



CIT Update

Dr. Charles Hillyer, Center for Irrigation
Technology - Fresno State



Center for Irrigation Technology

Lab Status & Standards Update

CIT Facilities & Lab Areas of expertise

- Development of testing protocols that define component performance
 - Performance data for system design
 - Product data for sales literature
 - Creates a basis for product differentiation
- Testing product performance as relates to USA and international standards requirements (ISO, ANSI, ASABE, ASSE, IADMO, ASTM, IA, etc.)

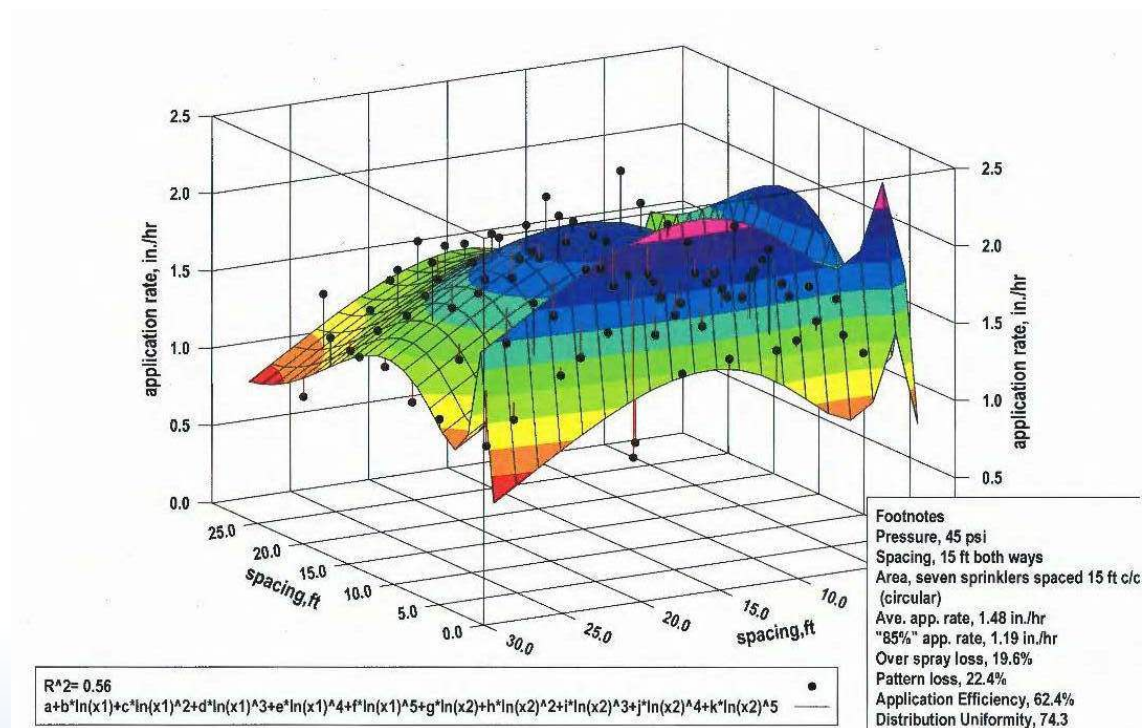




CIT HYDRAULICS LAB

Facility Size.....13,000 ft²
Test Lab Size 8,000 ft²
Year Opened.....2007
Test Pit Depth.....22 ft
Test Pit Volume.....53,000 Gallons
HP Capacity.....300 HP
Flow Capacity.....0 to 6000 gpm

Sprinkler Testing Laboratory



CIT Lab Status

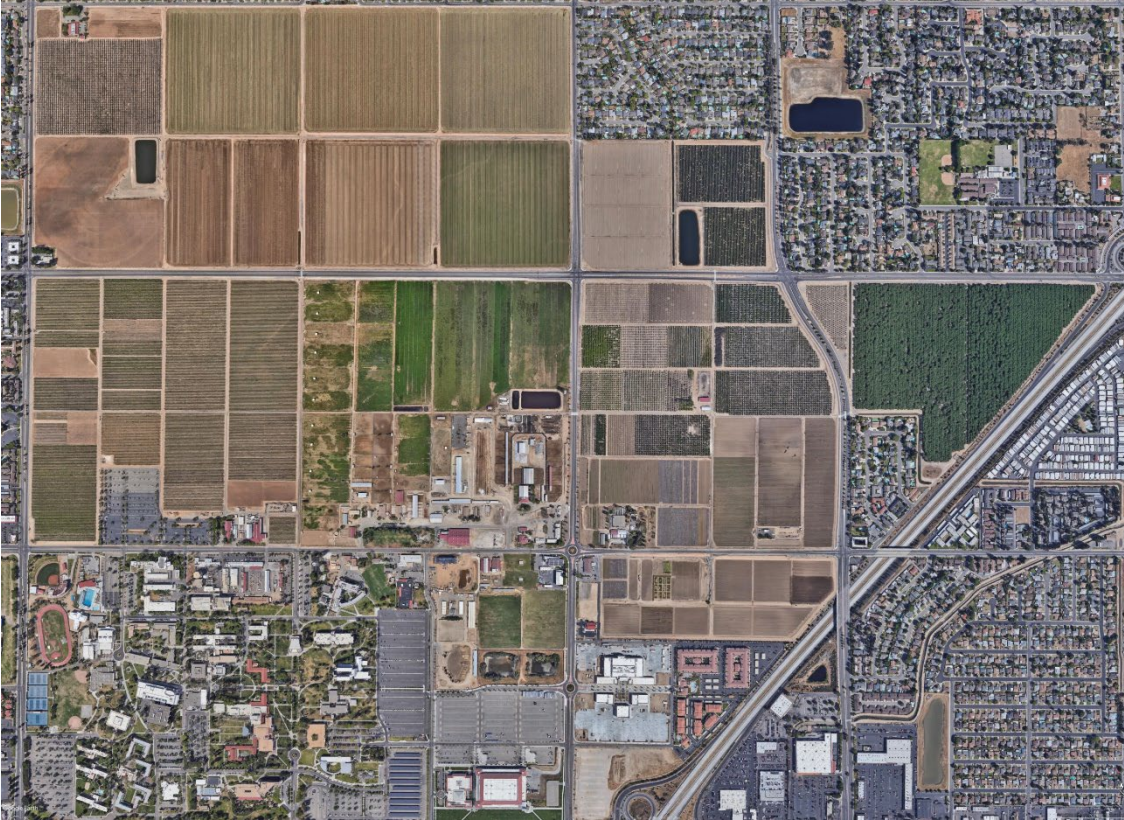
- COVID was not kind to CIT ...
- Critical staffing shortage shut down lab testing in early 2022
- Testing will resume (hopefully) in late July, after our IAPMO audit

<https://csucareers.calstate.edu/detail.aspx?pid=101375>

CIT Research Plots

- 6 acres
 - Dedicated turf plots
 - Multiple research projects each year
 - Public and private funded research
- **Focus on
Applied Research**





Fresno State Farm

- CSU Fresno University Agricultural Laboratory
- 1000 Acres (≈ 400 Ha)
- Farm represents microcosm of San Joaquin Valley
- Surface water and groundwater
- Drip, micro, pivots and surface irrigation systems
- Trees, vines, row crops and vegetables
- Allows for new technology testing and evaluation
- Provides training opportunities for students and growers

Water, Energy and Technology Center (WET)

- Technology Incubator & Accelerator Program



WET Center Works

We want to **empower students with experience** by leveraging the region's resources to support clean energy innovation and commercialization! Our primary focus is to develop and implement an experiential, hands-on-learning program that exposes undergraduate students to career opportunities in the ag-tech or climate/energy-focused industries.

We will be working with startup companies who are a part of or entering the ag-tech, climate-tech or energy space. **The WET Center Works program will provide learning opportunities to undergraduates through paid, project-based work experience that pairs students with startup companies.** Our mission is simple: to support and cultivate high-growth water, clean energy and ag-technology ventures, foster business growth in California's Central Valley, and empower students to be part of the next generation of growth and change.



FOR STUDENTS

Getting real-world experience just got way easier. Interested in our program?

Please email your resume and the position you are interested in to innovate@mail.fresnostate.edu



FOR COMPANIES

Have the perfect task for a student to assist you with?

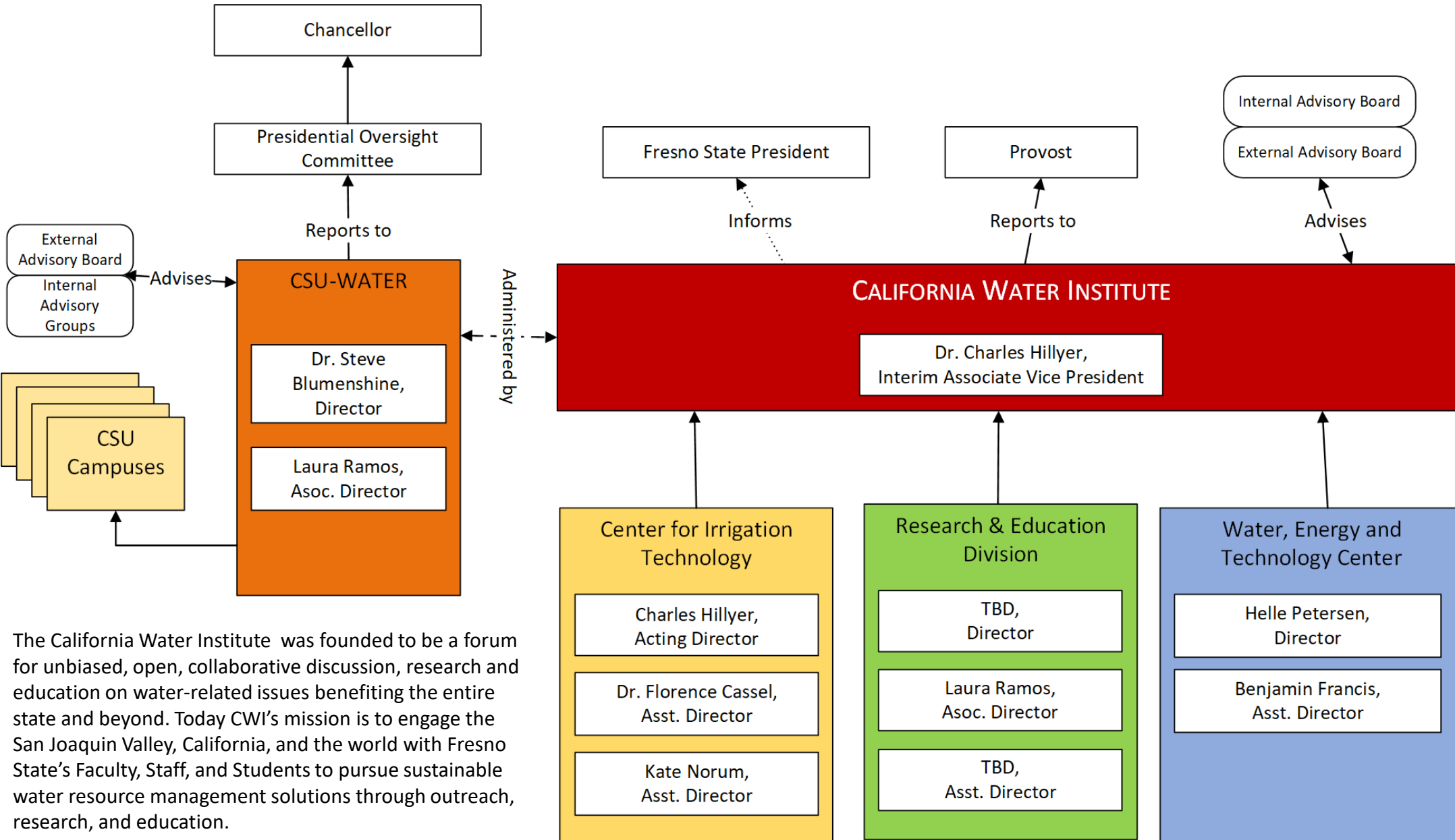
Reach out to us at innovate@mail.fresnostate.edu to learn more OR fill out our [inquiry form](#) below.



QUESTIONS?

Please direct all questions to innovate@mail.fresnostate.edu.

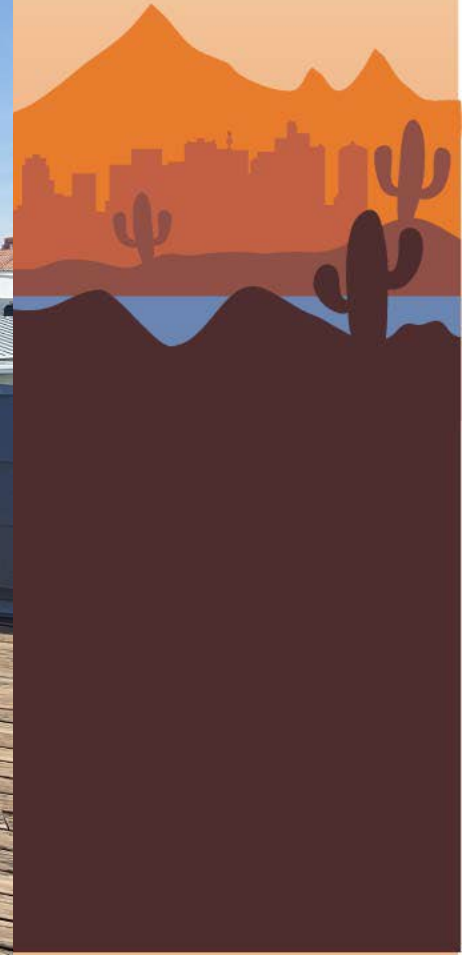
Thank you!



The California Water Institute was founded to be a forum for unbiased, open, collaborative discussion, research and education on water-related issues benefiting the entire state and beyond. Today CWI's mission is to engage the San Joaquin Valley, California, and the world with Fresno State's Faculty, Staff, and Students to pursue sustainable water resource management solutions through outreach, research, and education.

Standards Update

ISO Plenary of
TC23/SC18 in
Madrid last
week



AHG1: Micro-emitter clogging

- Renewed interest in establishing a standard for microemitter clogging
- Effort lead by Mr. Gao Benhu, from the Chinese delegation
- China has been translating several of their existing standards
- New standard(s) would include method for short and long term testing, and possibly performance standards
- Committee resolved to establish a new project at the preliminary stage
- Expect more developments next year



WG7: Valves

- Significant revisions of **ISO 9911 Manually operated small plastic valves**
 - Name changed to: **ISO 24649: Manually and hydraulically operated plastics valves**
- Committee resolved to open a revision of **ISO 9635-4 Irrigation valves — Part 4: Air valves**
 - Initiated by concerns from Israeli and Spanish delegations
 - Concerns seem to be focused on test methods
 - Scope of the standard will not change
 - Publication scheduled for 2026



Remote Monitoring & Control Technologies

ISO 21622 Irrigation techniques

— Remote monitoring and control for irrigation

- Part 2: Tests of Functionality and Robustness
 - FDIS approved, publication set for this year
- Part 3: Interoperability
 - Consensus reached (finally, after 8 years!)
 - Pivots and Linears are explicitly excluded
 - US Security and privacy concerns included as **normative**
- Part 1: General considerations
 - New Work Item Proposal scheduled for this year
- Part 4: Functionality
 - Postponed until 2025



WG 10: Filters

- New effort for **Determination of filtration grade**
 - Lead by Dr. Antonio Pires de Camargo from Brazil
 - Expect a **New Work Item Proposal** next year ...



WG 13: Pressurized irrigation systems

- ISO/PWI 24120-3 Guidelines on the implementation of pressurized irrigation systems – Part 3: Sprinkler Irrigation
 - Lead by Mr. Dubi Segal of Israel
 - NWIP scheduled for this year
- ISO/PWI 24120-4 Guidelines on the implementation of pressurized irrigation systems – Part 4: Mechanized irrigation
 - Cancelled and scheduled for reevaluation in 2025



Future Work Program

- ISO 13460-1:2015 - Plastics saddles — Part 1: Polyethylene pressure pipes
 - NWIP being prepared by Indian delegation
- Organic Farming
 - Lead by Indian delegation
 - Focus is on fertilizer production and injection
 - Examples were for relatively small systems
 - Discussions continue ...
- Nutrient solution supply unit — General requirements
 - Lead by Korean delegation
 - Focus is on fertilizer injection systems in greenhouse and CEA
 - Ad Hoc Group 3 created



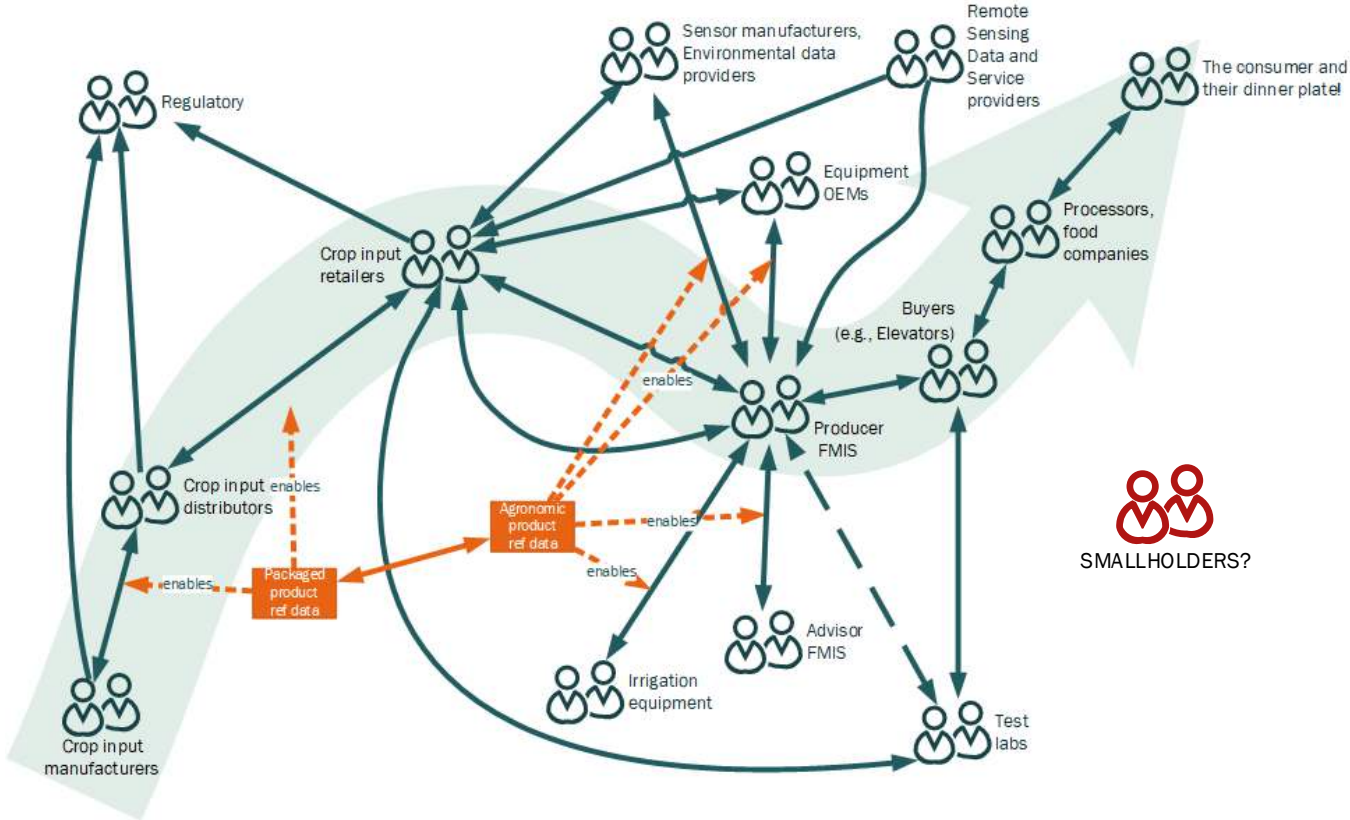
The ISO Strategic Advisory Group for Smart Farming

R. Andres Ferreyra, PhD (Syngenta Digital, Murray, KY, USA)

Johannes Lehmann, Head of Business Development, Smart Farming, German Institute for Standardization



Why are standards needed in Smart Farming?

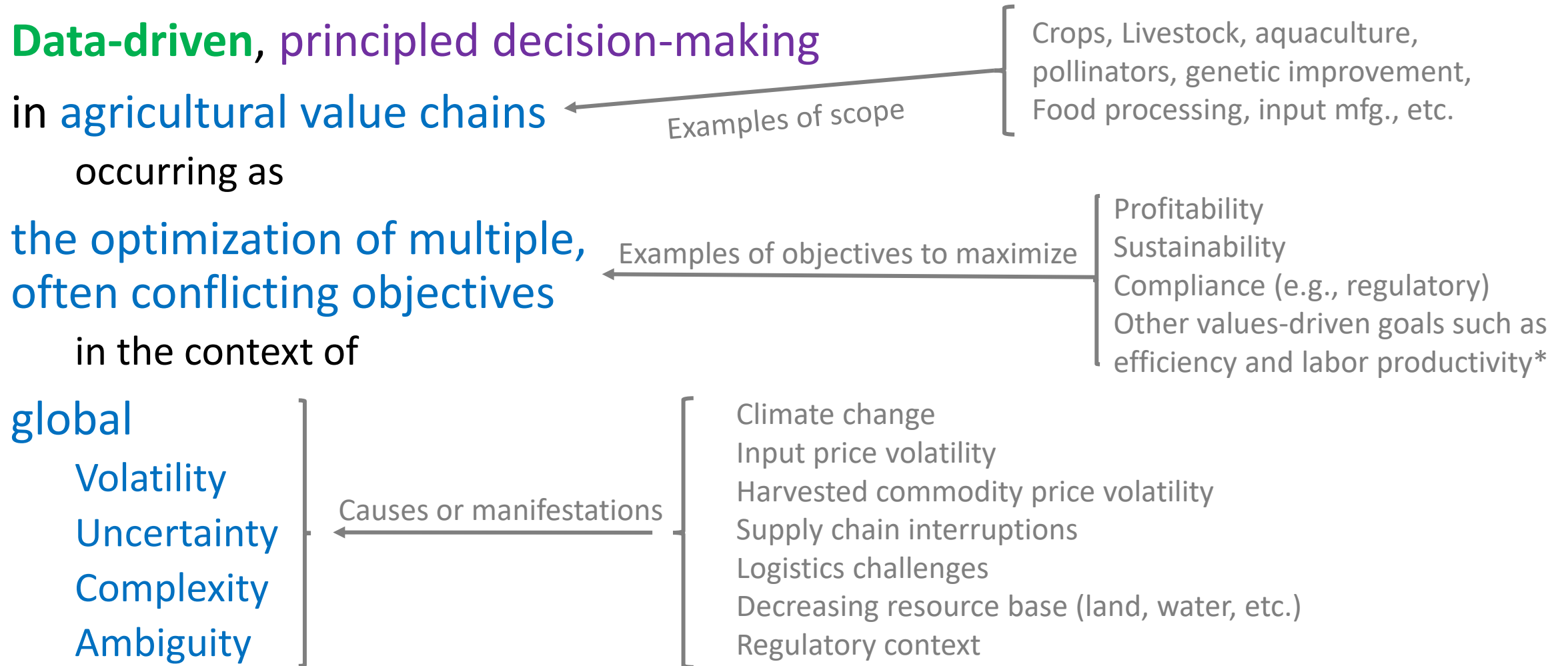


Cross-cutting technologies and topics

Artificial intelligence
Cybersecurity
Food loss and waste
Climate

- As the **complexity** of agriculture **grows**, the number of stakeholders and the **complexity of information flows** does too.
- Modern farms use machinery and software systems from multiple manufacturers.
- Producers must deal with a multitude of mutually-incompatible proprietary data formats, code lists, etc.
- **Standards, i.e., standardized interfaces, data formats and semantics are required for interoperability.**
- **IMPORTANT:** How to make the advances of Smart Farming available to a greater number of people. For example, how do smallholders fit here?

A working definition of Smart Farming



* These are geopolitical-context-dependent and may not be applicable in some contexts.

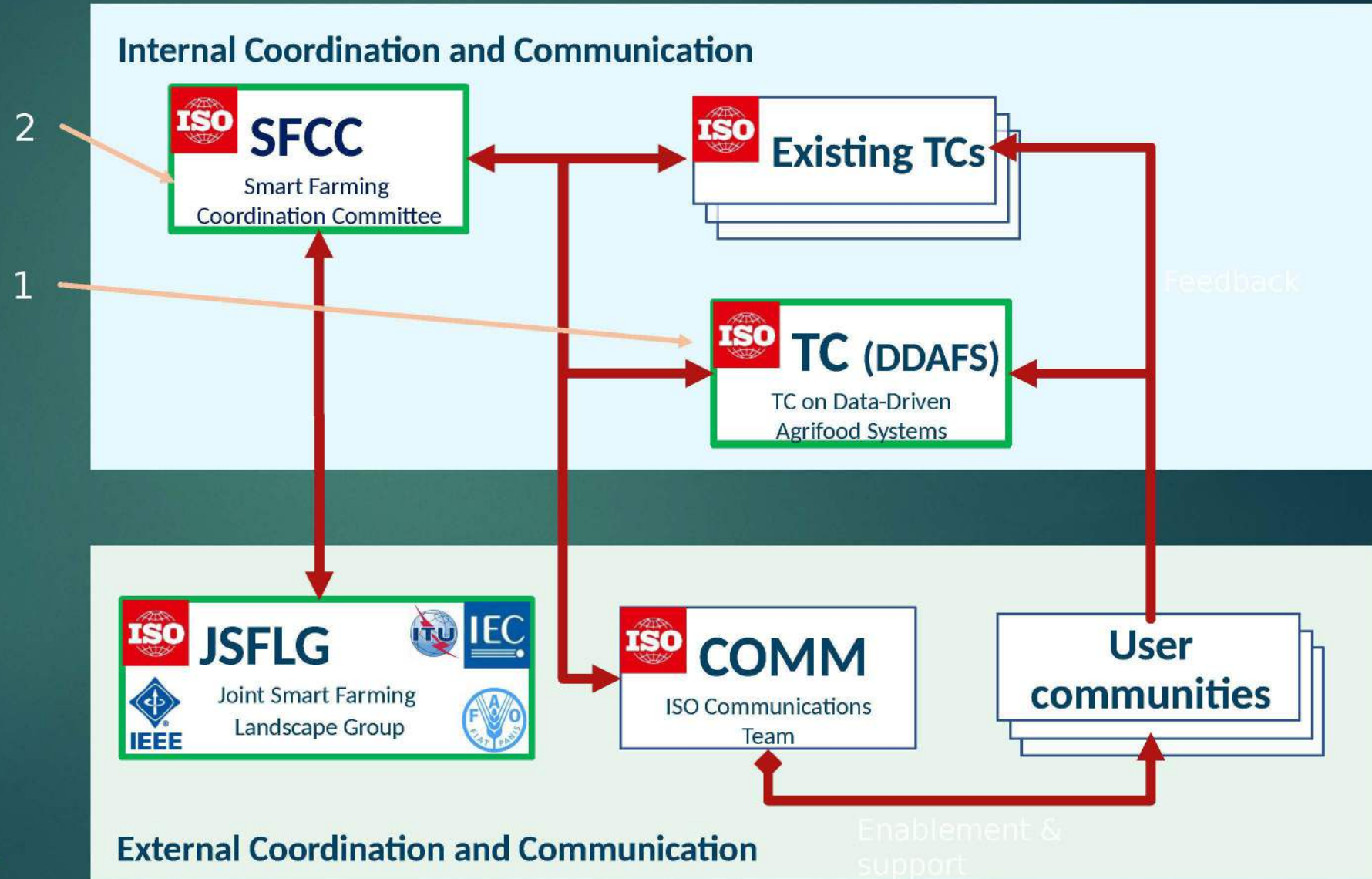


The data were collected through 9 subgroups engaged in the following areas:

- 1 . Crop production*
- 2 . Livestock and animal products*
- 3 . Greenhouse, controlled environment and urban farming*
- 4 . Climate and environment*
- 5 . Original equipment manufacturers*
- 6 . Terminology and semantics*
- 7 . Social aspects*
- 8 . Data and data exchange*
- 9 . Supply chain*

Coordination overview

Critical first steps





Thank You!

Dr. Charles Hillyer

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www.fresnostate.edu/jcast/cit

1.559.278.2066



The Business Case for Cyber Security

Zack Anderson, AIM IT Services

Cyber Security

By: AIM IT Services

"Providing New Technology, The Old-Fashioned Way"



Zack Anderson

VP of Managed Services

Most Common Responses

"Oh, you work in IT, so you..."

Make Websites? **Fix Printers?** **Are a Hacker...?**



Topics



Attack Vectors



Protections



Recommendations / Best Practices



Real world examples

Attack Vectors



Email (External Links / Credential Theft)



Email (External Links / Credential Theft)

Threats

- Impersonation Emails
- Alert Emails
- Share Links
- Encrypted Emails

Goals

- Credential Theft
- Redirect to Malware Website
- Reroute Payment / Direct Deposit



Email (External Links / Credential Theft)

An Example of Email Spoofing

So what does a spoofed email look like? Let's review the following example:

For one, the sender is impersonating "Medical Suppliers," using Display Name Spoofing and Domain Name Impersonation.

Alex, who is the head of Denver Dialysis Center procurement, might receive this email thinking that he forgot to pay an important invoice.

The email looks like it was sent by his contact at Medical Suppliers, Inc., Michelle, and it references the correct invoice number. But upon further examination, there are a few clues that point to Display Name Spoofing and Domain Impersonation.

From: **Medical Suppliers, Inc.** <michelle.smith@medicalsuppliersss.com>
Subject: Invoice #4356 Subject to Late Fee
Date: February 1, 2021 8:45:45 AM PST
To: alex@denverdialysiscenter.com
Reply-To: Medical Supplies, Inc. <xyz@hotmail.com>

Hello Alex,

You have not paid Invoice #4356 within our 30-day payment terms, and are subject to a \$1,000 late fee.

[Click on this link](#) to pay this bill directly or you will be subject to an even higher fee in the future.

Regards,
Michelle

The body of the email has odd language, too. \$1,000 fee seems like an arbitrary late payment, and there aren't any details around how late fees are structured going forward.

Moreover, the email contains a link that will likely direct Alex to a fake portal where he'll be prompted to input his credentials and provide payment information.

And even if he doesn't click on the phony link, any replies he sends (which could contain sensitive procurement-related information) will go to the suspicious email address in the Reply-to field: "xyz@hotmail.com."



Email (Attachments / Ransomware)



Email (Attachments / Ransomware)

Threats

- Virus / Malware
- Ransomware
- Remote Access

Goals

- Crypto Locker
- Extortion
- Data Exfiltration



Email (Attachments / Ransomware)



Private key will be destroyed on

06/03/2022
18:42

Time left
71:59:47

Your personal files are encrypted!

Your important files **encryption** produced on this computer: photos, videos, documents, etc. [Here](#) is a complete list of encrypted files, and you can personally verify this.

Encryption was produced using a **unique** public key [RSA-2048](#) generated for this computer. To decrypt files you need to obtain the **private key**.

The **Single Copy** of the private key, which will allow you to decrypt the files, located on a secret server on the internet; the server will **destroy** the key after a time specified in this window. After that, **nobody and never will be able** to restore files...

To obtain the private key for this computer, which will automatically decrypt files, you need to pay 300 USD / 300 EUR / similar amount in another currency.

Click <<Next>> to select the method of payment and the currency.

Any attempt to remove or damage this software will lead to the immediate destruction of the private key by server.

NEXT



Physical Theft



Physical Theft

Threats

- Lost Hardware
- Lost Data
- Exposed Client Data
- Exposed Company Data

Goals

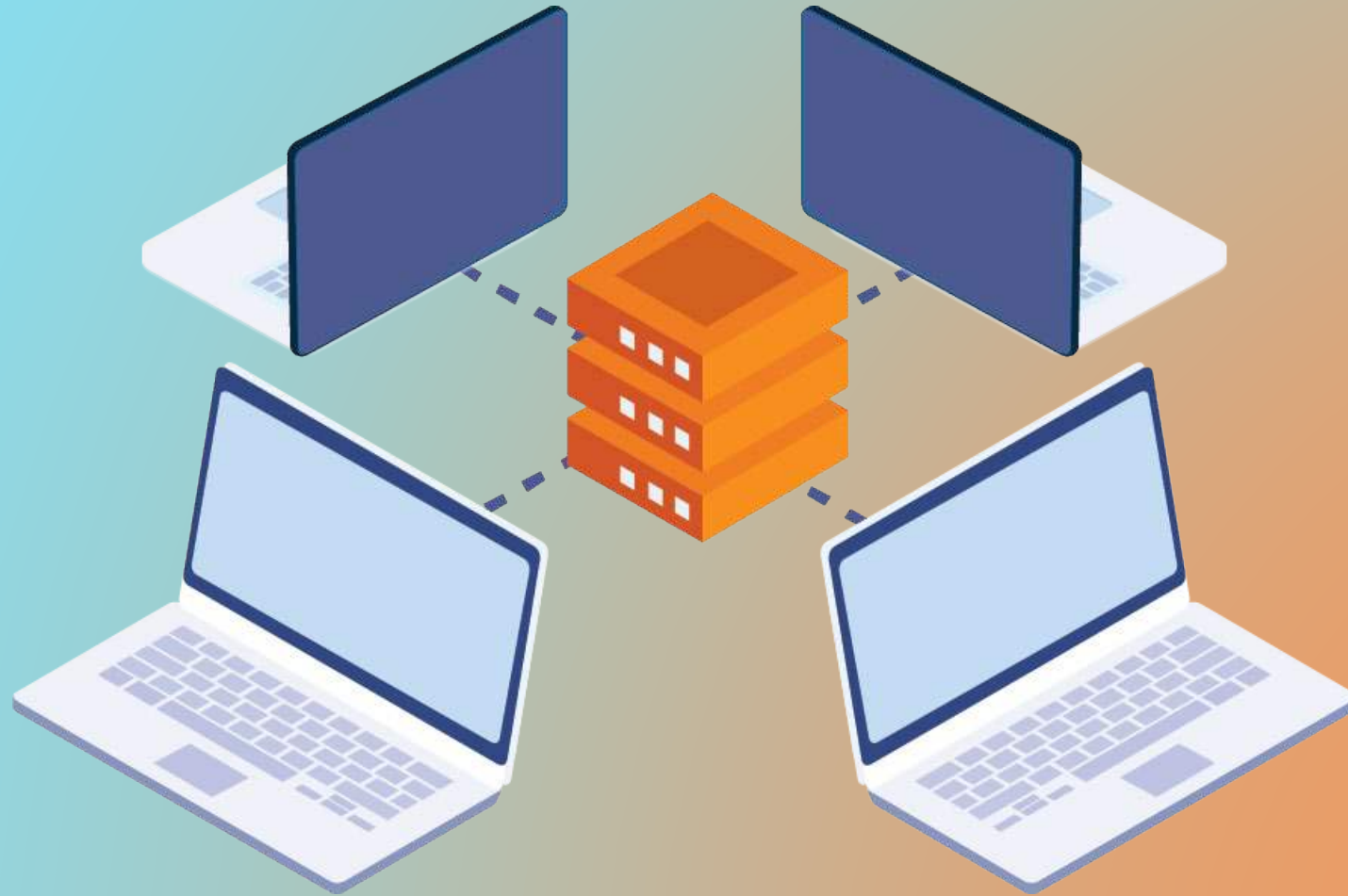
- Resell Stolen Hardware
- Credit Card Numbers
- Proprietary Client Data
- Logins / Passwords



Protections



Backups



Backup 3-2-1

3-2-1 Backup Strategy

Rule

- 3 Copies of your Data (including live set)
- 2 Local Copies but different Media
- 1 Copy offsite



Backup Tools

Cloud Storage / Sync

- Microsoft OneDrive
- Google Drive
- Drop Box



Backup Software

- Veeam Endpoint (<https://veeam.com>)
- AFI (<https://afi.ai>)
- Drop Suite (<https://dropsuite.com>)
- Carbonite (<https://www.carbonite.com>)

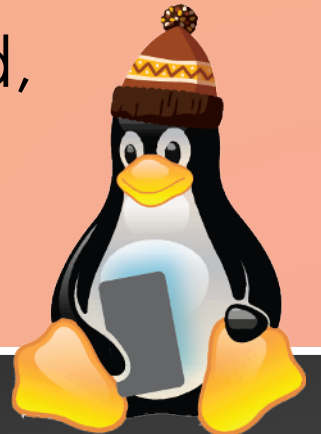


Backup Strategies



Cloud Storage

- Redirect Desktop, Documents, Downloads (OneDrive)
- Train Staff to use Cloud Storage (Dropbox, Google Drive, etc..)
- Use Online Versions of Tools (Google Sheets, Online Word, Quickbooks Online, etc..)



Backup Strategies

Cloud Provider Backups

- Do I need backup my Google/Microsoft Cloud? No
- Should I backup my Google/Microsoft Cloud? Yes

Why?

- User Error
- Convince / Simple Restore
- Retention
- Billing Disputes
- Compromised Cloud Admin Accounts



Passwords and Password Managers



Passwords Policy

National Institute of Standards and Technology (NIST)

- User-generated passwords should be at least 8 characters in length.
- Password Phrases are better (e.g. "This is my strong password")
- Context-specific words, such as the name of the service or the individual's username, should not be permitted.
- Users should be prevented from using sequential characters (e.g., "1234") or repeated characters (e.g., "aaaa").
- Knowledge-based authentication (KBA), such as "What was the name of your first pet?", should not be used.
- Complexity requirements — like requiring special characters, numbers or uppercase letters — should not be used.
- Passwords should not expire



How to pick a good password?

- Minimum 8 characters but more is better
- Longer passwords that are simpler and better than short passwords that are complex
- Don't use known facts/numbers (birthdays, madden name, kids names, etc..)
- Password Phrases are the best
 - **Bad Password:** Password123!
 - **Better Password:** E*dbVTz
 - **Best Password:** I would rather be fishing!

Passwords Managers

Pros

- Only need to remember your Master Password
- Single repository of all your passwords and helps enforce unique and complex passwords
- Allows sharing of passwords with other users
- Some can check if your password is on any public breaches
- Desktop / Mobile applications available for some

Cons

- Only as safe as your Master Password
- All your eggs in one basket



SSO



2FA Everything!

What is 2FA?

The recommended security setup requires 3 things to authenticate you:

- Something you are (username)
- something you know (password)
- Something you have (2FA)

`Username`s are easy to guess these days, mostly your email address.

`Password`s can be phished or guessed by attackers. Stealing your 2FA token is much harder, which is usually an app running on your phone or possible hardware token.



When to enable?

- Just about any major software or service provider should support 2FA these days
- You should turn it on anywhere and everywhere you can
- Consider using alternative vendors/software if they don't support 2FA
- SMS (Text Messages) is better than nothing, but no longer recommend
- Authentication Apps (Google Authenticator, Microsoft Authenticator, Duo, etc..) are better



What is SSO?

- Some vendors will allow you to authenticate to their servers using a 3rd party (Google, Microsoft, etc..)
- In most cases this is a good thing here is why
- One less password to remember
- One less password to change if you need to rotate
- 3rd Party probably has better Security and support for 2FA



Endpoint Security



Best option for SMB? Windows

Defender

- Based on the independent tests concluded in January and February 2022, AV-Test labs evaluated Microsoft Defender protection at 100%. This is both in terms of prevalent malware and zero-day threats, including online and email threats. By contrast, AV-Comparatives tested Windows Defender in March 2022 and concluded around 99% malware threat detection and protection rates with only five false positives. Compared to top providers in the antivirus market, these are good results.
- Included with all versions of Windows at no extra charge
- Definition Updates come through Windows Updates



Windows OS and Updates

- Enable Windows Updates and let it reboot when it asks
- Upgrade your version of OS when it goes End of Life
- Windows 7 EOL: January 14, 2020
- Windows 8 EOL: January 12, 2016
- **Windows 10 EOL: October 14, 2025**
- Windows 11 EOL: TBD



Application Updates

- Make sure to update your other applications as well.
- Pay special attention to Browsers, MS Office and PDF viewers since they are common targets of exploits. Most of them have built in update notifications, do it when they ask.
- Ninite (<https://ninite.com>) is a great application to let you install/update common applications.



Computer Encryption

- Most Laptops come with hardware to support BitLocker, you should enable it
- When buying new hardware see if you can find ones with included TPM Chips (most do)
- Confirm you have the lock logo (see below) on your C:
- Can also be used to Encrypt USB / External Drives
- If using Microsoft 365 the encrypt keys should be automatically backed up to MS, if not you should export and save the keys somewhere safe.



Adblocker / DNS Filtering

- Recommend install Adblock (<https://getadblock.com>) or uBlock Origin (<https://ublockorigin.com>) for any browser you use (Edge, Chrome, Firefox)
- Not only does it cut down on Ads but it will protect you if Ad Network is compromised and used to send out malware. They are common targets.
- DNS filtering is also a good way to add another layer of protection.
- NextDNS (<https://nextdns.io>) has free and cheap home/business plans that will also help filter out bad websites and other malware related networks
- Cloudflare (<https://1.1.1.1>) also has a free DNS you can use on your machines/networks.
- For home use they also have some DNS filters that can block adult content <https://1.1.1.1/family> . Also works for businesses.



Recommended Setup



Basic Setup

Here is how I would setup a new business..

- Windows 10 or 11 Professional (no Windows Home)
- Everyone logs in with Microsoft 365 Accounts that have 2FA enforced, no exceptions.
- Microsoft 365 Business Standard License (Office Users)
- Microsoft 365 Business Basic (Field Users)
- Microsoft OneDrive with Known Folders (Desktop, Docs, etc..) redirect on all machines
- Ideally some basic IT policies related to how/where to save data given to staff
- Purchase only Laptops for flexibility and make sure BitLocker is enabled
- Password Manager with Business account (LastPass, BitWarden, etc..) and make sure all staff uses this to save any business-related logins.
- Full backup of Office 365 (AFI or Dropsuite) to save Email, Onedrive, Sharepoint, Teams, etc..



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Considering HDPE in Commercial Projects

Garry Bouvet, ISCO Industries

<https://prezi.com/view/NGXt4cJqJY968QaTlaIE/>





Supply Chain Issues Facing the Irrigation Industry Update

Dan Wurgler, Ewing Irrigation

This Afternoon-

- **The Toilet Paper Tempest**
- **Let's Talk About the Weather**
- **One is the Loneliest Number**
- **Q&A**



Toilet Paper Tempest



Supply Chain

A network of individuals and companies who are involved in creating a product and delivering it to the consumer.



Let's Talk About the Weather

- **What's Better?**
 - Product availability in general
 - Transportation
- **What's Not?**
 - Supply consistency
- **Prices**
 - More stability
 - Commoditized products moving down
 - Other products appear to be holding or moving to a more traditional pattern

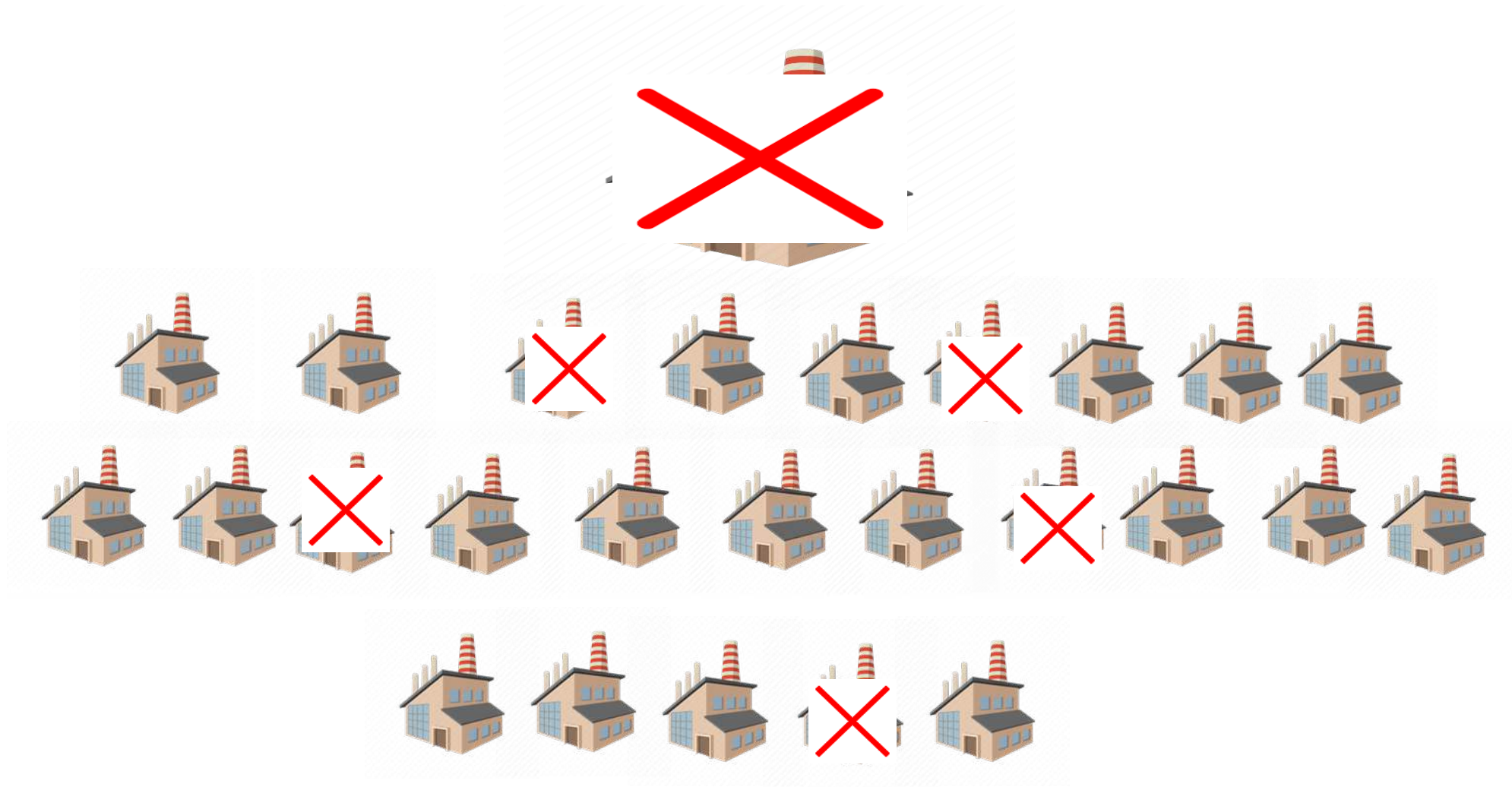


Let's Talk About the Weather

- **What's Next?**
 - **Transportation (Domestic)**
 - **Natural Disaster**
 - **An ongoing war in Europe**
 - **A very real possibility of conflict in Asia**
 - **Government Regulation**



“Making things is hard!”



One is the Loneliest Number



One is the Loneliest Number

- **Most supply disruptions can be mitigated by some combination of...**
 - **Modification of Time Frame**
 - **Modification of Budget**
 - **Modification of Specification**
- **The importance of a Plan B.**



Questions

