

Acerca da Bentley



A missão da Bentley é fornecer soluções inovadoras de software às empresas e profissionais que planeiam, dimensionam, constroem e operam a infraestrutura em todo o Mundo, garantindo a sustentabilidade econômica e ambiental para a melhoria da qualidade de vida

An aerial illustration of an industrial complex. In the foreground, a large dam spans across a river. To the right of the dam is a power plant with several large spherical storage tanks and various piping. Further right is a process plant with more complex piping and structures. In the background, there are power transmission towers and a road with a truck. In the bottom left, a ship with colorful cargo is docked at a pier. In the bottom center, an offshore oil platform is shown on the water, supported by several large concrete pillars. A helicopter is flying nearby. To the right of the platform, another tall offshore structure is visible.

POWER PLANTS

- AutoPLANT
- OpenPlant
- AutoPIPE
- STAAD
- ProStructures
- Raceway and Cable Management
- AECOSim
- RAM
- gINT
- Descartes
- GEOPAK
- InRoads
- Bentley Map

PROCESS PLANTS

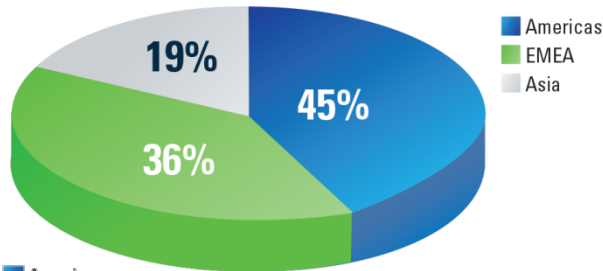
- OpenPlant
- AutoPLANT
- eB
- Raceway and Cable Management
- promis.e
- AutoPIPE
- ProStructures
- STAAD

OFFSHORE

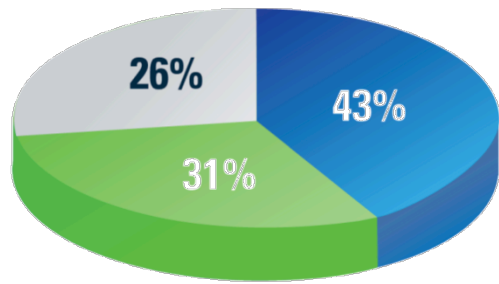
- SACS
- FormSys
- AutoPIPE
- STAAD
- ProStructures
- ConstructSim

Um Empresa Verdadeiramente Global

REVENUE BY REGION 2012



GLOBAL DISTRIBUTION OF BENTLEY COLLEAGUES

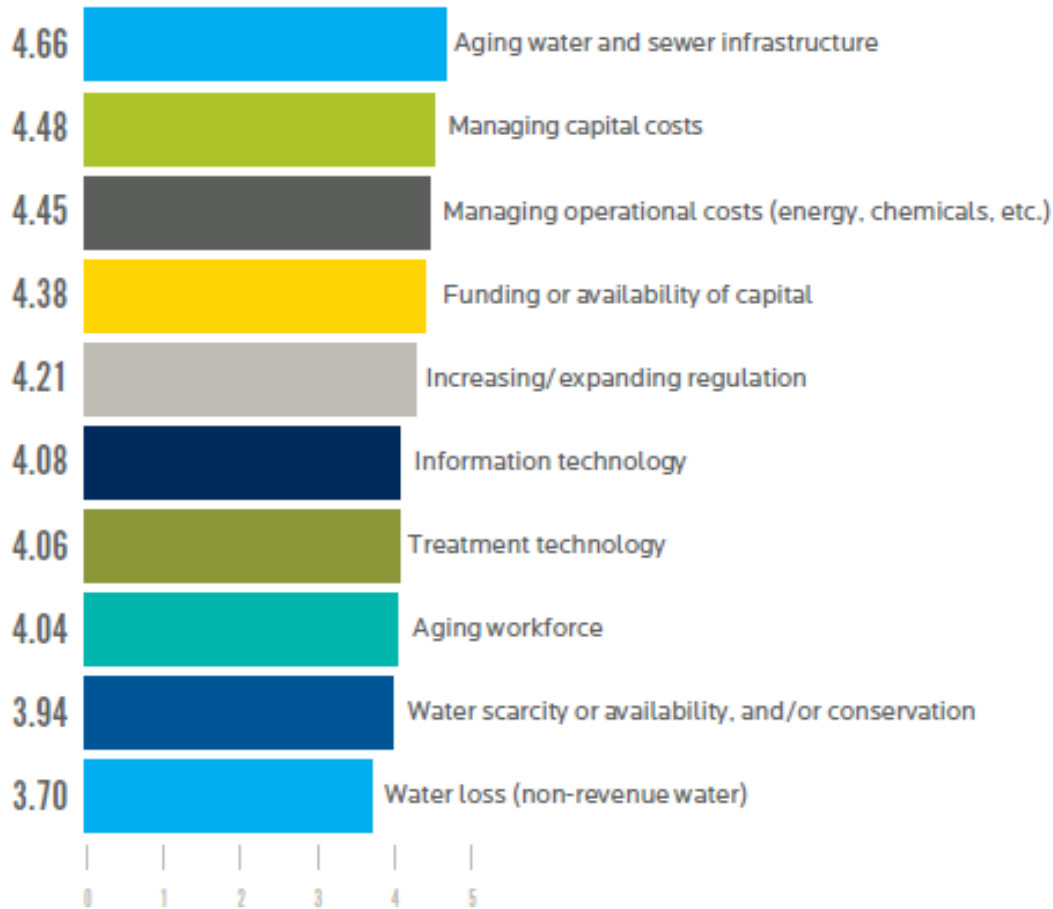


Representative *Be Inspired* Winning Projects

- 1** John A. Martin & Associates, Inc. LAX Terminal Expansion Los Angeles, CA, U.S.A.
- 2** CH2M HILL Northern Wastewater Treatment Plant Denver, CO, U.S.A.
- 3** Modjeski and Masters, Inc. Huey P. Long Bridge Widening New Orleans, LA, U.S.A.
- 4** Zetton, Inc. Modular GTL Plant Aracaju, Brazil
- 5** Taylor Woodrow-BAM Nuttall JV Victoria Station Upgrade Jet Grouting London, U.K.
- 6** Sweco AB Hailandsås "Live BIM" Railway Project Förstöv to Båstad, Sweden
- 7** AzerSU OJSC GIS-based Infrastructure Asset Management Baku, Azerbaijan
- 8** Saudi Electricity Company/Nahil Computer Company Kingdom-wide EDMS Saudi Arabia
- 9** Petra Diamonds Limited Finsch GIS Lime Acres, South Africa
- 10** HydroChina Zhongnan Engineering Corp. Pumped Storage Power Station Zunyi, China
- 11** Nippon Steel & Sumikin Engineering Tokyo International Airport re-expansion Tokyo, Japan
- 12** Parsons Brinkerhoff and Arup JV Airport Link and Northern Busway Brisbane, Australia

Preocupações – Top 10

FIGURE 4
TOP 10 INDUSTRY ISSUES

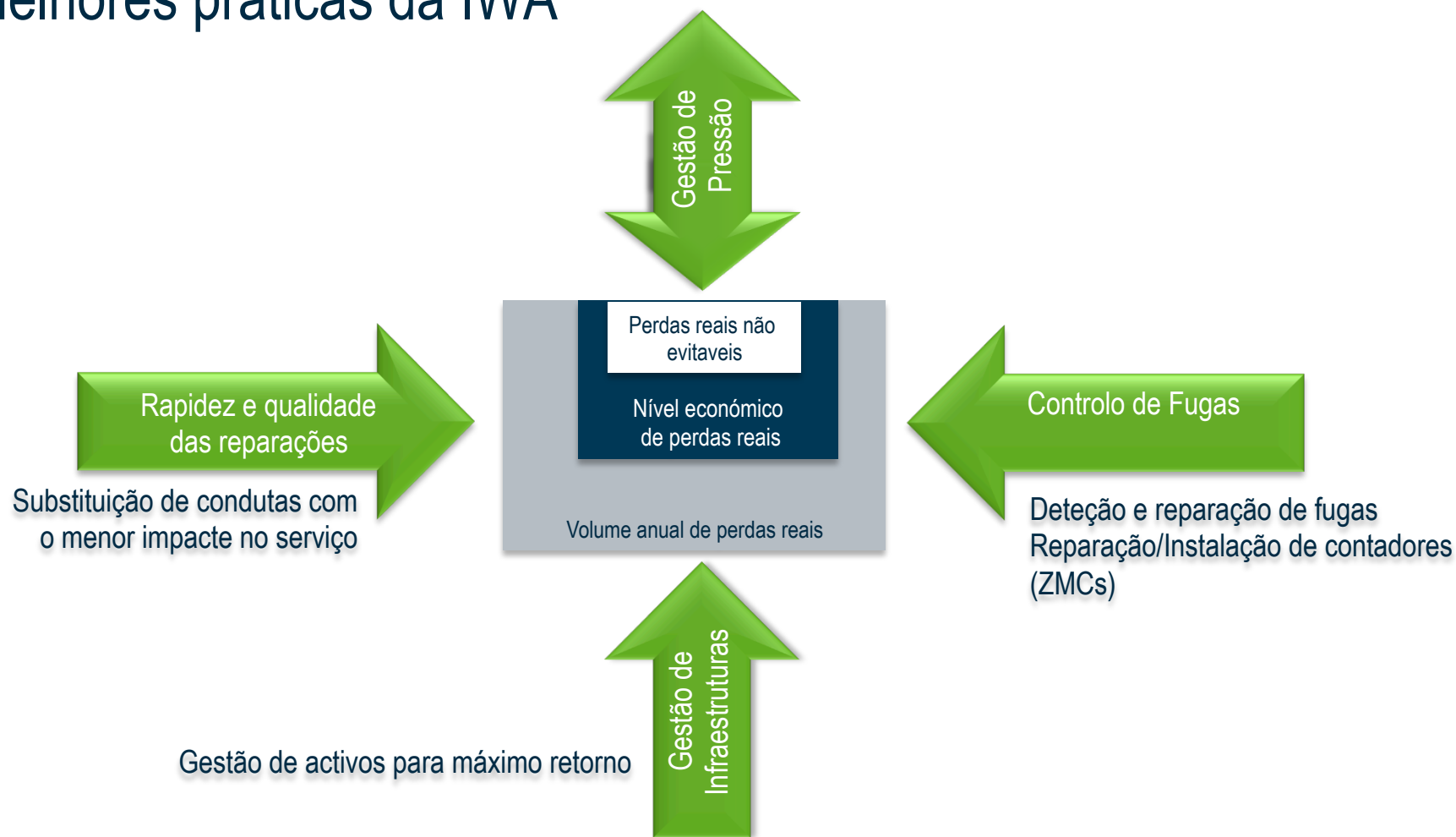


Source: Black & Veatch

Participants were asked to rate the importance of each issue using a scale of 1 to 5, where 1 indicates "Very Unimportant" and 5 indicates "Very Important."

Uma estratégia de longo prazo com benefícios imediatos

Melhores práticas da IWA



Modelos !!

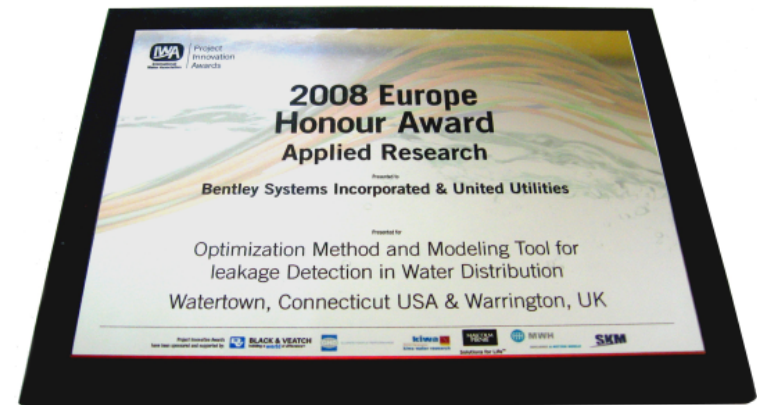
$$H = z + \frac{p}{\rho g} + \frac{v^2}{2g} = h + \frac{v^2}{2g},$$

Análise, Planeamento, Previsão e
Performance

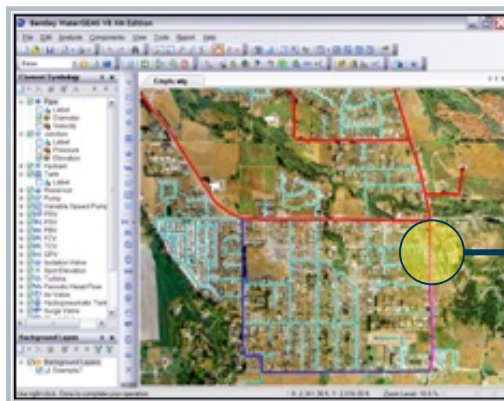
Controlo Activo de Perdas

DARWIN CALIBRATOR

- Solução inovadora para deteção de fugas
- Indica os pontos críticos de fuga (localização e quantidade)

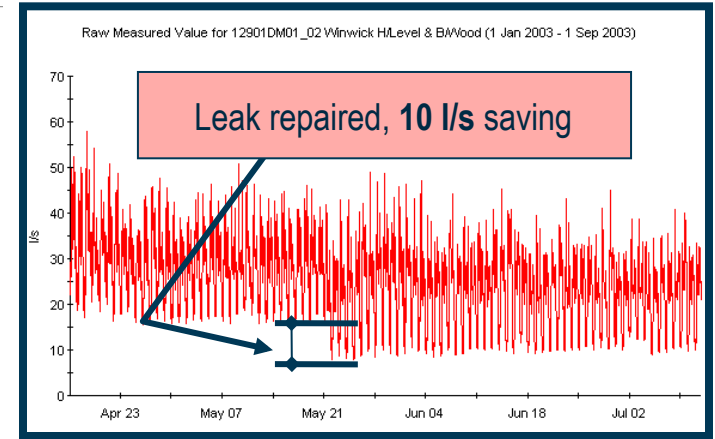
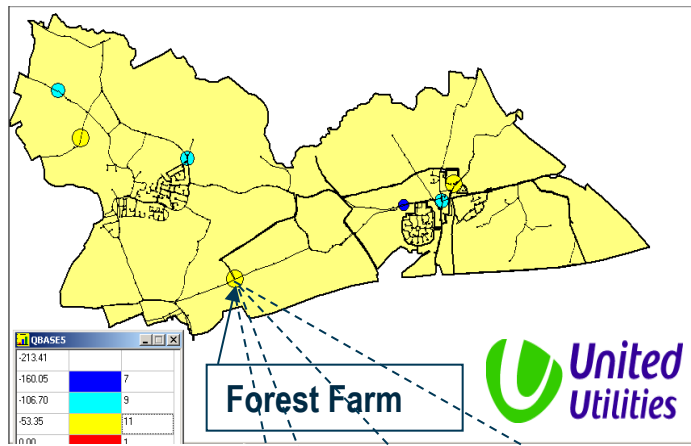


Prémio IWA em 2008

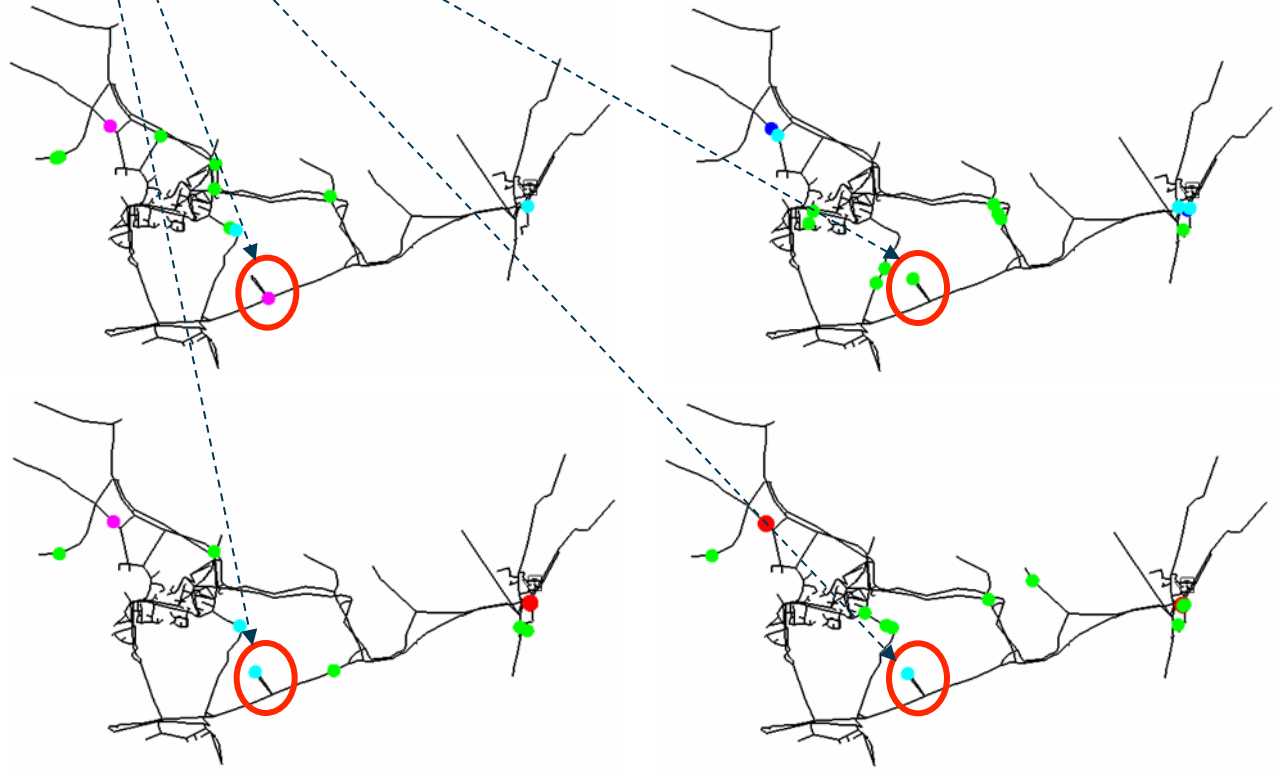


Case I

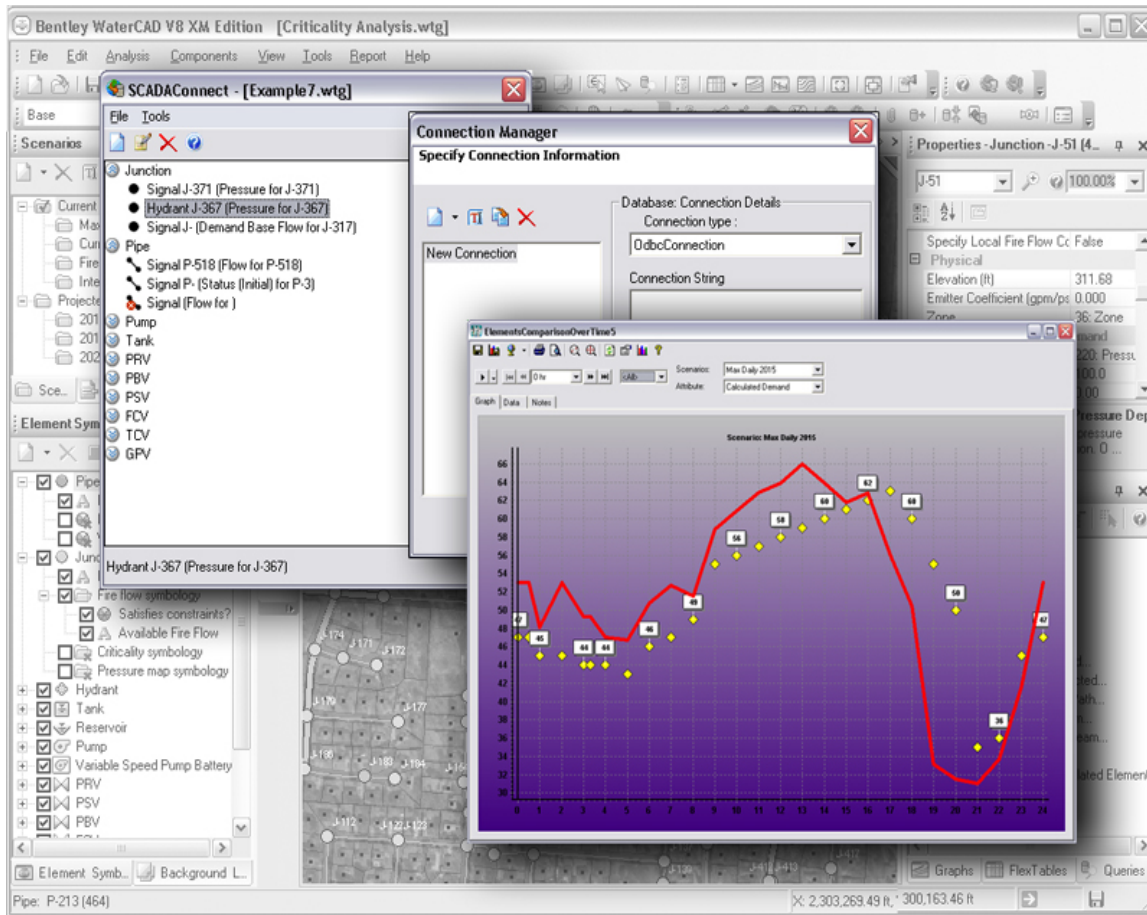
Posi-Tect & field survey



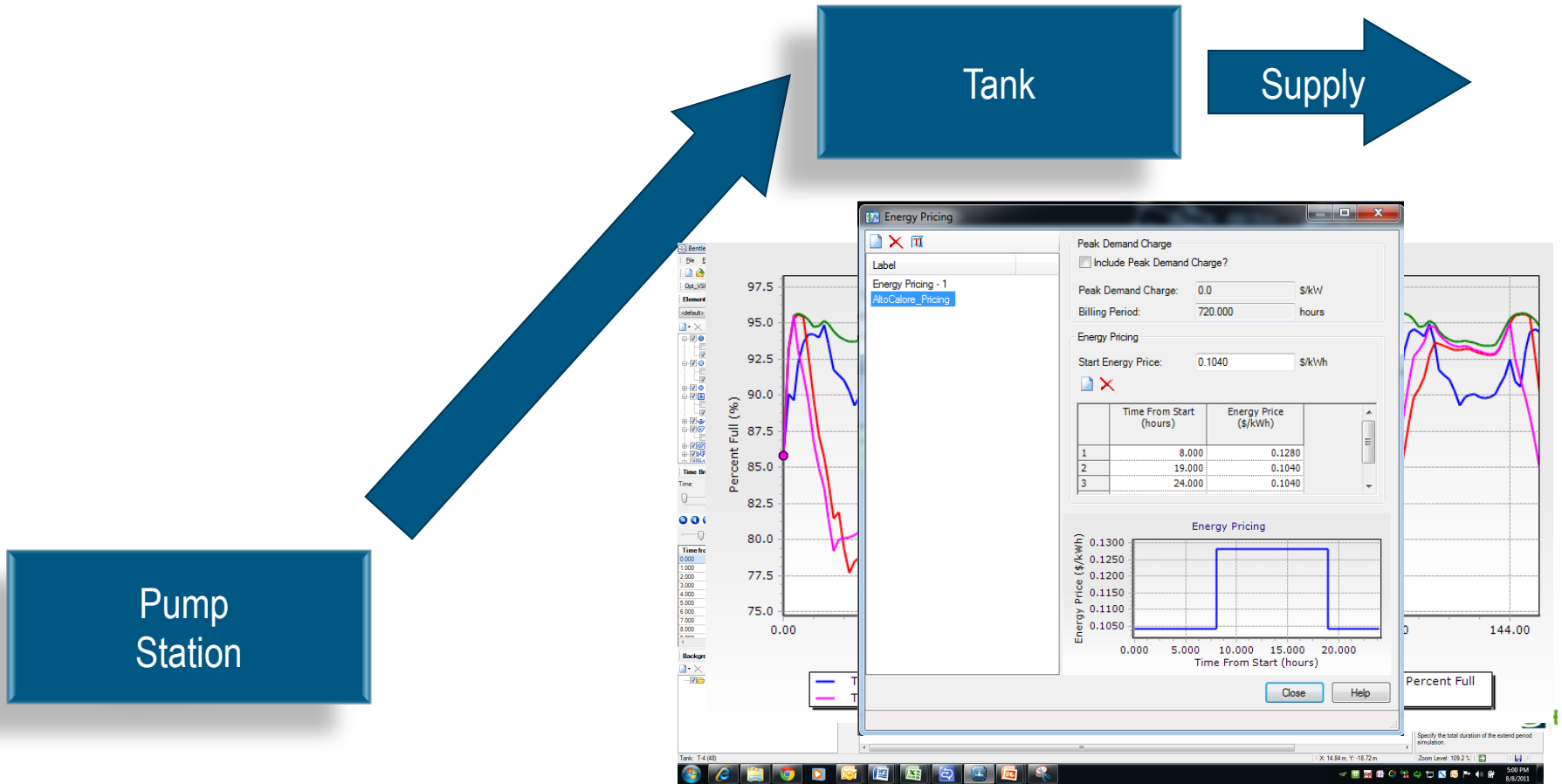
Leakage spots identified with Darwin Calibrator



Utilização de SCADA e informação em Tempo Real

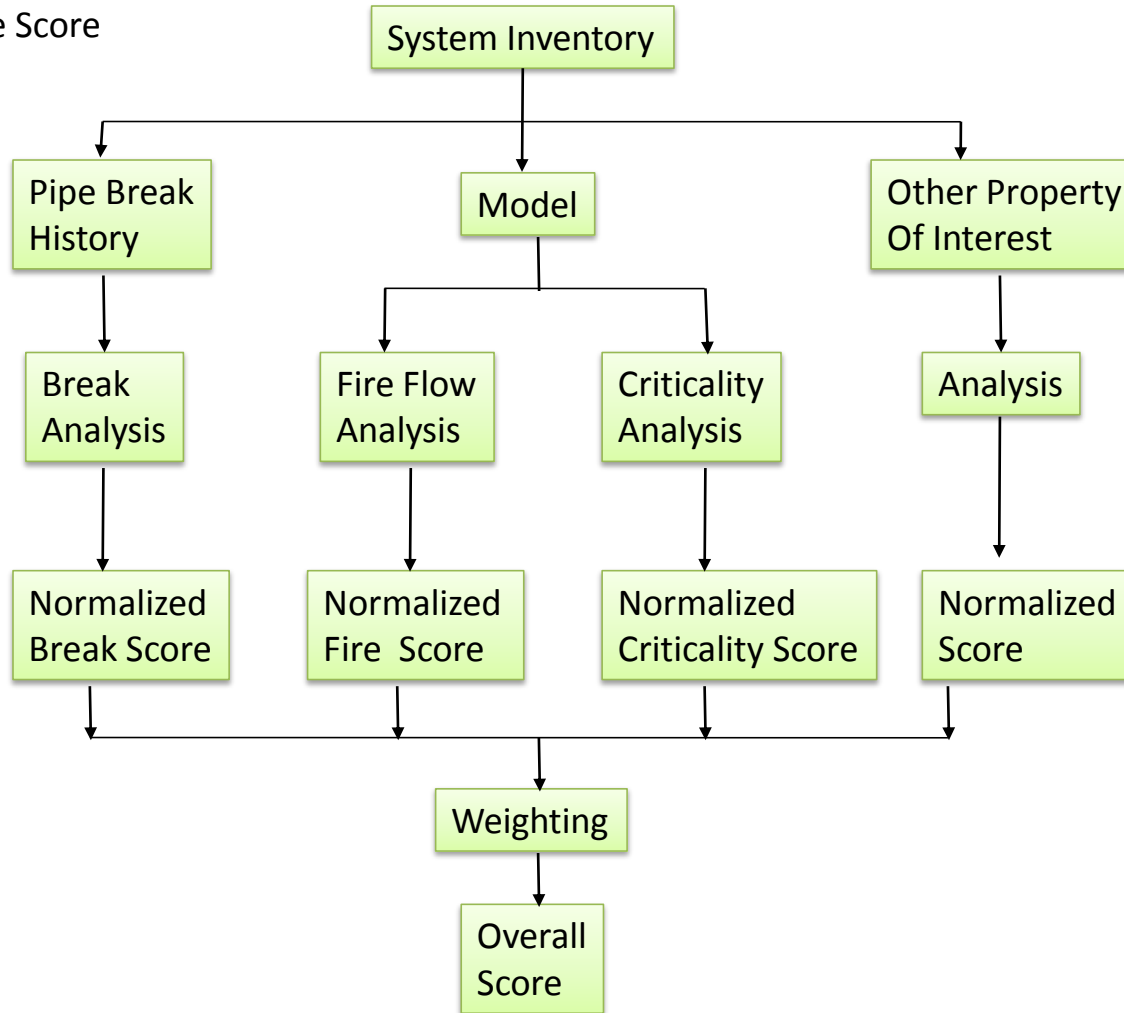


Otimização de Bombagem

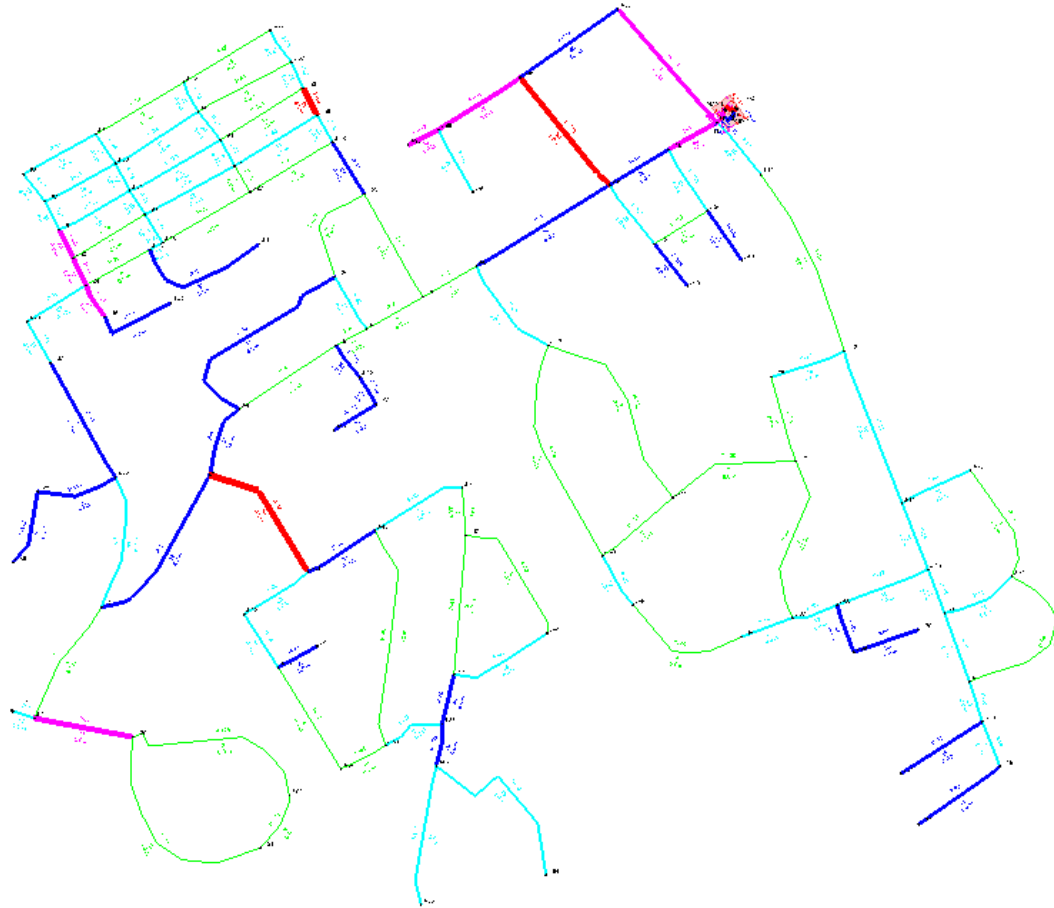


Workflow

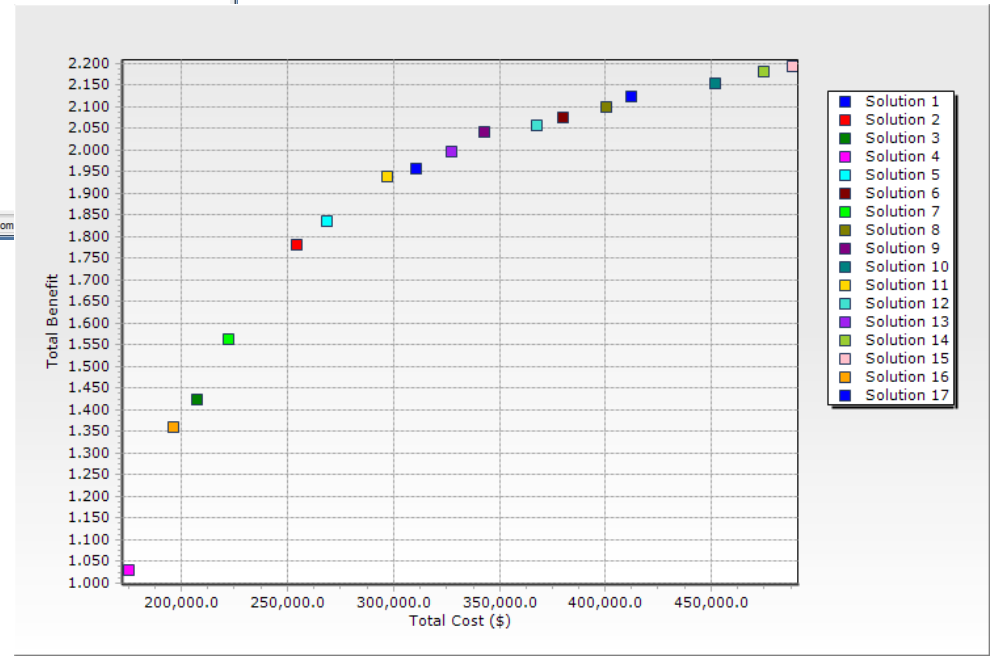
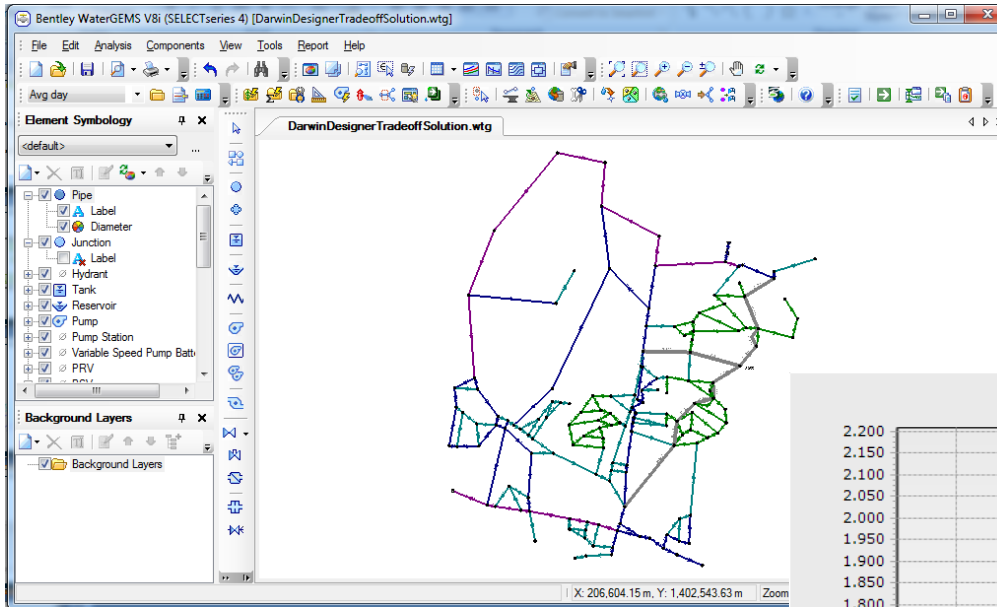
Pipe Score



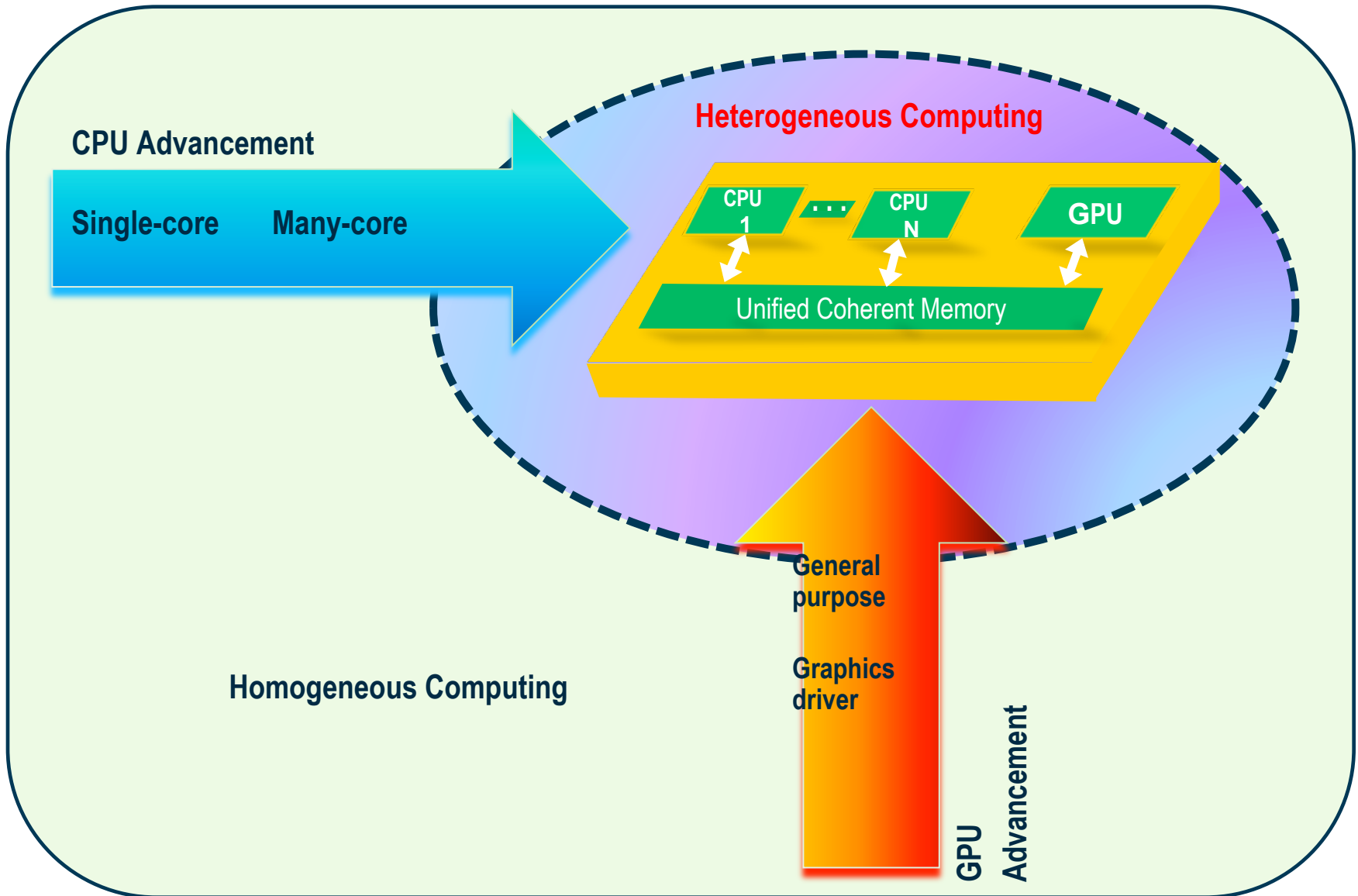
Resultados



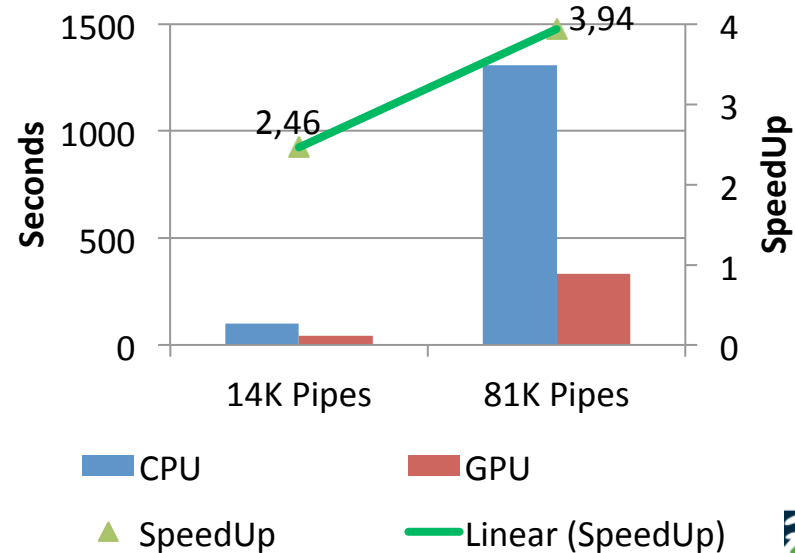
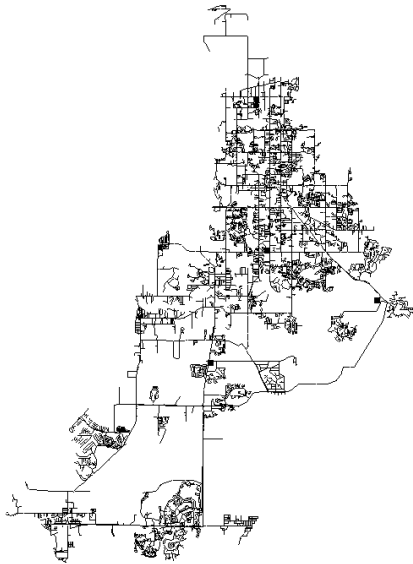
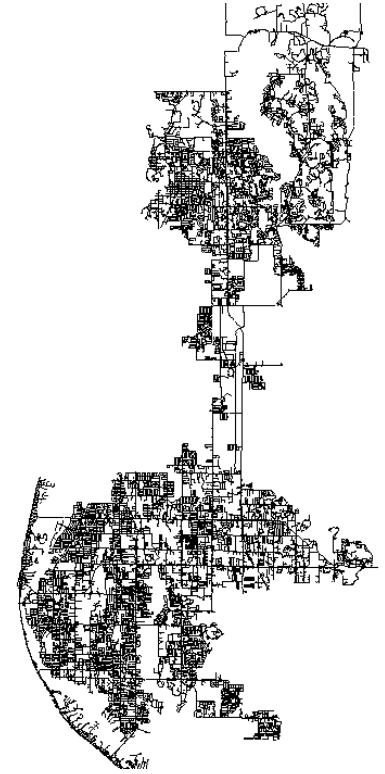
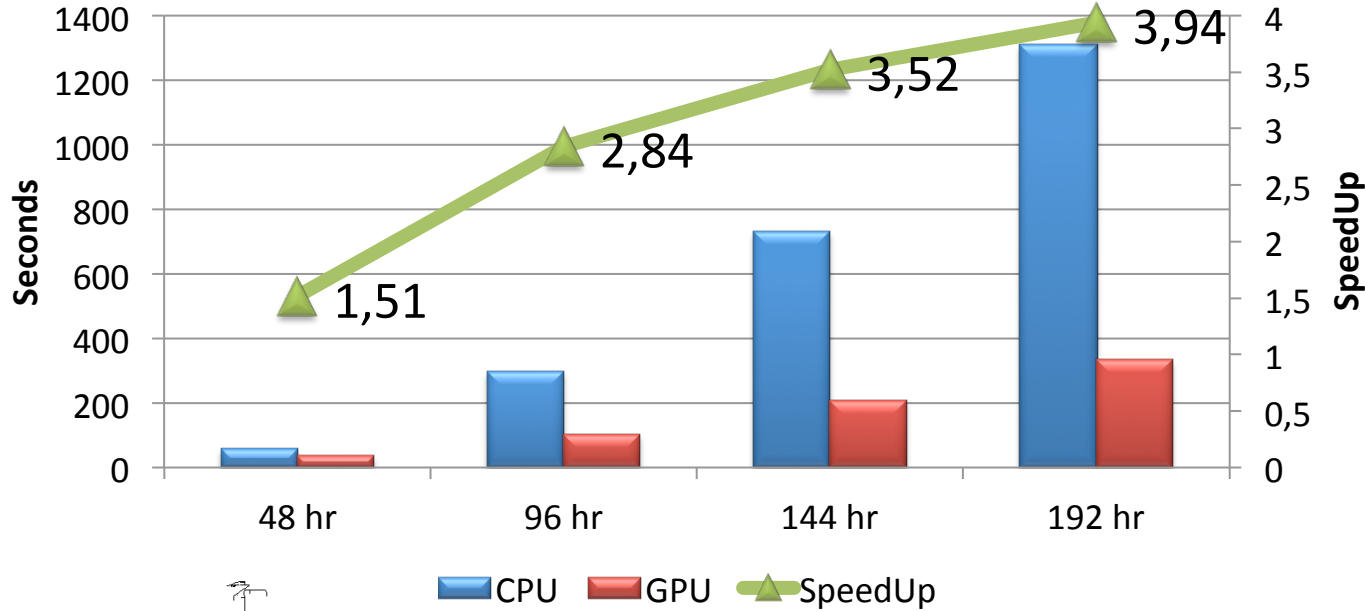
Otimização da Reabilitação



Um Novo Paradigma ...

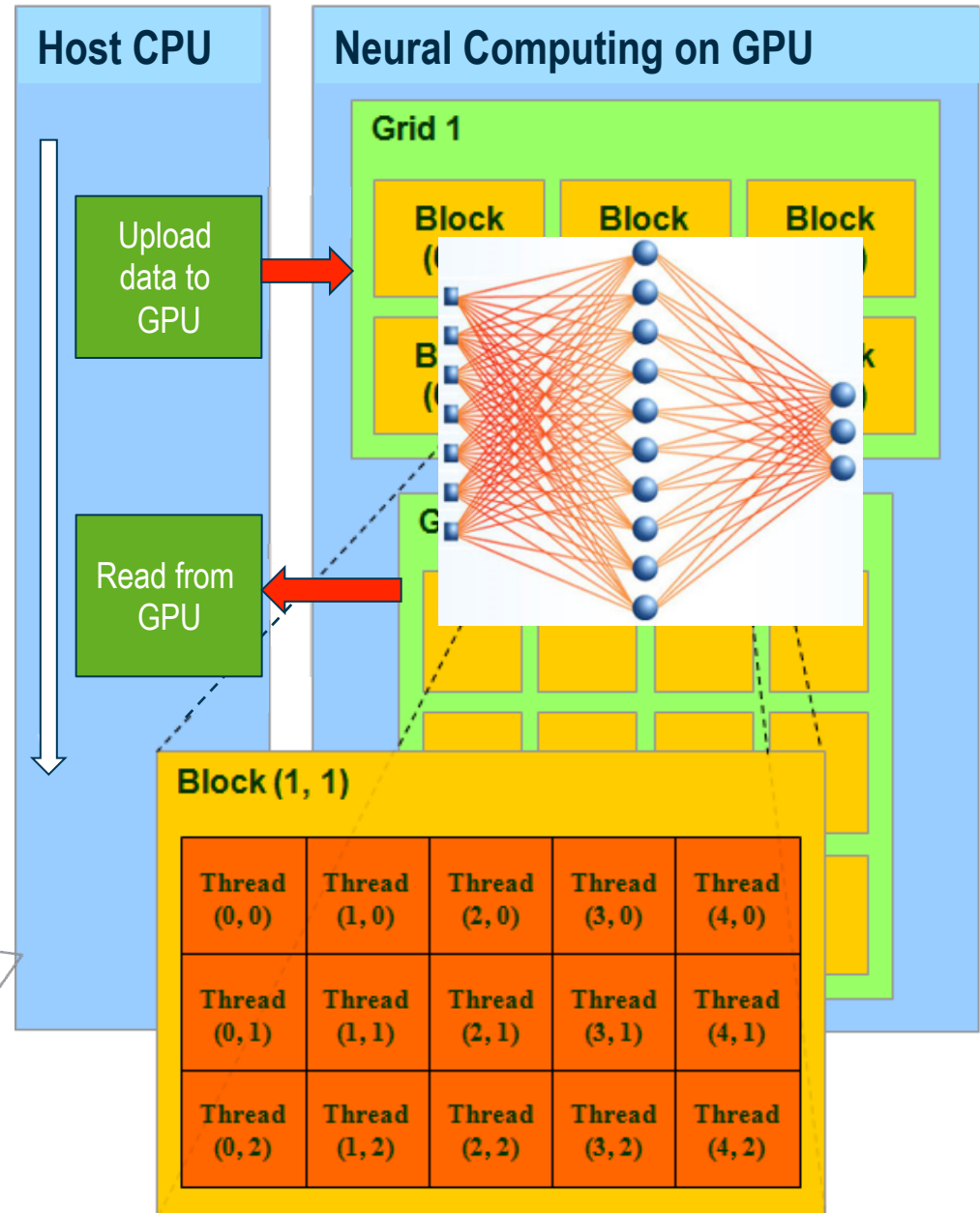
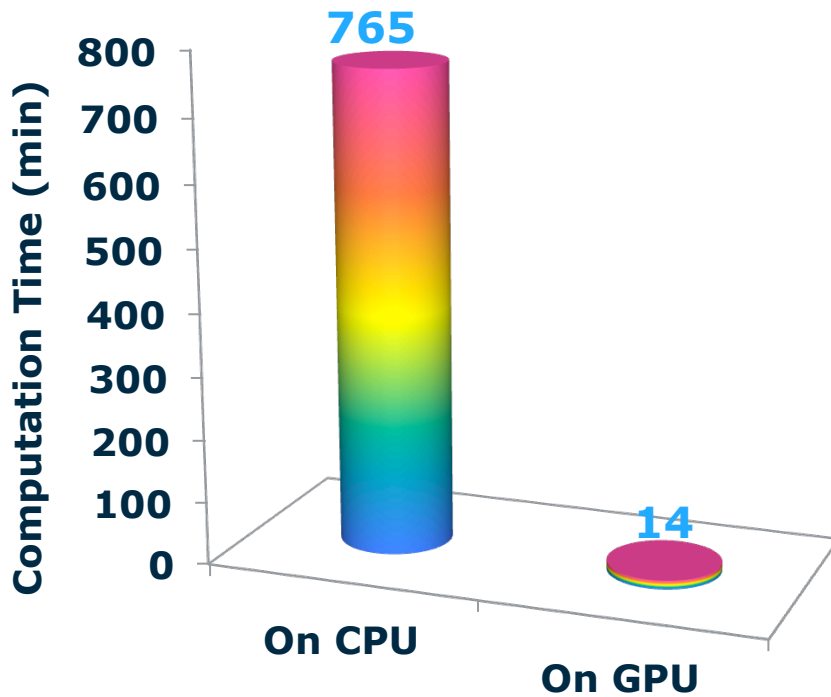


Accelerated Modeling

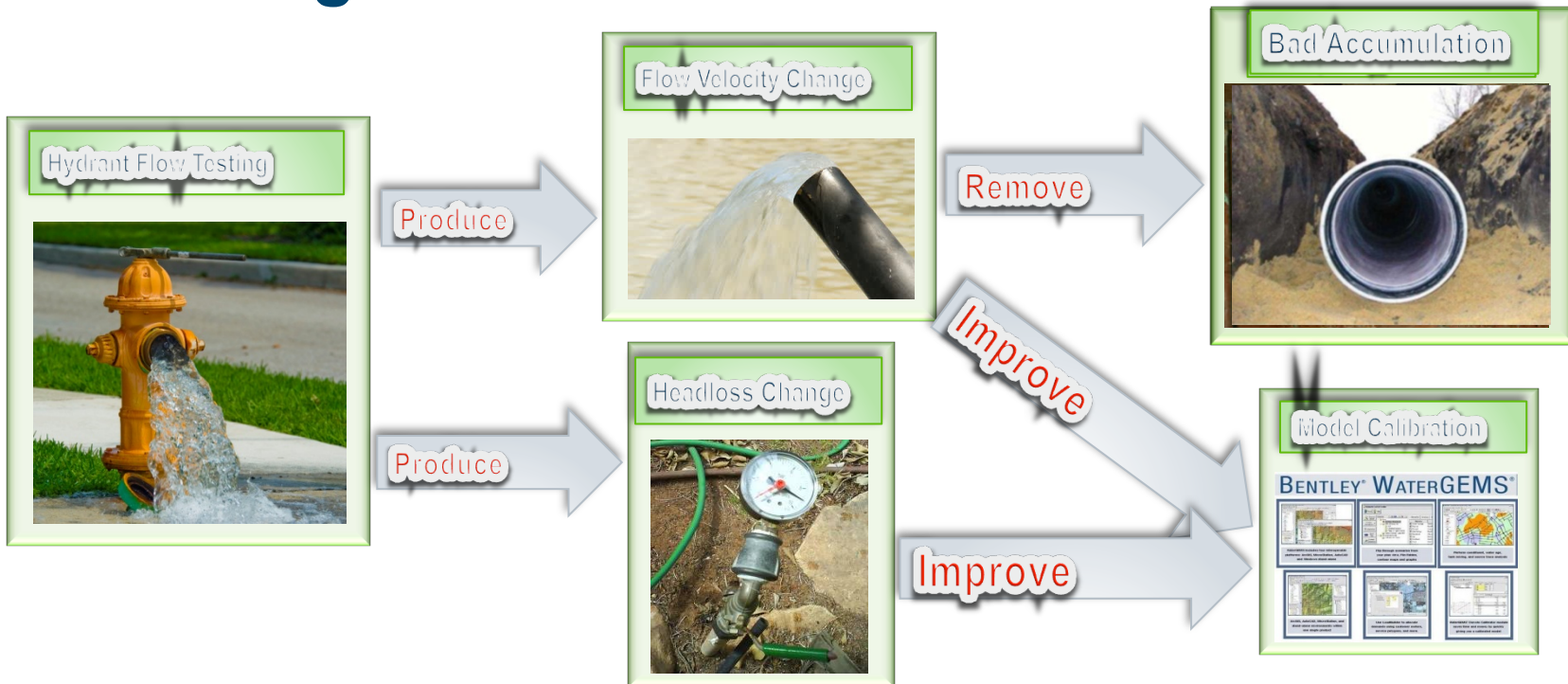


Data-Driven Model

- Big data, big opportunity
- Data \neq information
- Capture data relationships
- Fast ANN **model training/ calibration**

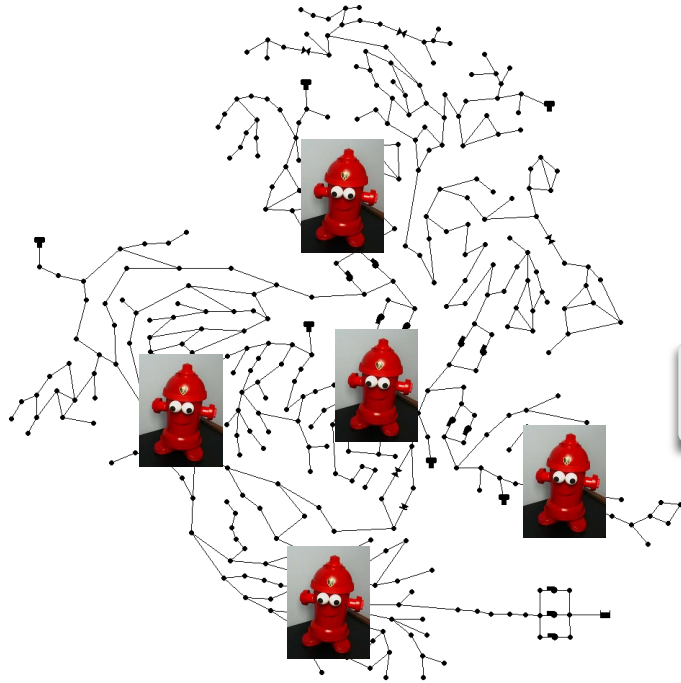


Flushing Problem



- Opening hydrant changes head loss and flow velocity of pipes, which is useful
 - Greater the change, more helpful for the model calibration
 - Changing velocity helps remove bad accumulations in the pipe
- Very common operation in practice

Hydrant Selection - Find Best Hydrants To Open

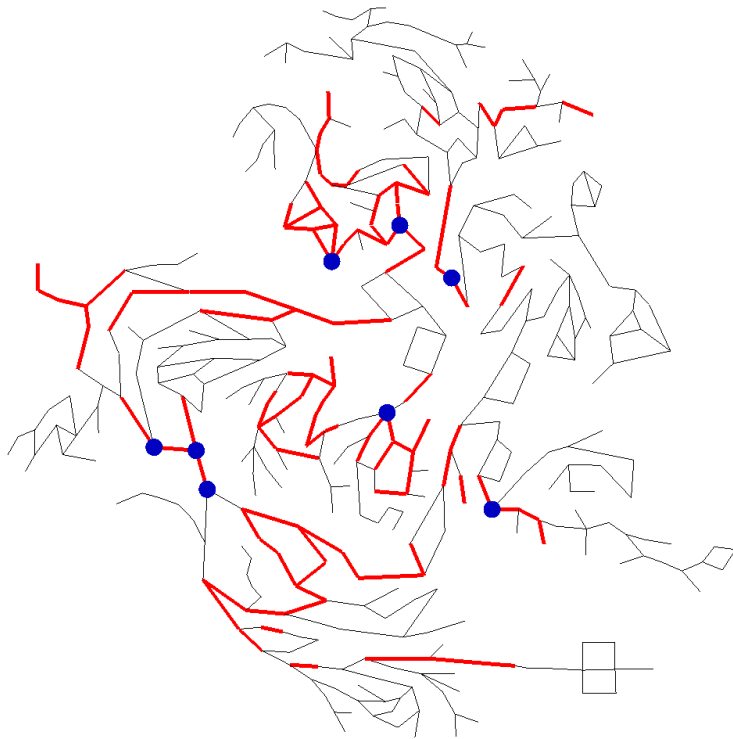


Which one?
How many?
How much flow?

Find a way to evaluate the capability of a combination of hydrants

- We don't want to open all hydrants <- Limited number of hydrants should be opened
 - Which one to open? -> Affect as much as possible pipes [Efficiency]
 - How many to open? -> Require as few as possible [Cost]
- How much hydrant flow should be used? -> Smaller the better

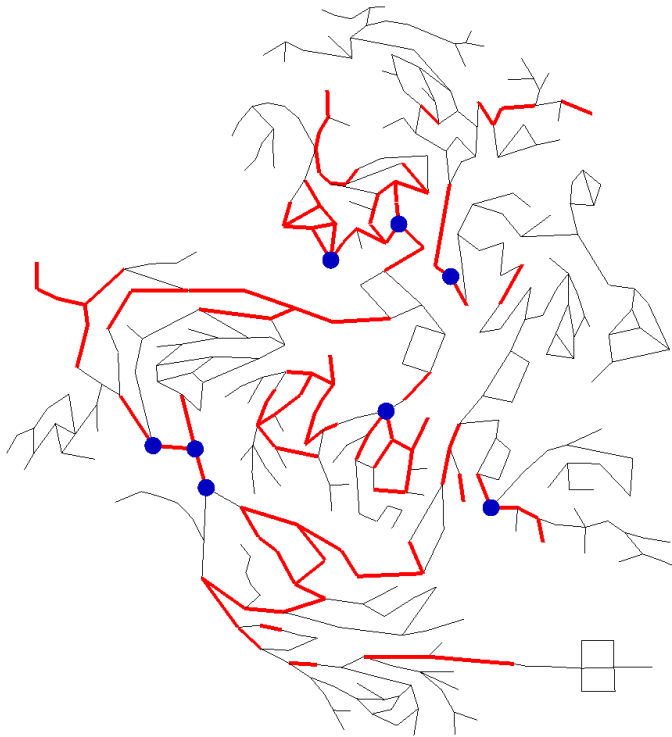
Case study



- Use **Hydrant Selection Tool** to find optimal combination of hydrants
 - A water system with 429 pipes
 - Currently 8 hydrants are selected for flow testing, selected by experience
 - Head loss change threshold: 0.1 m H₂O (0.14psi)
 - Hydrant Flow Range: 32 – 126, Interval: 4

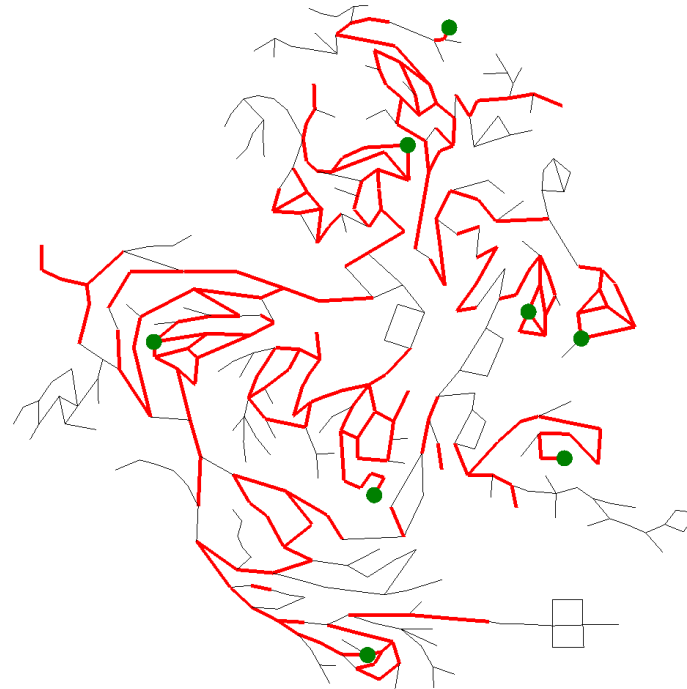
Sum of Pipe Lengths Comparison

Current 8 Hydrants



Affect pipe lengths / total pipe lengths
 $18270 / 56387 = 32\%$

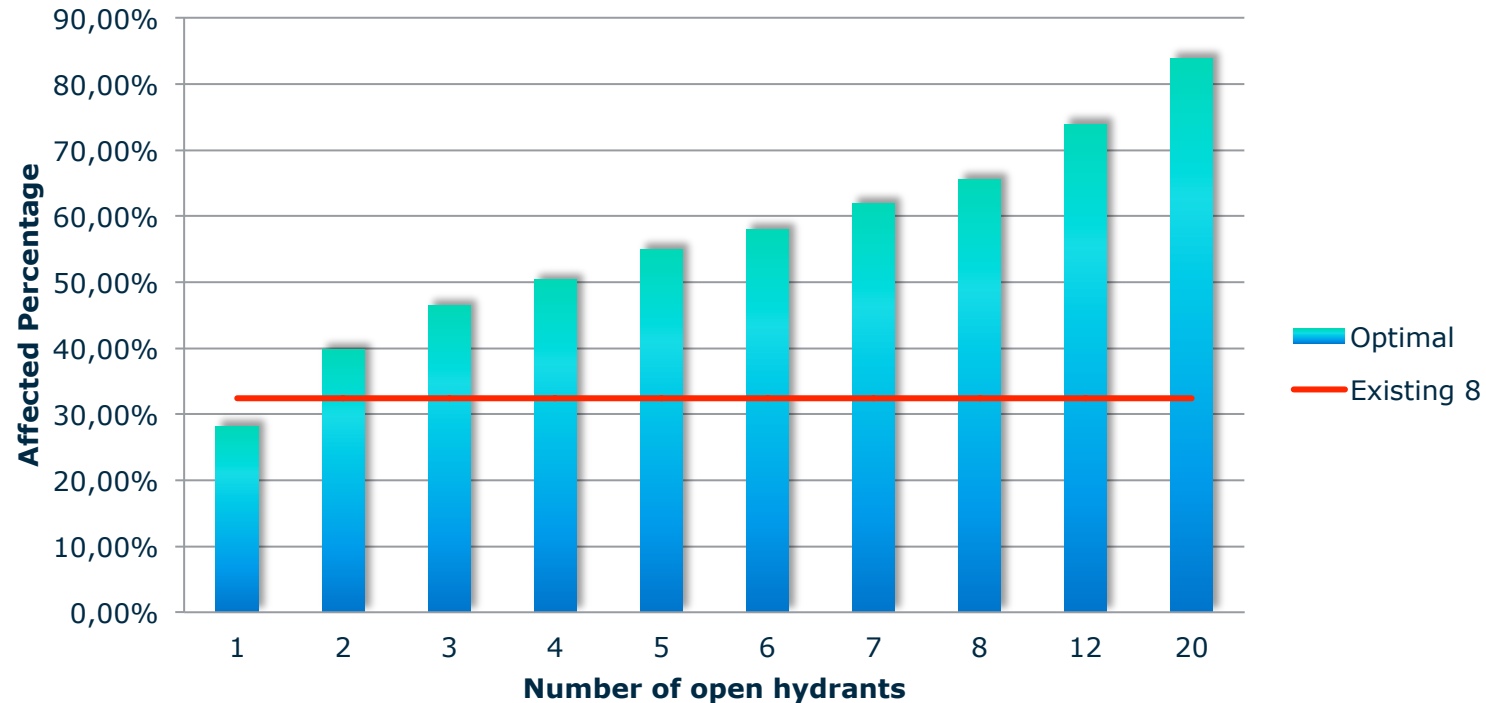
Optimum 8 Hydrants



Affect pipe lengths / total pipe lengths
 $36950 / 56387 = 66\%$

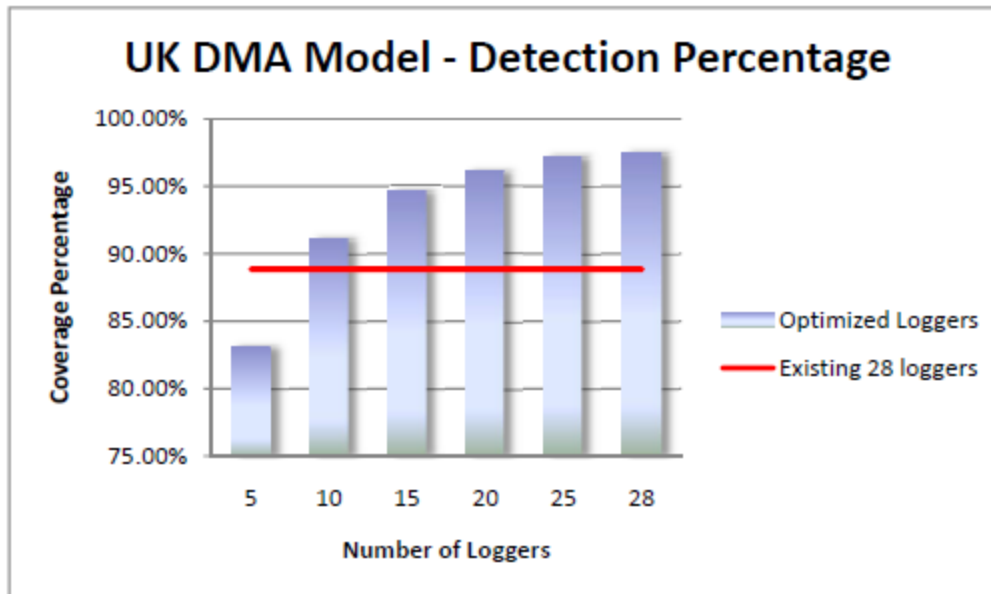
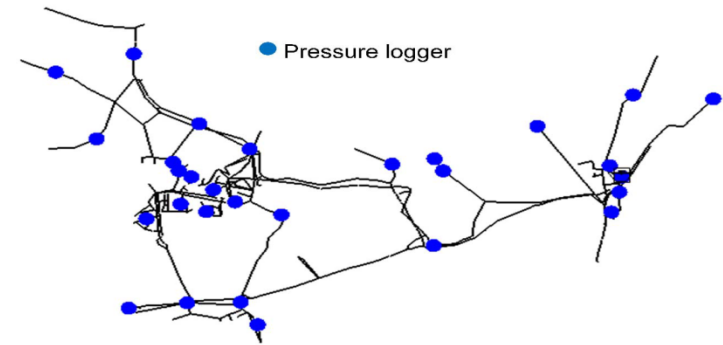
Sum of Pipe Lengths / Total Pipe Lengths Comparison

Optimal VS Existing 8

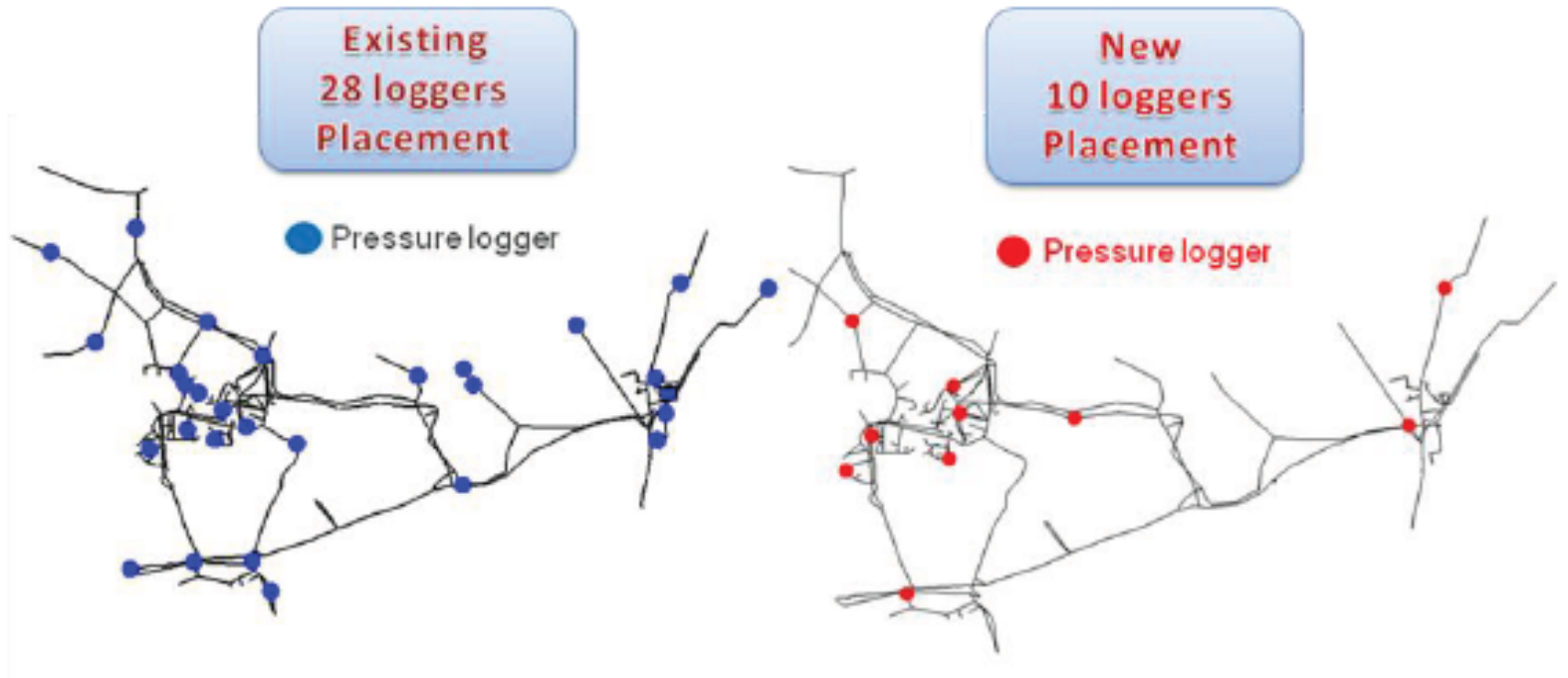


- Optimal solution outperforms existing 8 hydrant setting with even 2 hydrants

Posicionamento de Sensores



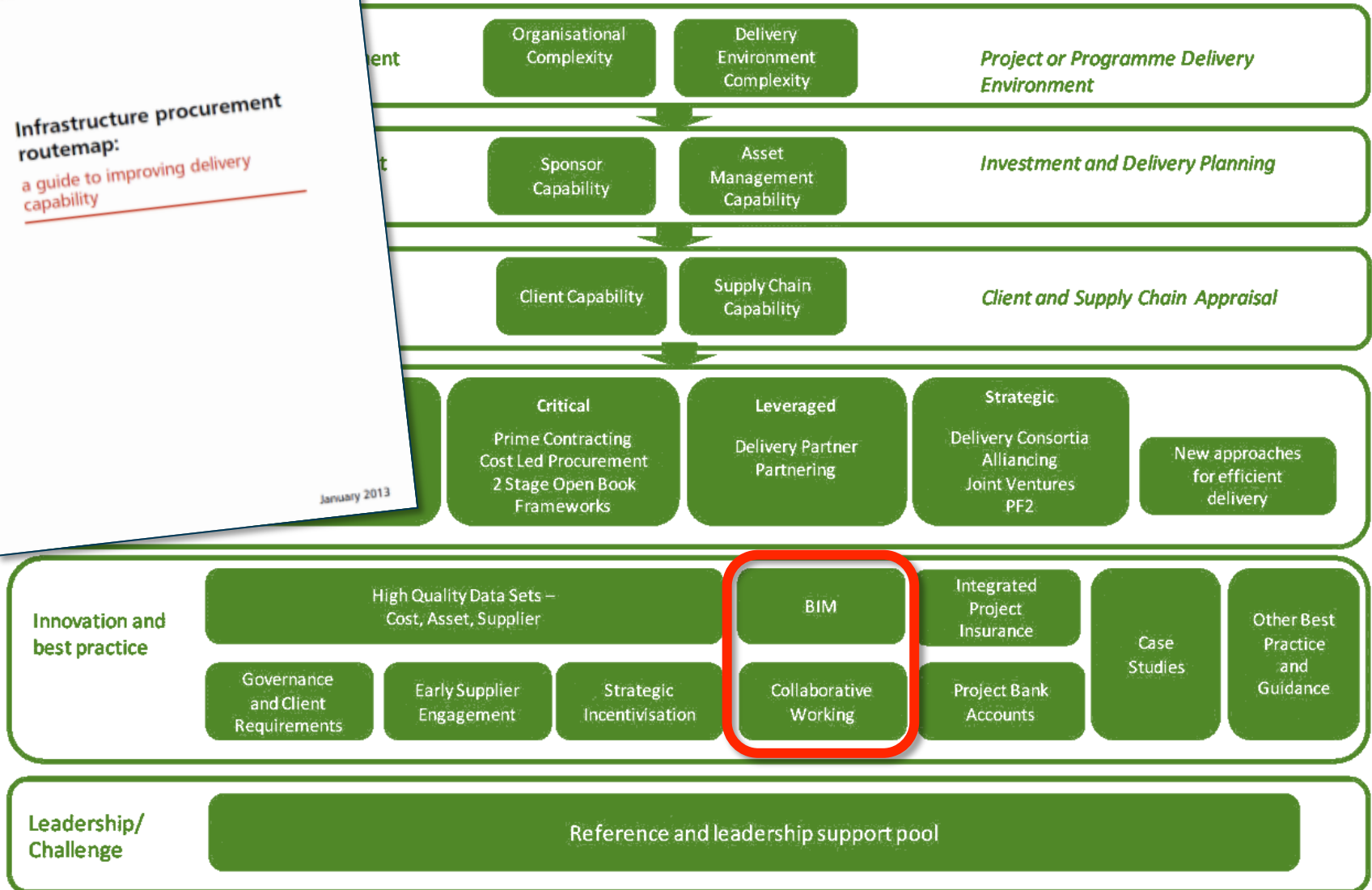
Posicionamento de Sensores



“É um conjunto de de **processos**, suportados pela tecnologia, que criam valor através da criação, gestão e partilha da **informação** de um **activo** durante o seu ciclo de vida”

Planeamento de Processo de Compra (UK), January, 2013

Chart 2 A: The Infrastructure Procurement Routemap – Overview



Informação “Desintegrada”

Estou a trabalhar na Vers. 29.0

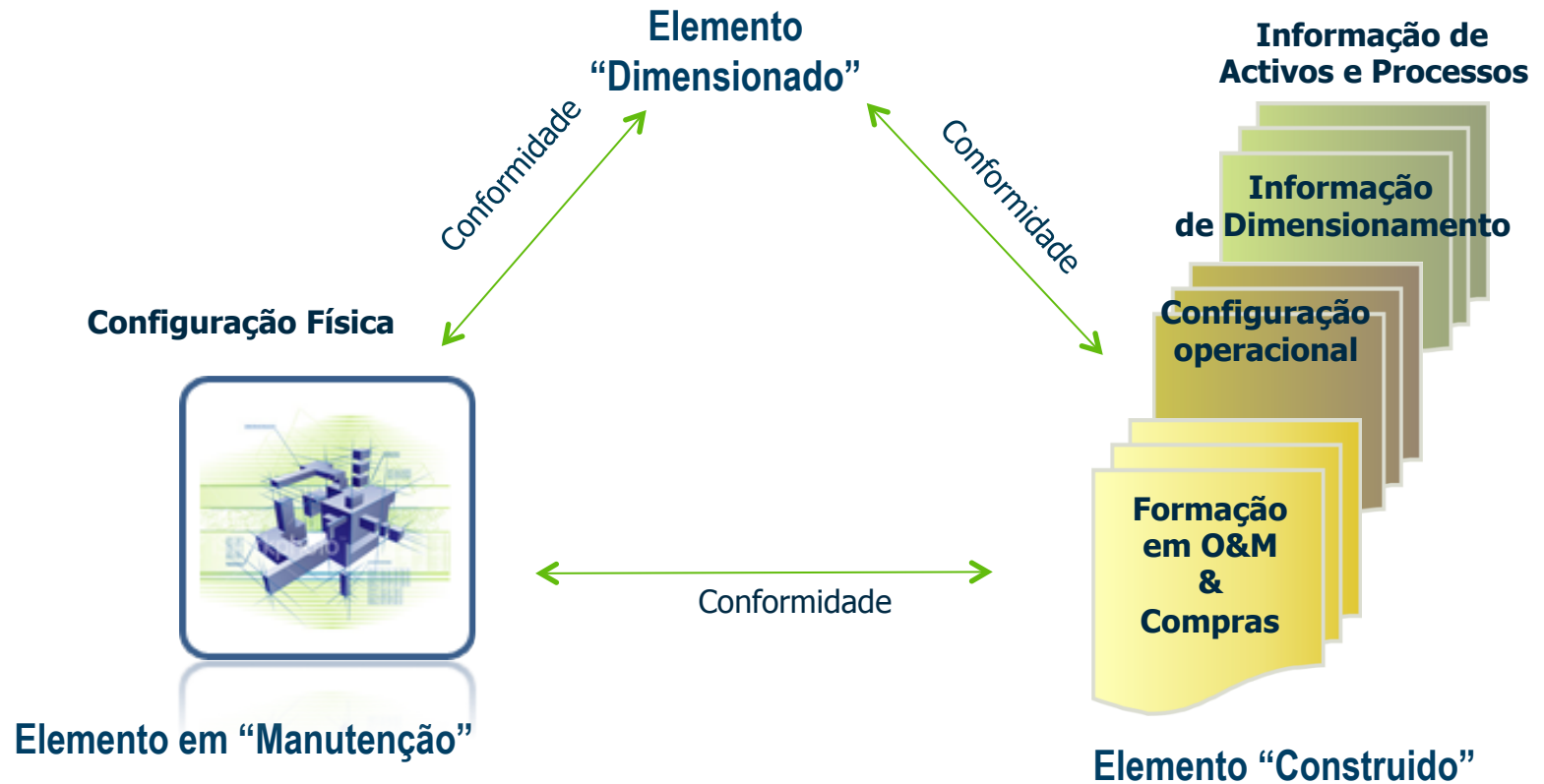
@\$&*!#

Mas a versão mais actual é a Vers. 31.5

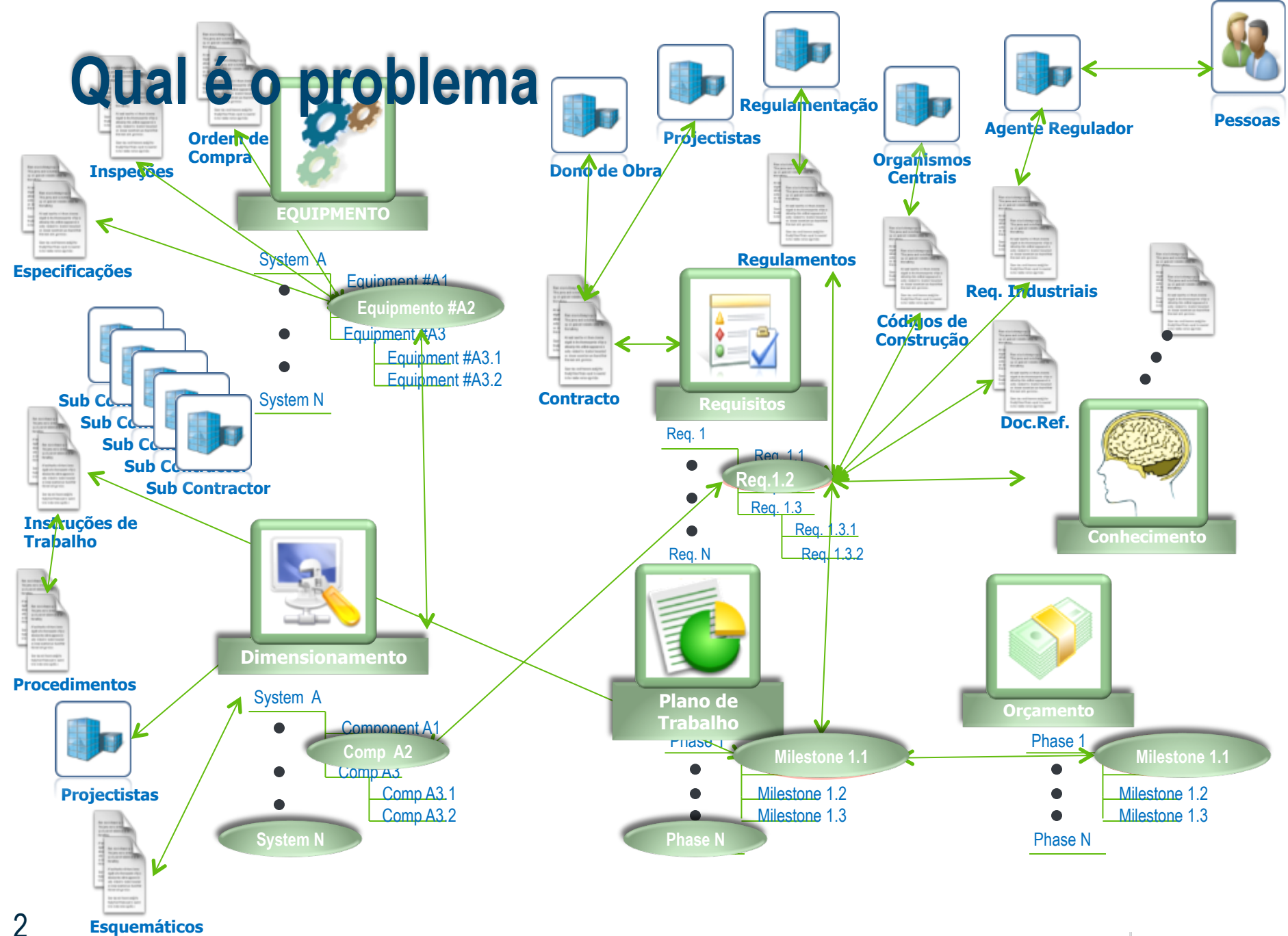
???



O Desafio...

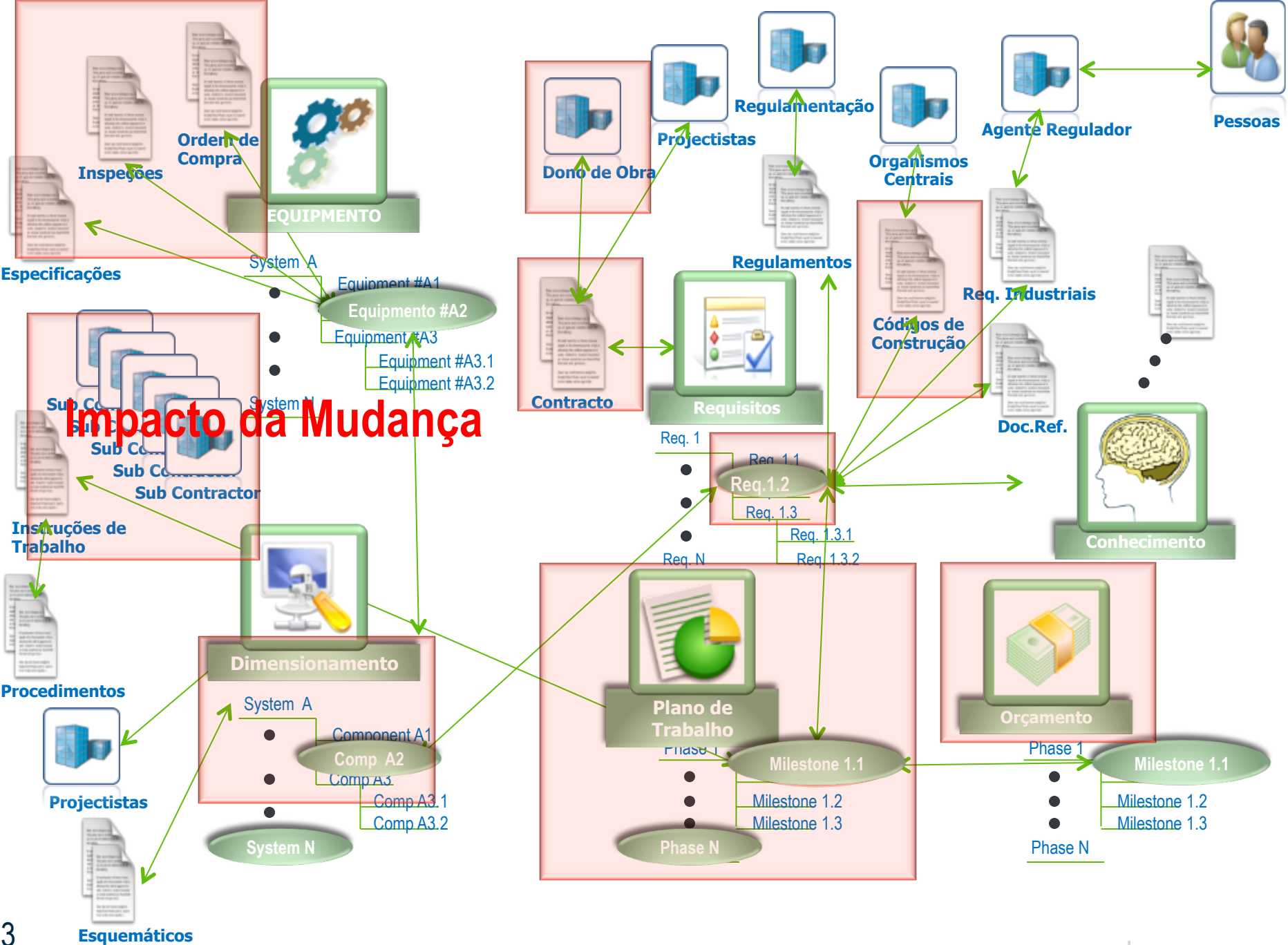


Qual é o problema



Esquemáticos

Impacto da Mudança



3
0 30 | Esquemáticos

Realidade Aumentada 1



Realidade Aumentada 2





Obrigado!