

THE BUTTERFLY EFFECT

CROSS SECTOR DEPENDENCIES IN CYBER SECURITY



“

WIKIPEDIA: I KNOW EVERYTHING!
GOOGLE: I HAVE EVERYTHING!
FACEBOOK: I KNOW EVERYBODY!
INTERNET: WITHOUT ME YOU ARE NOTHING!
ELECTRICITY: KEEP TALKING!

”

MYTHS WHICH WE ARE FACING

- **WE ARE SECURED ENOUGH, WE ARE ABLE TO RESIST**
- **OUR EMPLOYEES ARE WELL TRAINED, AND THEY KNOW HOW TO REACT**
- **WE ARE SMALL REGIONAL COMPANY, WHY SHOULD ANYONE ATTACK US?**
- **DATA IN OUR NETWORK IS SECURE ENOUGH, NO REASON FOR TRANSPORT ENCRYPTION**
- **OUR ICS (OT) ASSETS ARE INDEPENDENT FROM THE MESSY IT WORLD**
- **WE HAVE RELIABLE PARTNERSHIP WITH SERVICE PROVIDERS, THEY WILL HELP US**
- **OUR CUSTOMERS WILL NOT SEE ANY IMPACT**

“

WHY SHOULD THEY ATTACK US?

”

(MY FAVORITE AND VERY OFTEN QUESTION TO ANSWER)

RISKS WHICH WE ALL DEALING WITH

- **COMPLEX IT ENVIRONMENTS MAKES FORMER SIMPLE RULES INEFFICIENT**
- **ICS IS THE SHADOW IT WITHIN ENERGY SECTOR**
- **CLOUD SERVICES VS. CRITICAL INFRASTRUCTURE**
- **CUSTOMER ORIENTATION VS. CONVENIENCE**
- **PHYSICAL ATTACKS**

MODERN ENERGY – MODERN THREATS

ENERGY IS INDEED CORNERSTONE OF RELIABLE BUSINESSES, BUT 21ST CENTURY BROUGHT US NEW THREATS:

- **MASSIVE AND TAILORED DDOS ATTACKS**
- **TARGETED PHISHING, SOPHISTICATED SPEAR PHISHING CAMPAIGNS**
- **SPONSORSHIP OF ATTACKERS = INCREASED MOTIVATION OF ATTACKERS**
- **“SMART” & IOT BUZZWORDS**
- **DEVOPS 😊**

**“ TO DEVELOP A COMPLETE MIND: STUDY THE
ART OF SCIENCE; STUDY THE SCIENCE OF ART.
LEARN HOW TO SEE. REALIZE THAT
EVERYTHING CONNECTS TO EVERYTHING
ELSE”**

– LEONARDO DA VINCI

POINT OF VIEW

EVERY BUSINESS IS INDEED SPECIFIC AND UNIQUE:

- **ENERGY IS NOT YET DEPENDENT ON ONLINE CONSUMPTION CHARGING BUT IS OBLIGED CHARGE WITH HIGHEST ACCURACY**
- **RESTAURANT CHAIN WHICH IS USING CSP, IS HIGHLY DEPENDENT ON ONLINE CONSUMPTION CHARGING**

DIFFERENT BUSINESS NEEDS HAVE A COMMON DRIVER – RELIABILITY

UNDERSTANDING DEPENDENCIES

- **ENERGY IS THE LIFEBLOOD OF VAST MAJORITY OF BUSINESSES, ESPECIALLY FOR THOSE WHO PRODUCE THE MOST OF NATIONAL GDP**
- **MODERN ENERGY IS HIGHLY DEPENDENT ON COMMUNICATIONS INFRASTRUCTURE (OPERATION, SUPPORT FUNCTIONS INCLUDING IT, DEPARTMENT, CUSTOMER SERVICE, ETC.)**
- **COMMUNICATION INFRASTRUCTURE IS OFTEN USED AS ENTRY POINT FOR ATTACKERS WHICH MAKES THIS A CRITICAL PART FOR THE BUSINESS**

INTERACTIONS/DEPENDENCIES ON SEVERAL LEVELS

- **PHYSICAL – USAGE OF OUTPUTS CROSS SECTOR**
- **GEOGRAPHIC – LOCALLY, REGIONALLY, WORLD WIDE**
- **LOGICAL – E.G. LINK TO FINANCIAL MARKET**
- **CYBER – DATA TRANSFERRED OVER COMMUNICATION LINES (PUBLIC, PRIVATE)**

IMPACT AFFECTING INTERCONNECTED SECTORS

- **CASCADING EFFECT**
 - **ENERGY BACKOUT CAN CAUSE CASCADE EFFECT, DISRUPTING WATER SUPPLIES...**
- **ESCALATION OF FAILURE**
 - **FAILURE ON COMMUNICATION NETWORK BETWEEN CONTROLLERS CAN CAUSE DISRUPTION OF ENERGY SUPPLY (SUBSTATION, PART OF THE GRID, ETC.)**
- **COMMON CAUSE**
 - **TYPICALLY NATURAL DISASTERS**

TYPICAL QUESTIONS TO ANSWER

- **WHAT ARE CONSEQUENCES IN CASE OF ATTACK ON CRITICAL INFRASTRUCTURE – IMPACT ON NATIONAL SECURITY, ECONOMY, HEALTH,.....?**
- **IS THERE ANY CHOKER POINT, WHERE ATTACK CAN CAUSE DRAMATIC IMPACT?**
- **DO WE KNOW THE MOST SENSITIVE AREAS?**
- **DO WE HAVE BUDGET?**

RISK ANALYZE AS A BASIS

- **RISK ANALYZE SHALL BE EXIST ON NATIONAL LEVEL, CONSIDERING SECTORS AS DEPENDENT**
- **TOP-DOWN ANALYZE GOING MORE SPECIFIC TO SECTORS (MACRO TO MICRO APPROACH)**
- **RISK ANALYZE SHALL BE THEN FOCUSED ON KEY COMPANIES, ESPECIALLY CRITICAL INFRASTRUCTURE OPERATORS (BUT NOT ONLY)**
- **CONSIDERING VARIOUS ASPECTS AND POINT OF VIEWS (ENERGY VS. TELCO, TELCO VS. ENERGY – DEPENDENCIES ARE NOT BIDIRECTIONAL BY DEFAULT)**
- **NATION WIDE REGISTER OF THREATS, TAILORED FOR TYPICAL SECTOR SCENARIOS, MAY STREAMLINE SPECIFIC SECTOR ANALYZES**

THE BUTTERFLY EFFECT

IN CHAOS THEORY, THE BUTTERFLY EFFECT IS THE SENSITIVE DEPENDENCE ON INITIAL CONDITIONS IN WHICH A SMALL CHANGE IN ONE STATE OF A DETERMINISTIC NONLINEAR SYSTEM CAN RESULT IN LARGE DIFFERENCES IN A LATER STATE.

BOEING, G. (2016). "VISUAL ANALYSIS OF NONLINEAR DYNAMICAL SYSTEMS: CHAOS, FRACTALS, SELF-SIMILARITY AND THE LIMITS OF PREDICTION SYSTEMS"

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