What is Sustainable IT and How Do We Achieve It?

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Sustainable IT Ecosystem Laboratory

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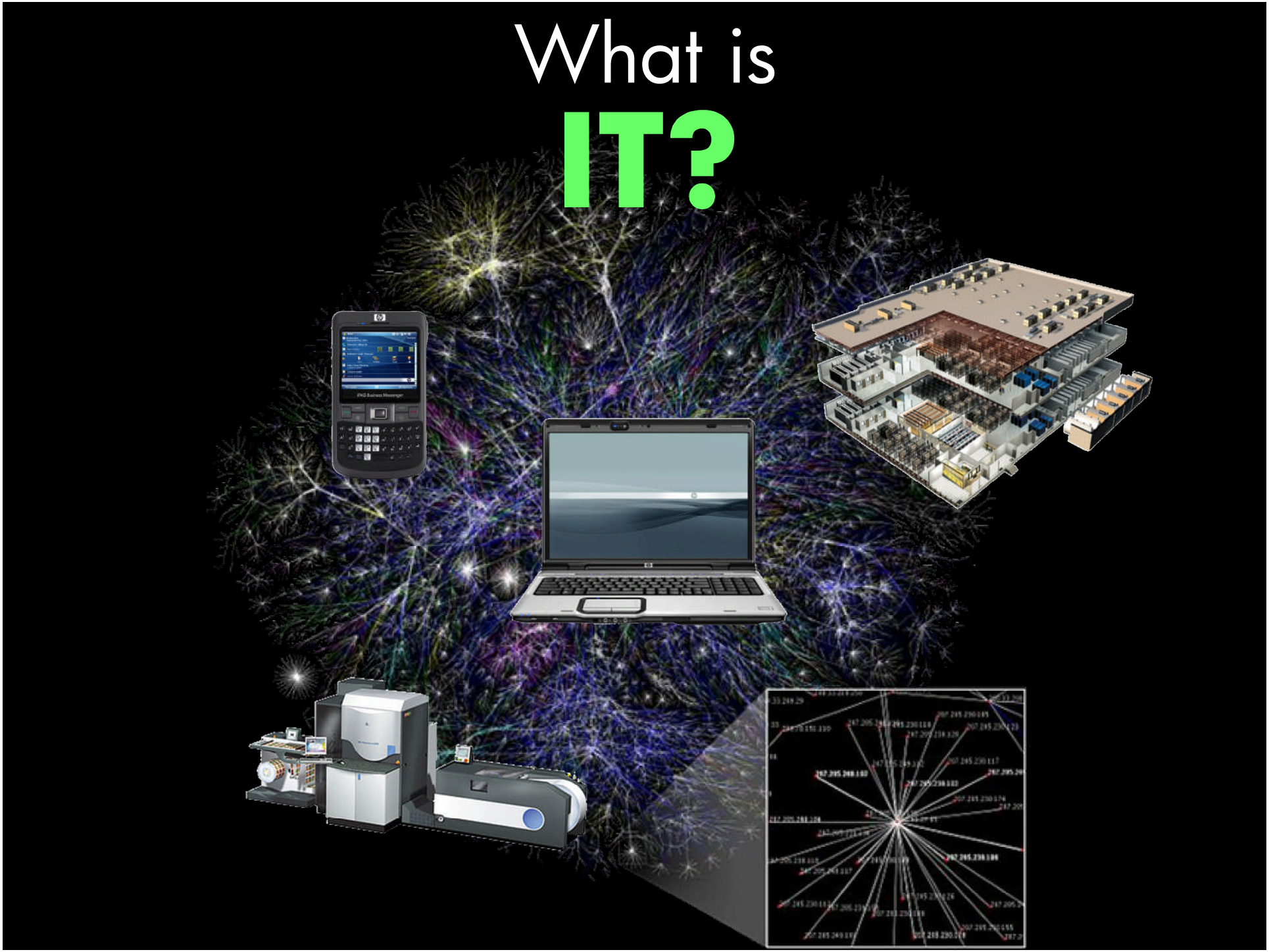
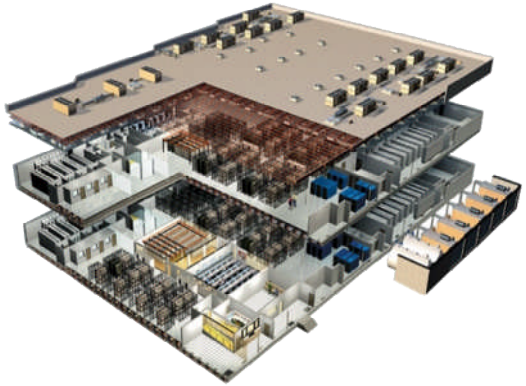
What is **IT?**



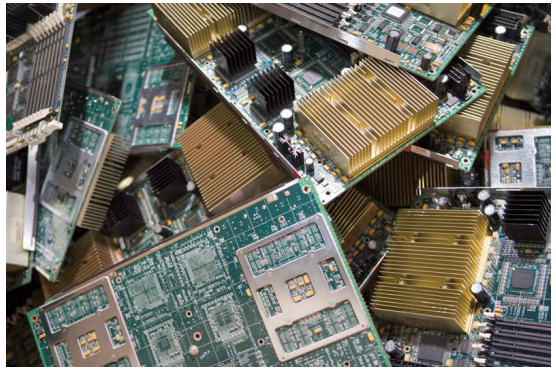
Manufacturing



Operation

Transportation

Mining



Retirement

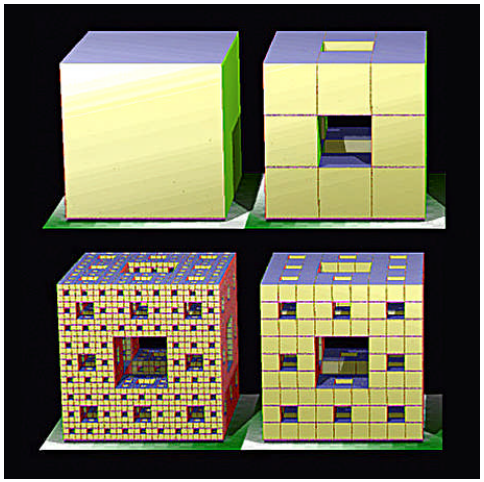
What is **Sustainability?**

"Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs"

UN Brundtland Commission, 1987

Least Energy

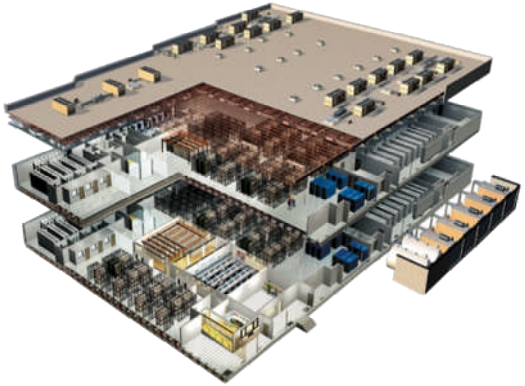
Appropriate Energy



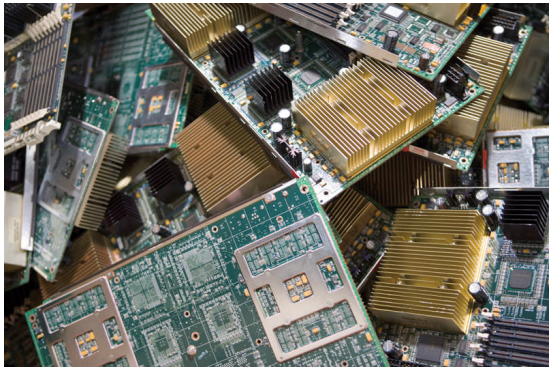
Least Materials

Appropriate Materials

Manufacturing



Operation



Retirement

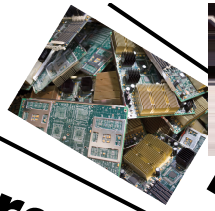
Mining

How do we achieve

Sustainable IT?

Mining

Manufacturing



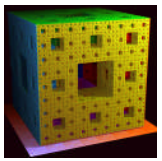
Operation

Retirement

Transportation

Least Energy

Appropriate Energy



Least Materials

Appropriate Materials

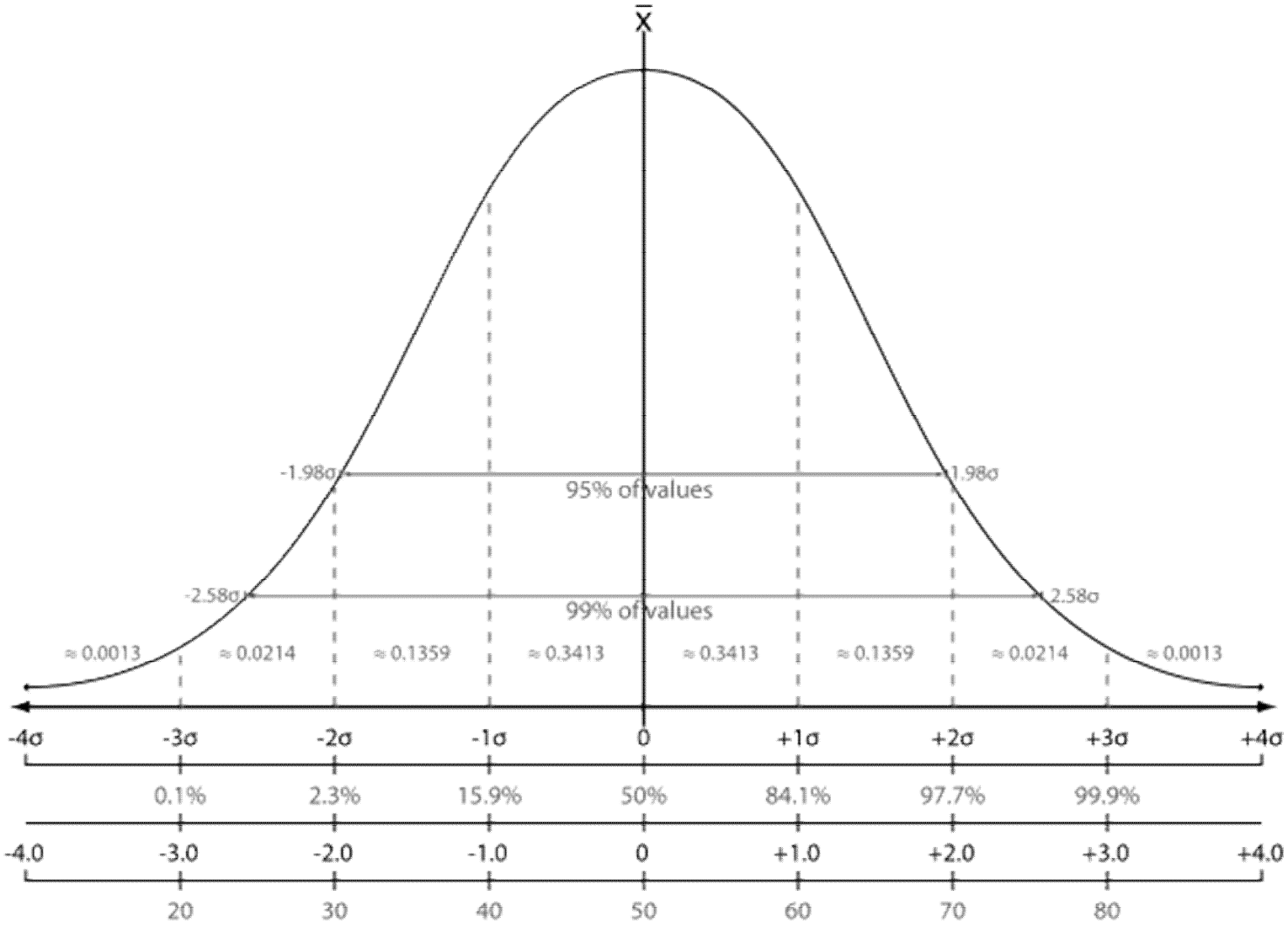
Return to Ground

Technologies for

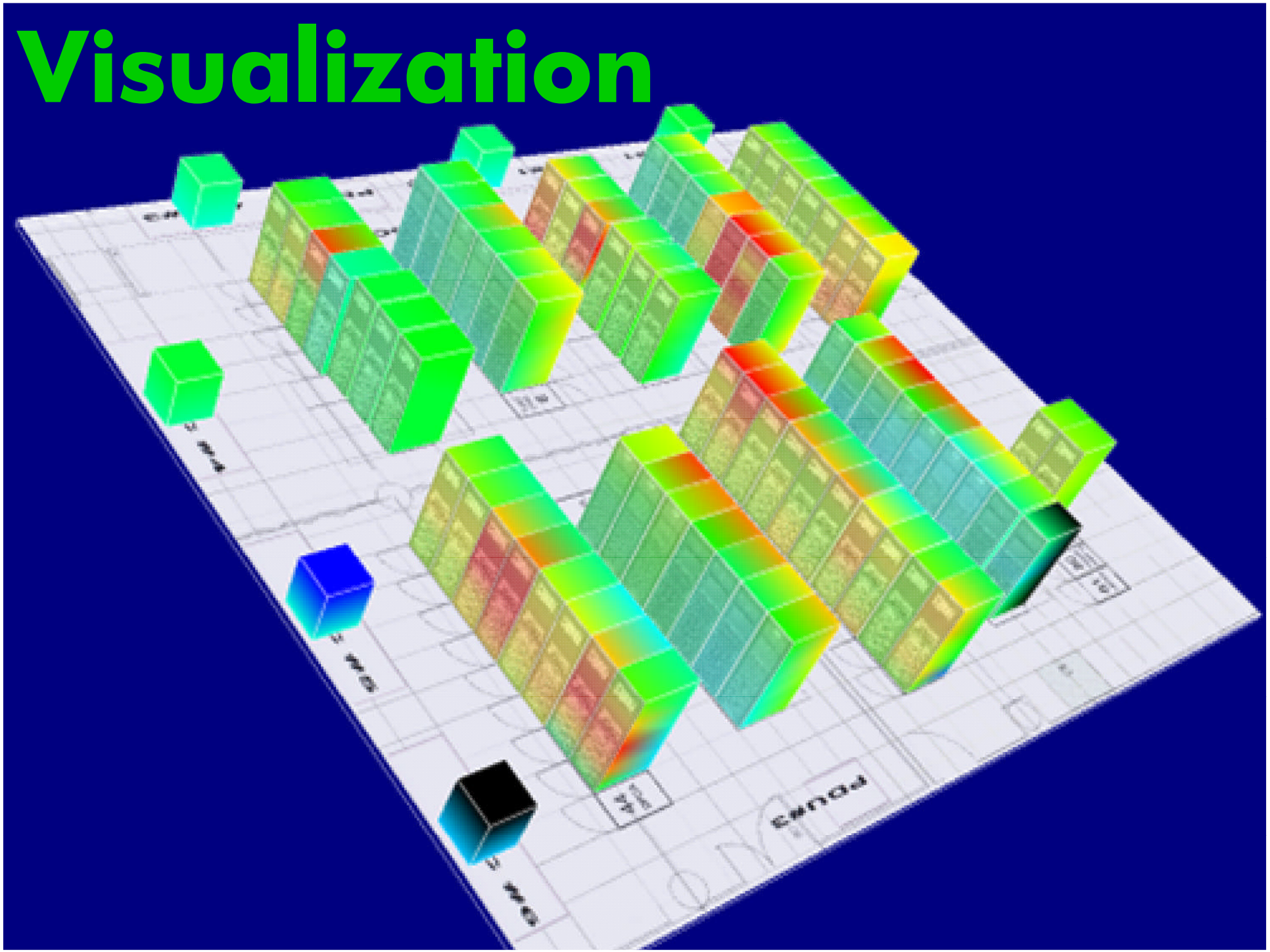
Sustainable IT

Sensing

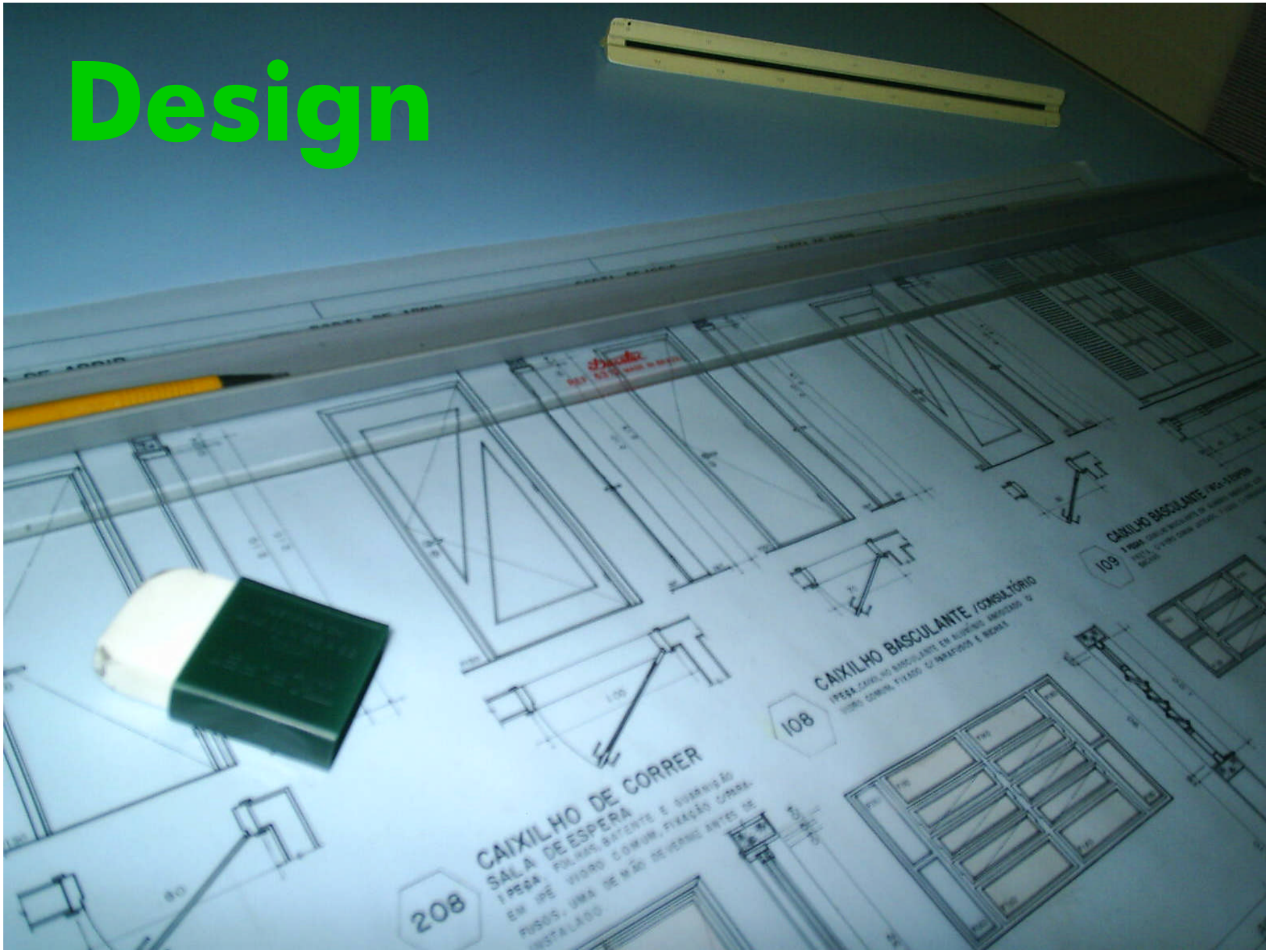
Analysis


$\bar{X}$
-1.98σ
1.98σ
95% of values
-2.58σ
2.58σ
99% of values
≈ 0.0013
≈ 0.0214
≈ 0.1359
≈ 0.3413
≈ 0.3413
≈ 0.1359
≈ 0.0214
≈ 0.0013
-4σ
-3σ
-2σ
-1σ
0
+1σ
+2σ
+3σ
+4σ
0.1%
2.3%
15.9%
50%
84.1%
97.7%
99.9%
-4.0
-3.0
-2.0
-1.0
0
+1.0
+2.0
+3.0
+4.0
20
30
40
50
60
70
80

Visualization



Modeling


Design
CAIXILHO BASCULANTE /CONSULTÓRIO
108
CAIXILHO DE CORRER
SALA DE ESPERA
208

Actuation

Automation

Coordination

What is Sustainable IT?

Client devices
Data centers
Print factories
Internet fabric
Software

Mining
Manufacturing
Operation
Retirement
Transportation

Least energy
Most appropriate energy
Least materials
Most appropriate materials
Re-use, recycle, return-to-ground

How do we achieve it?

Sensing
Analysis
Visualization
Modeling

Design
Actuation
Automation
Coordination