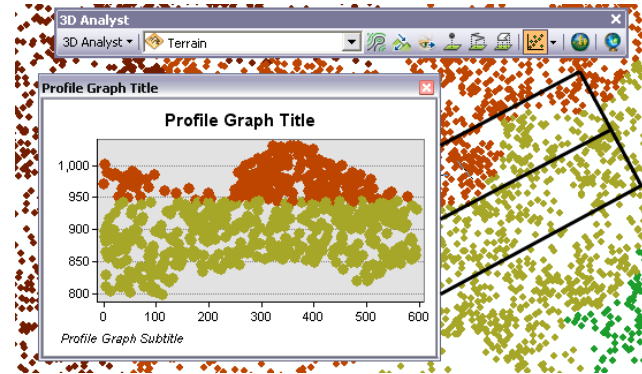


This is a database
NOT a graph!

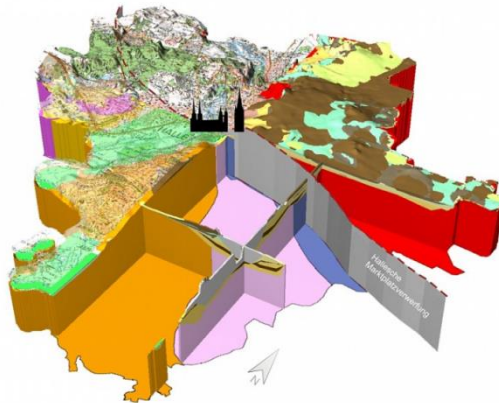
JACOBS

Why aren't we using ESRI graphing capability?

- We want a graph that is **data** not a picture
- We want to be able to **exaggerate** in both dimensions
- We want to **close the loop**



Source: ESRI

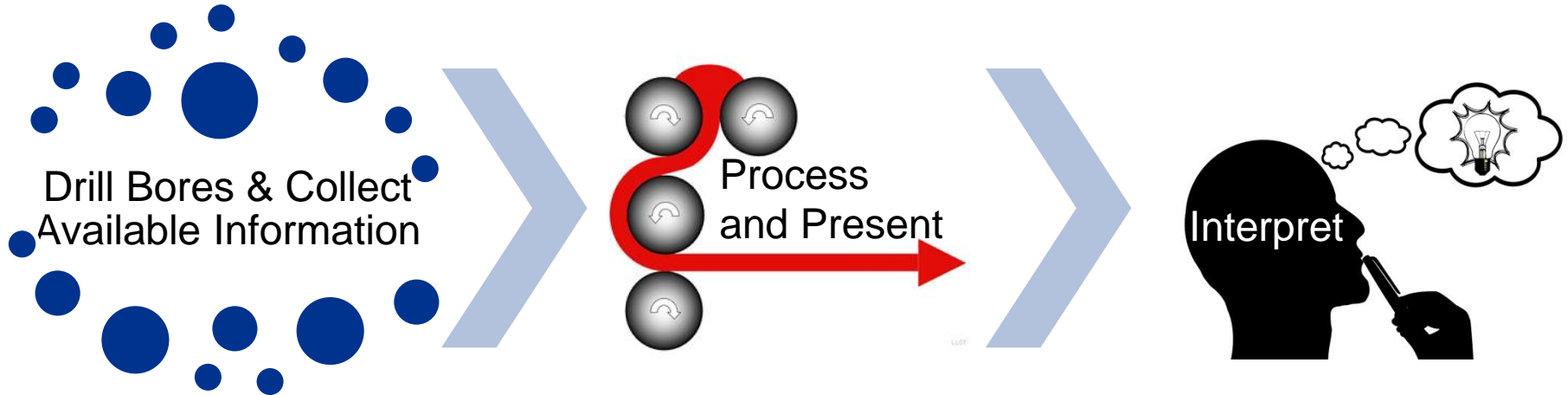


Why aren't we using 3D?

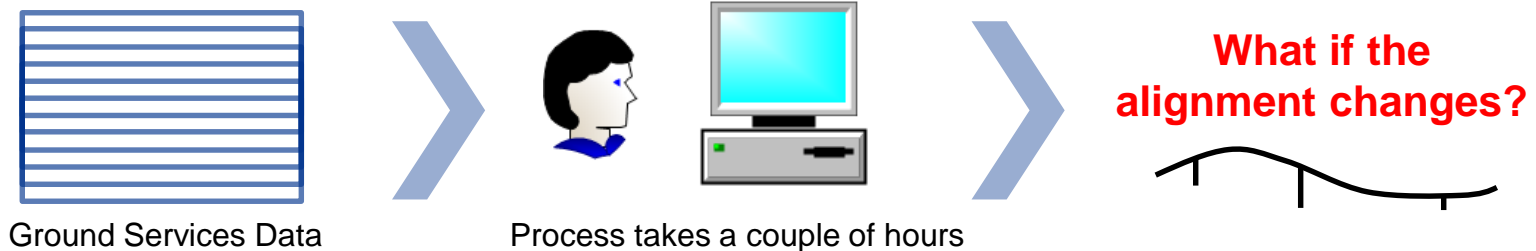
- Focus is the **3rd D**
- **Scale** differences
- **Perspective** is not great for measuring
- **Solids** hide information
- Special tech / expertise / \$ required

And now back to the problem...

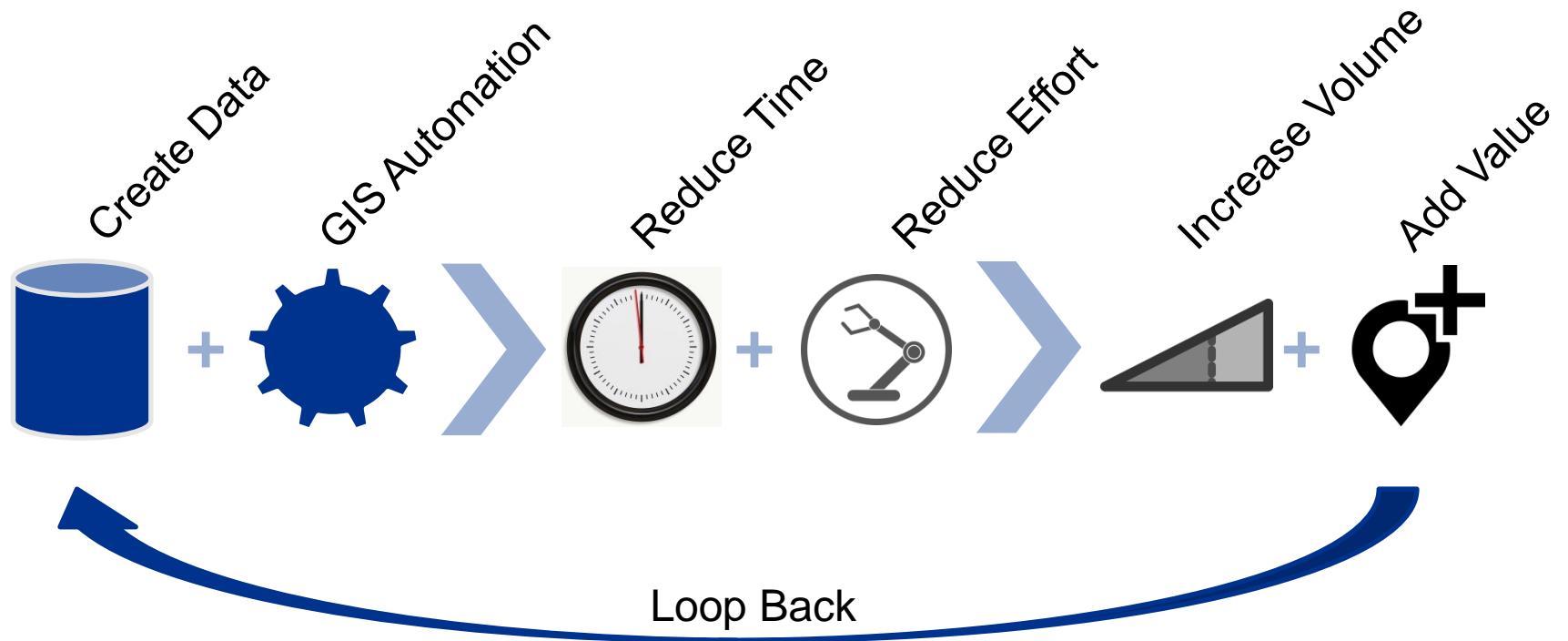
need to understand the underground conditions



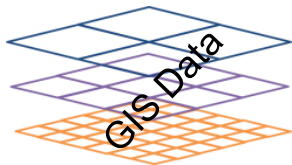
draw cross section in CAD by hand



We are going to....

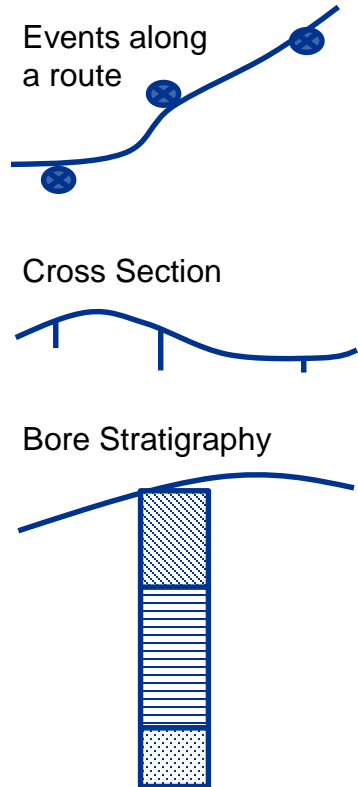
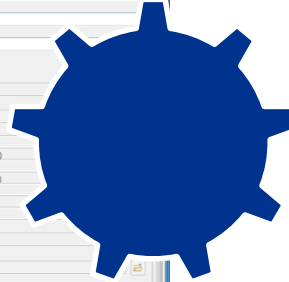
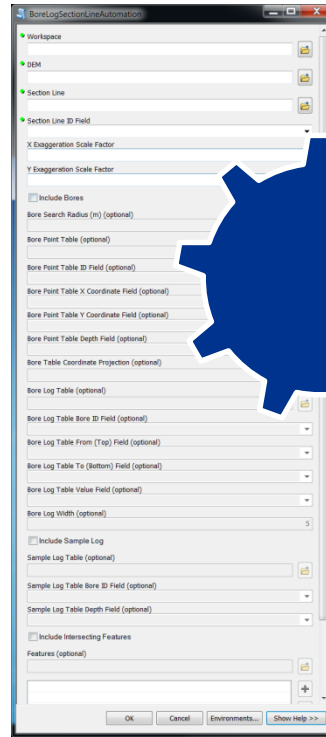


The process diagram...



Bore Log Data

GridRefID	PointID	HoleDepth	HOLE_TYPE	HOLE_TERM	HOLE_LOCA	East	North	Elevation
16 BH0191	3 BH	Target depth				728977	5742685	252
17 BH0192	3 BH	Target depth				729655	5742677	234.5
18 BH0193	3 BH	Target depth				729656	5742727	237.5
21 BH0194	3 BH	Target depth				730351	5742612	256
22 BH0195	3 BH	Target depth				730668	5742619	256
23 BH0196	3 BH	Target depth				731330	5742606	254
24 BH0197	3 BH	Target depth				731708	5742628	240
25 BH0198	3 BH	Target depth				732252	5742619	240
26 BH0199	3 BH	Target depth				733001	5742795	238.5
27 BH0199	3 BH	Target depth				733448	5742612	231
28 BH0111	3 BH	Target depth				733780	5743027	230.5
29 BH0112	3 BH	Target depth				734542	5742696	234.5
30 BH0113	3 BH	Target depth				734825	5742681	199.5
31 BH0114	3 BH	Target depth				734852	5742619	195

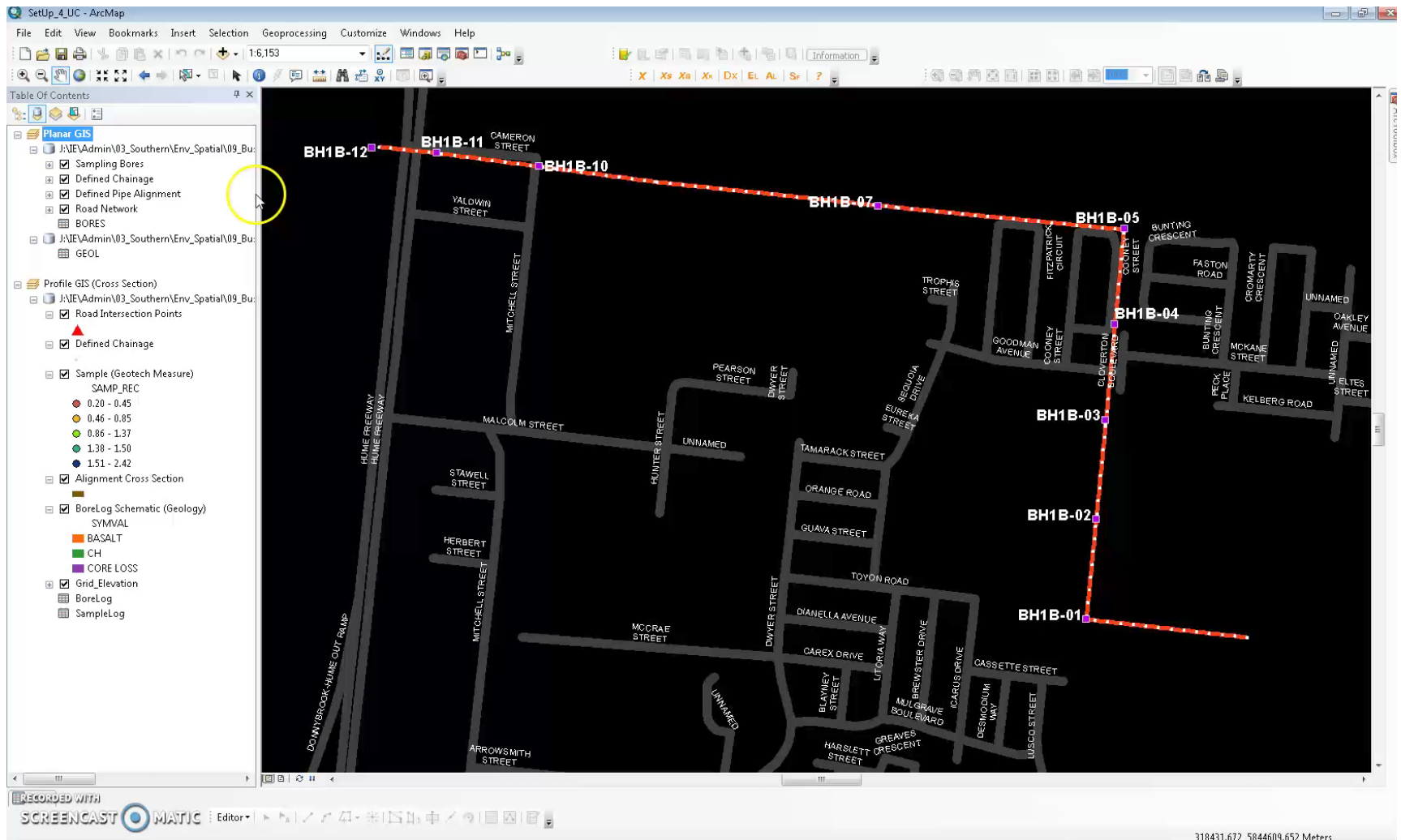


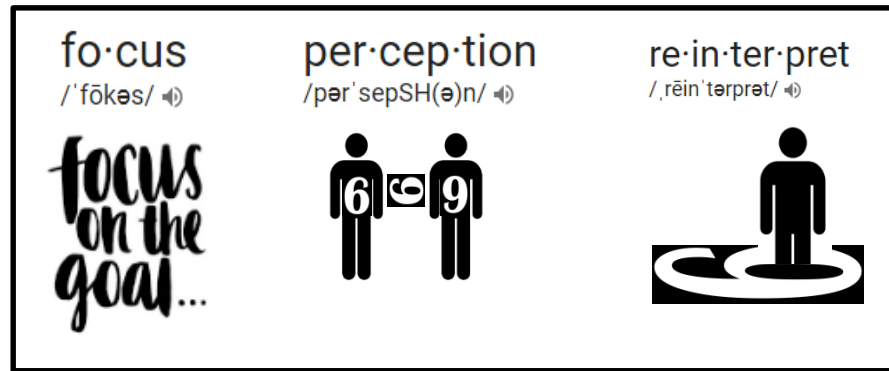
Route Events

DTM Extraction

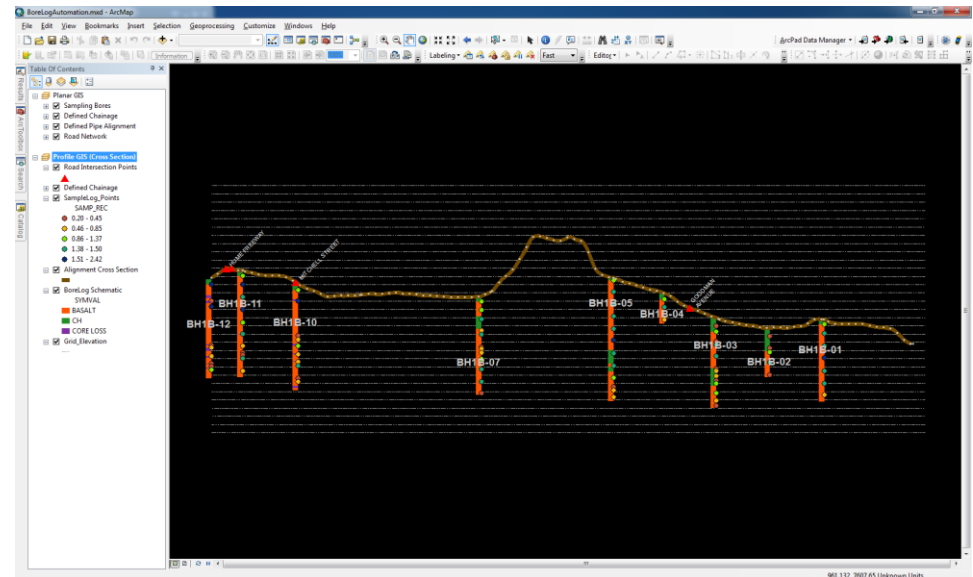
Profile Projection

Demo Video



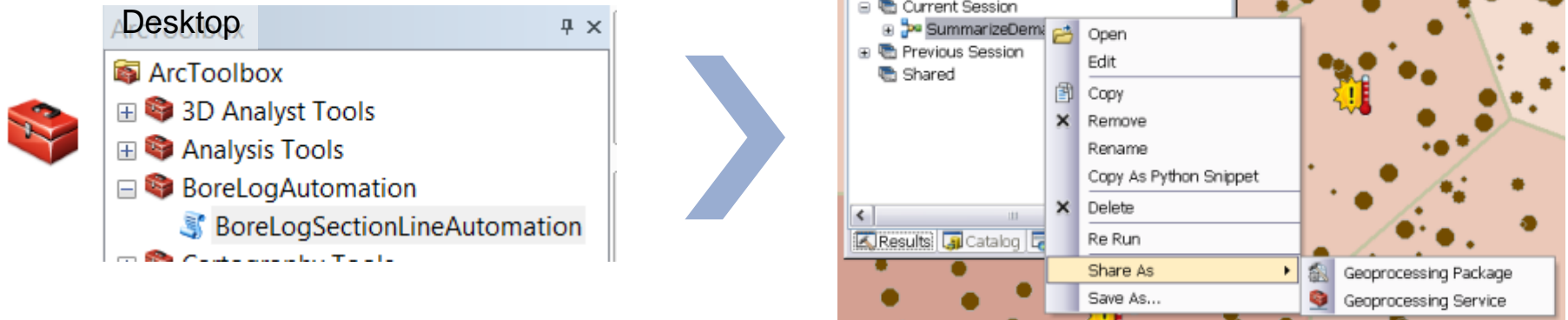


- Metrics
 - Was: Few Hours
 - Now: Few Minutes
- Reduced effort
- Increased production volume
- Add value
 - Graphs re-imagined as data
- Loop back



Future Development

- Self-service desktop tool
- Online geoprocessing service



© ESRI, 2017

Disclaimer

Important

The material in this presentation has been prepared by Jacobs®.

Copyright and other intellectual property rights in this presentation vest exclusively with Jacobs. Apart from any use permitted under applicable copyright legislation, no part of this work may in any form or by any means (electronic, graphic, mechanical, photocopying, recording or otherwise) be reproduced, copied, stored in a retrieval system or transmitted without prior written permission.

Jacobs is a trademark of Jacobs Engineering Group Inc.

© Copyright

June 22, 2017

Jacobs Engineering Group Inc. All rights reserved.

Unpacking the 3rd D in 3D

Acknowledgements:

Jacobs – Milos Pelikan, John Delamore