Building Automation System Game Changers

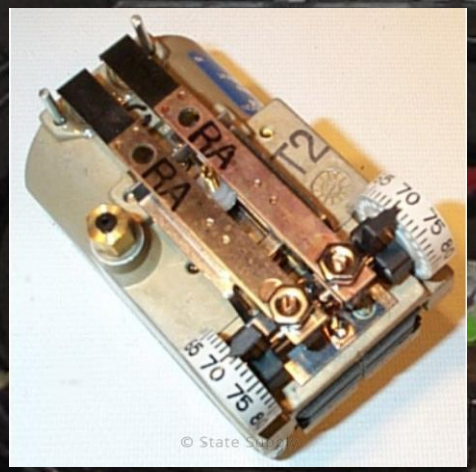
Presenter: Fred Hayward,

Building Automation System Coaching and Design

Building Automation System Game Changers

Kent ISD's Assistant Superintendent Jerry Hunsberger was convinced that it was important to bring the entire district's HVAC system into the digital age

Kent ISD HVAC was 95% pneumatically controlled in 1996



I was hired in part to upgrade about 600,000 sq.ft. of buildings to digital controls

My first real BAS challenge presented itself in combatting an error in understanding basic HVAC system operations on the part of the facilities staff as they overreacted to a catastrophic failure.

Remember, we are talking about 600,000 sq. ft. of building in occupied mode, 24/7 through the coldest months of the year…

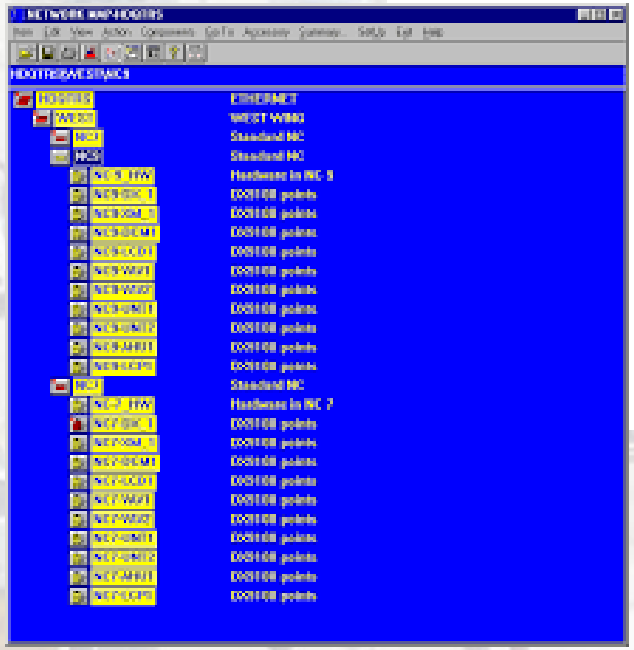
Think about it…

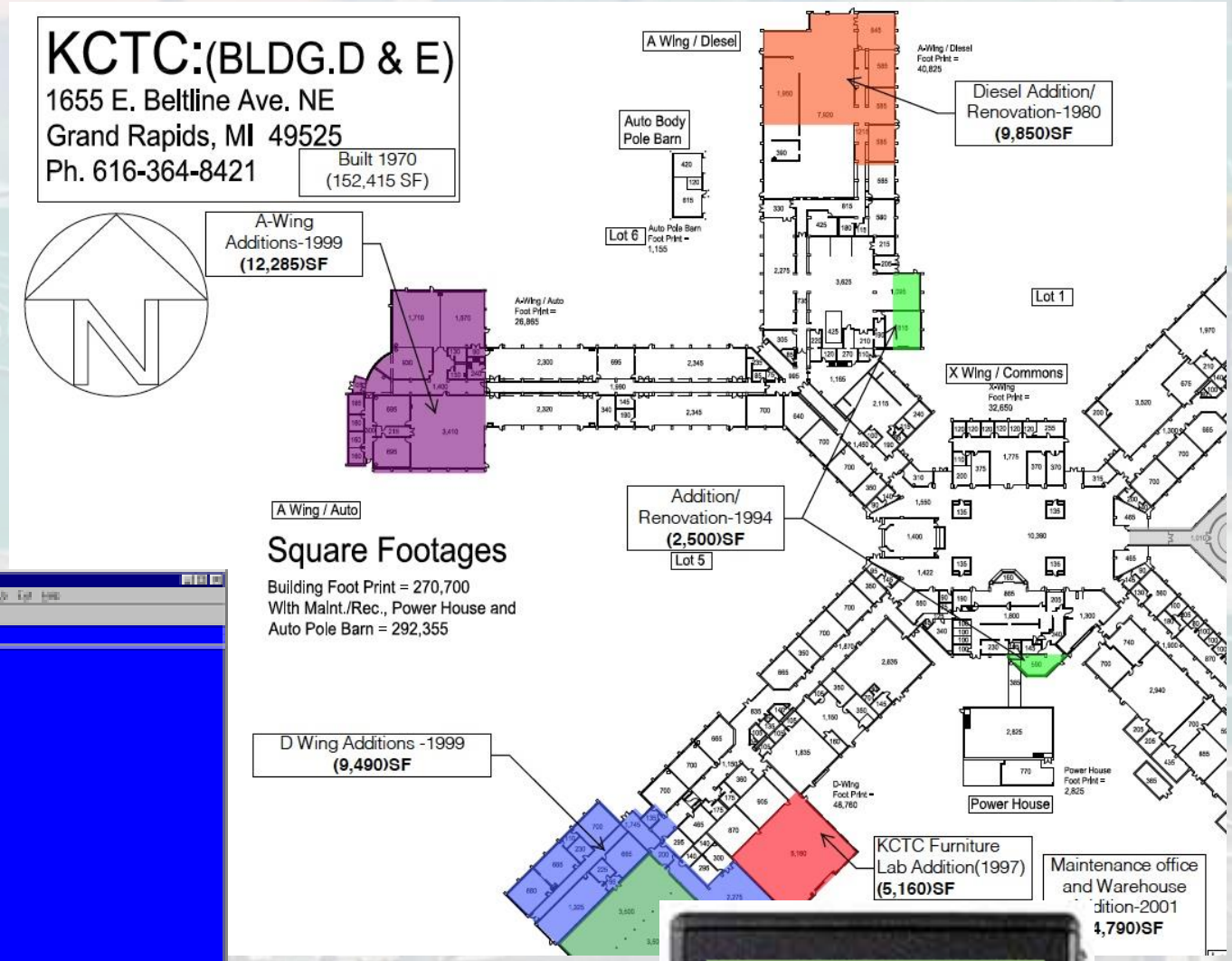
Julio and I had our work cut out for us trying to re-educate folks in what I was learning were HVAC basics… like… introducing outdoor air into a building more than necessary in the dead of winter is a BAD idea.

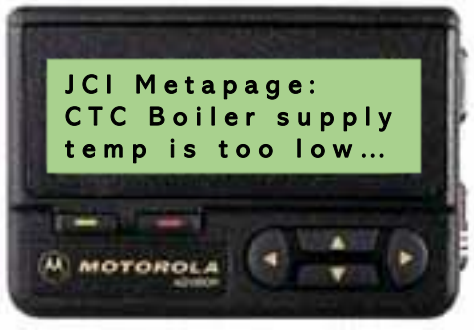
So we talked them out of it. Slowly.

It was our first big success in using our BAS to put money back into the classroom… I cannot even imagine how much money it saved the first year… if our accountants noticed they didn't say anything and I didn't have access to the energy bills at the time... Which by the way, ***you should get access if you can***.

Digital controls were rolled into our late 90's additions – including a JCI Metasys workstation

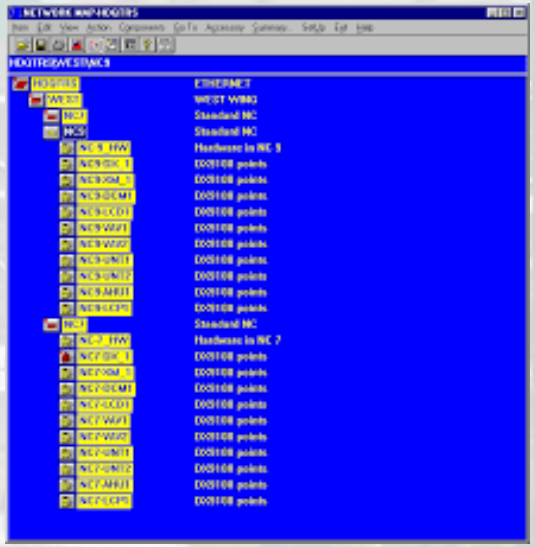




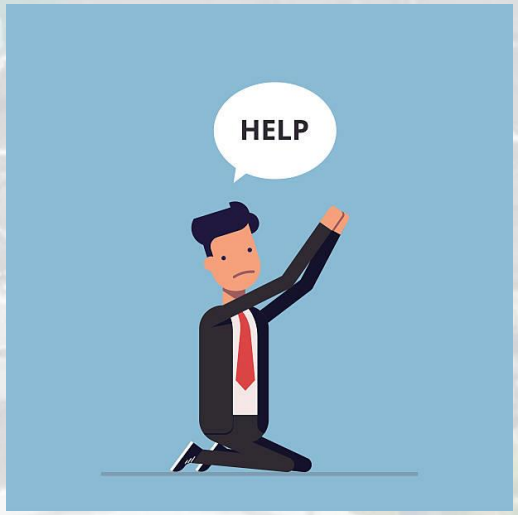


With the advent of cell phones, one tech in the field could call the other tech back at the shop and have him login to the BAS and help him trouble shoot.

GAME CHANGER #1



Our work order system almost didn't exist, no coordinated effort to handle HVAC or BAS problems or any other calls for help.

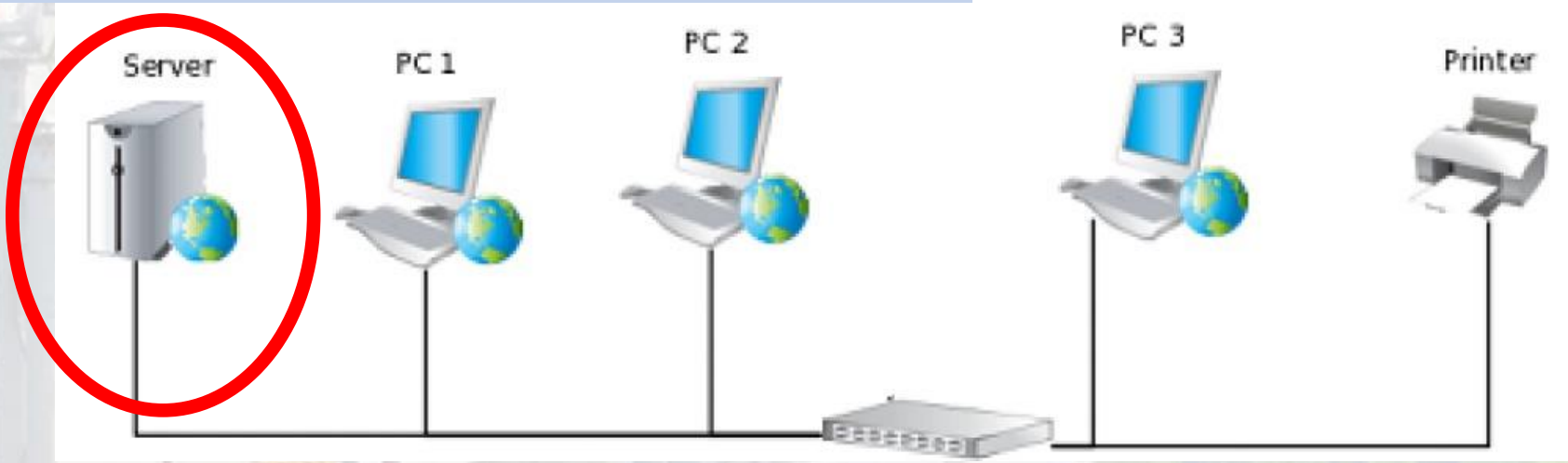


Since I was the computer geek for the department, I started looking into CMMS's..

ASSET HANDLER

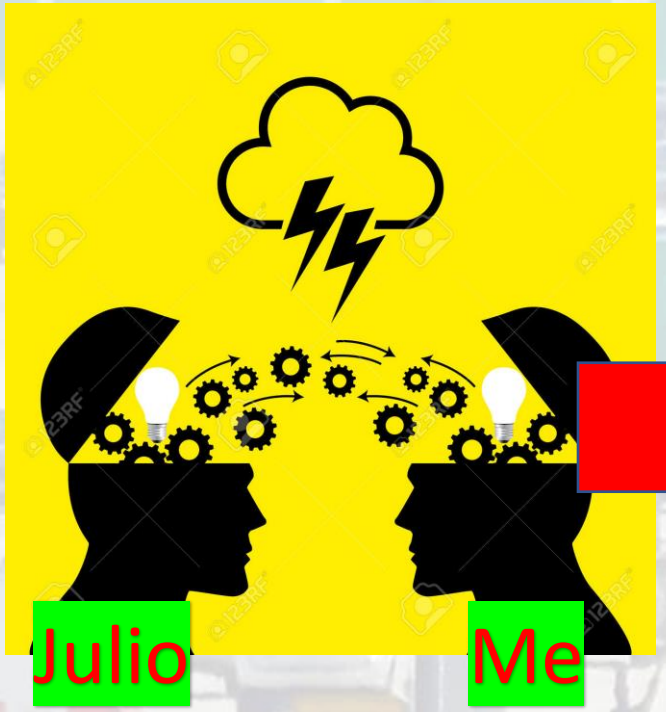
CMMS

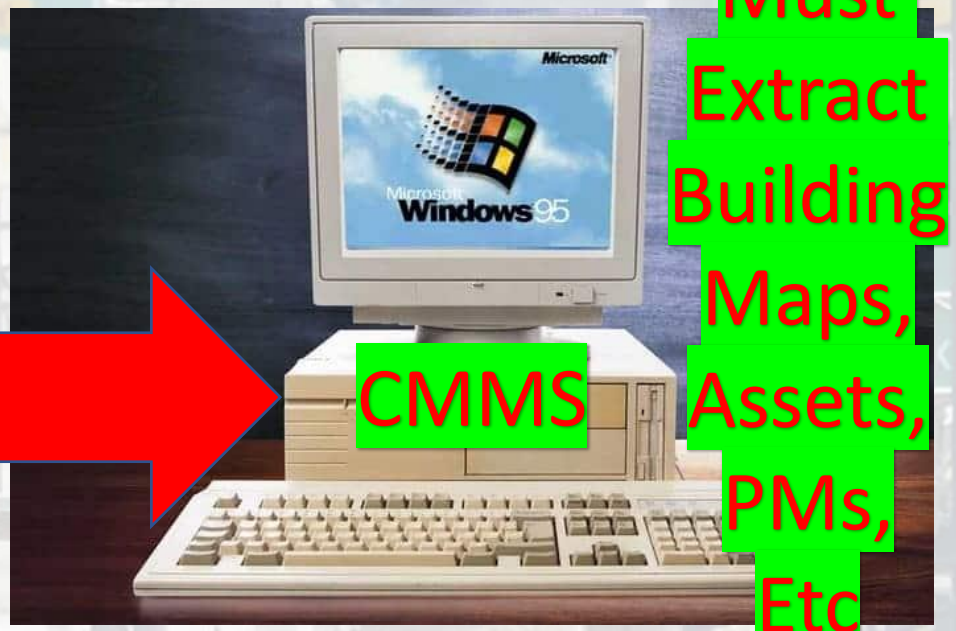
Computerized Maintenance Management Software



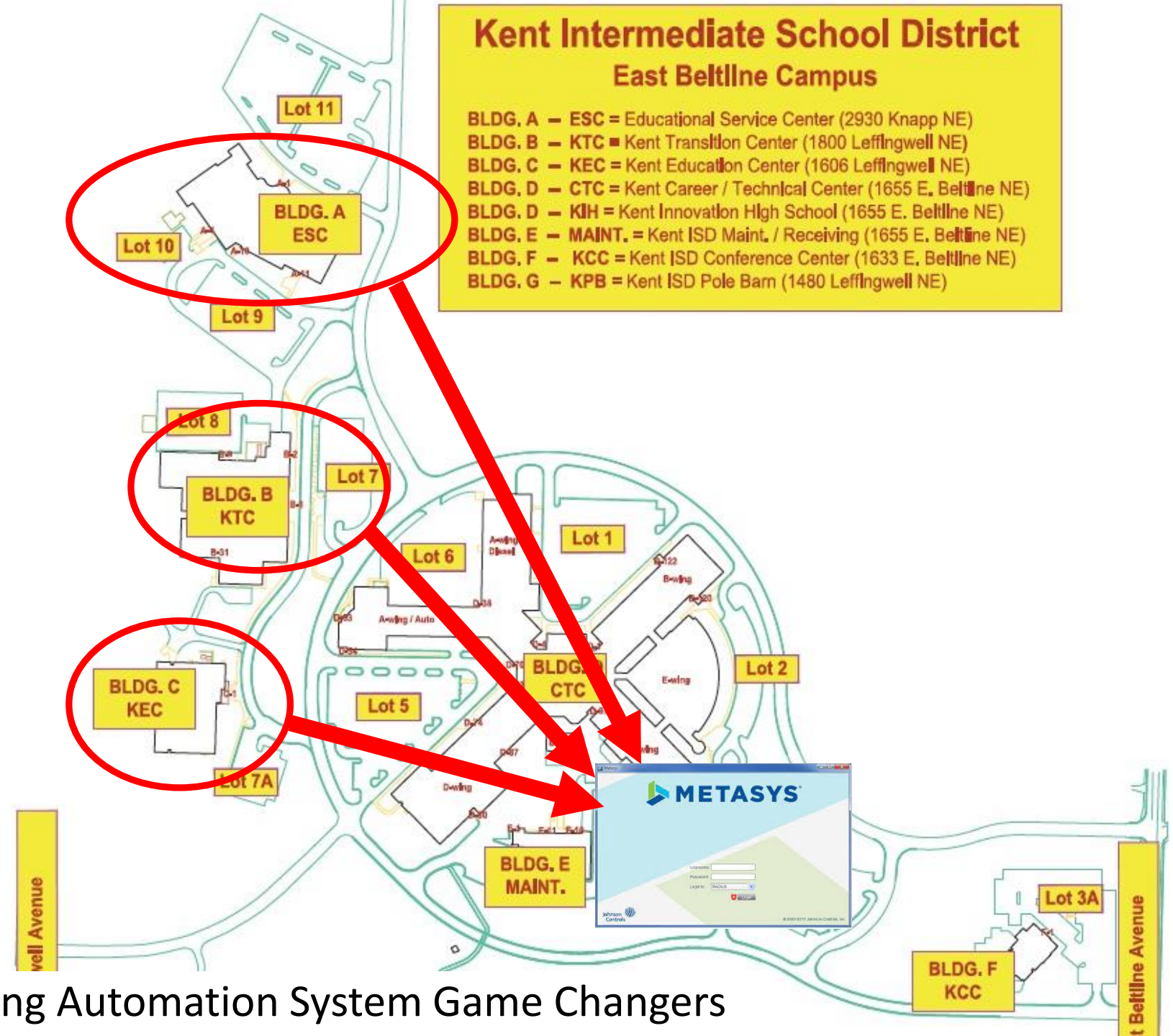
Julio is Retiring!!!!

INCENTIVE: Julio is retiring… and all that institutional knowledge on HVAC, BAS and most importantly Preventive Maintenance is walking out the door!!!



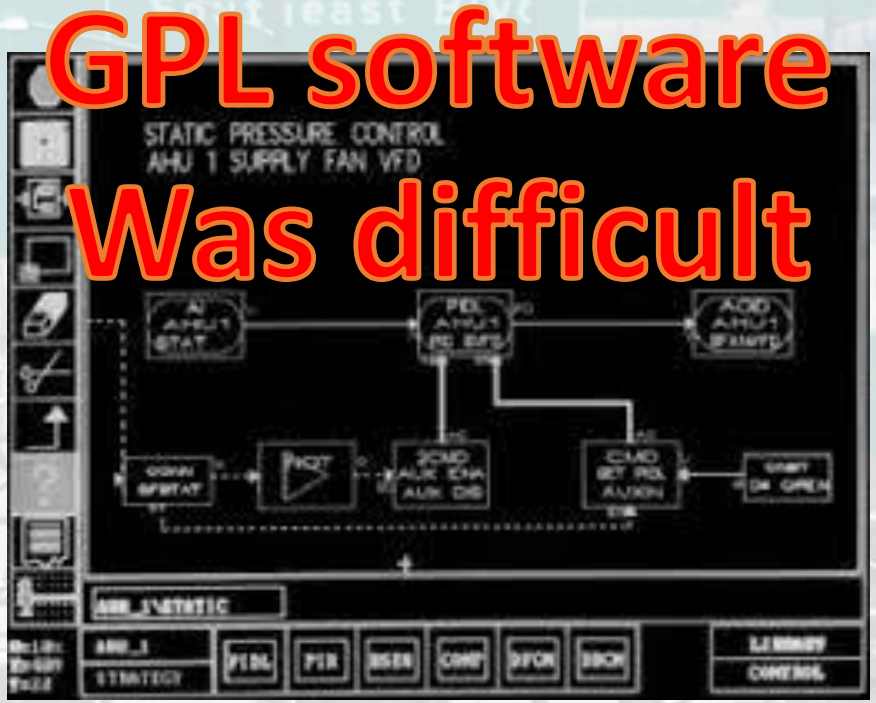


Must Extract Building Maps, Assets, PMs, Etc



The early 2000's saw our Board continuing to support our BAS digital upgrades… more buildings came online with core systems accessible through our Metasys workstation.

METASYS



As our system grew, we became less and less enchanted with our building head end controllers. They were pricey and didn't allow us to make program tweaks without difficulty

With my boss's flat-out refusal to work with JCI's controls division anymore, I started looking into Trend which was very strong in the European market, but it had its drawbacks as well.

TREND

Almost as pricey as JCI and highly proprietary

We started considering Tridium's Niagara Platform and head end controllers and we are really glad that we did! At the time, JCI corporate couldn't even sell their version of it (the FX-40) and that suited my boss fine. Allow me to explain why this was a good idea for Kent ISD…

ALERTON

NO!!! WE ARE!!

Honeywell

NO!!! WE ARE!!

Johnson Controls

NO!!! WE ARE!!

novar®

NO!!! WE ARE!!

TRANE®

NO!!! WE ARE!!

TREND

NO!!! WE ARE!!

Navigating Building Automation System Options

GAME CHANGER #2

It is hard to overstate how well Tridium Niagara leveled the playing field for Kent ISD and so many others.

TRIDIUM

What did it do?

- It spoke all the favorite languages of the various proprietary vendors: N2, LON, BACnet, Modbus..
- It was less than half the cost of the more proprietary solutions
- Its graphics SNAPPED – 10 to 20 times faster than our experience with Trane or JCI at that time
- It deployed securely over the Internet!
- Programming tweaks could be done with ease on the fly with a tiny bit of coaching!

DIGITAL PENTECOST
(Undid the Tower of Babel)
We will speak all
Of your languages
And bring you all
Together under
One Roof!

powered by niagara framework

Let's GO LIVE on Kent ISD's BAS
To demonstrate some aspects of
GAME CHANGER #2

So, it was Hi Tech / Andy Egan and a couple other local contractors that showed us the way to Niagara. Hi Tech's Nate Denaway helped us in so many ways to make that transition over the next several years. Hi Tech started winning more and more of our BAS upgrade projects and JCI corporate faded in BAS world for Kent ISD, but they still used them to PM boilers and chillers.

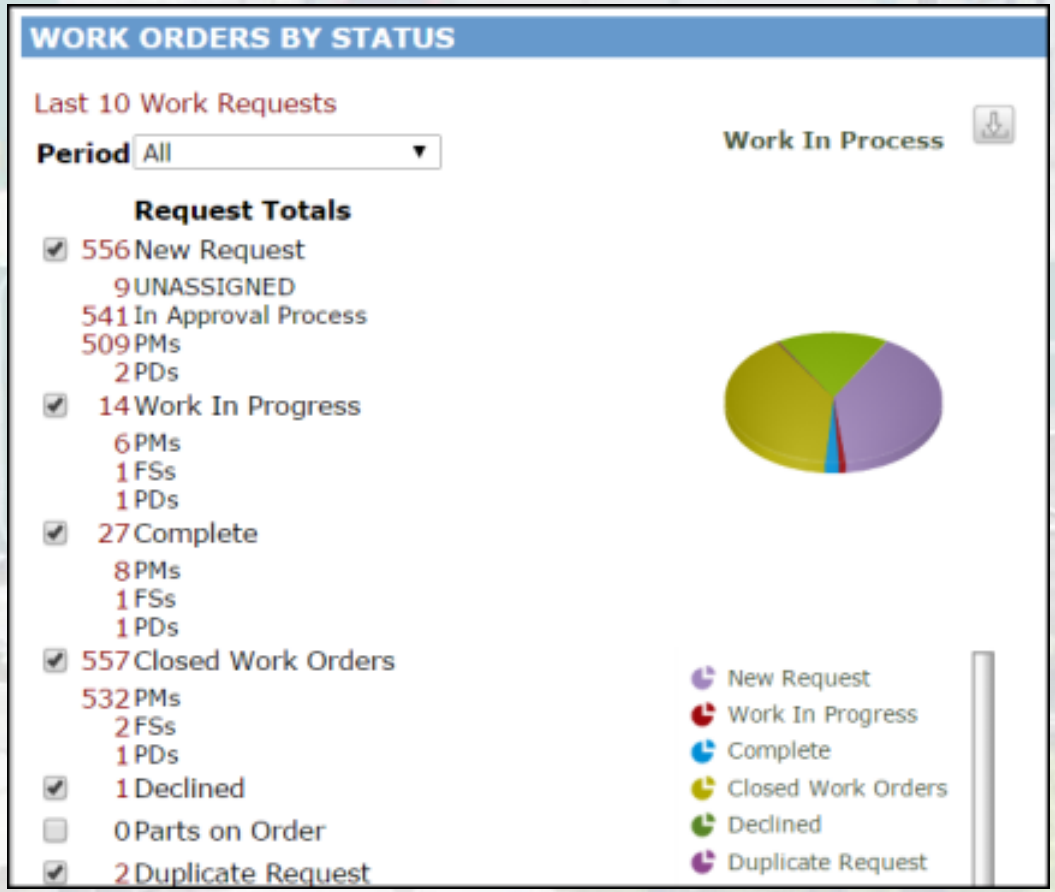
Andy J. Egan Co., Inc.

Sometimes the next game changer sneaks up on you and that was the case when I ran into Charlie McGinnis in the basement corner of the MSBO Expo in 2001, checking on his work orders over the INTERNET!!!

WHAT?!?!?

Michigan School Business Officials April 2001

Annual Conference & Exhibit Show



ENTER GAME CHANGER #3 for KISD

SCHOOL DUDE .com®

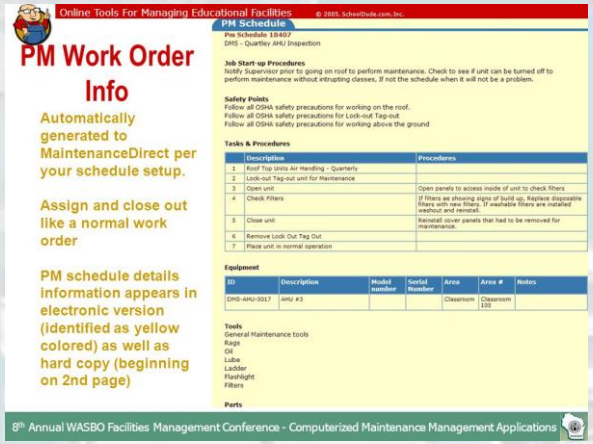
Goodbye CMMS

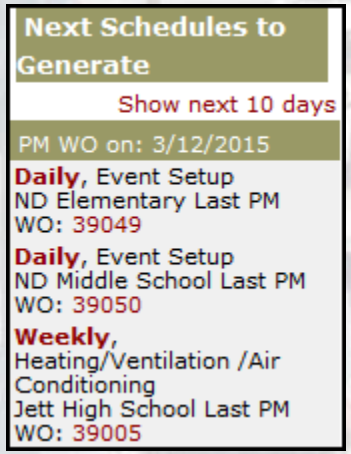
Hello SAS/IMMS

MAINTENANCE DIRECT™

Why were School Dude's IMMS Apps so good?

- Delivered over the Internet to every staff person in the district
- Much less costly than a Server based CMMS
- Updates and improvements deployed universally in the background (No more bugging IT to help)
- It sent out automatic email updates to all stakeholders on the work being done.
- It was modular, only activate the parts that you need, add more later.
- Very little input needed to get started now!





AND… it Integrated its PM module with it's work order module with a common asset database!!

- All the work Julio and I had been doing to give every asset a unique name paid off
- I could start getting all the PM data out of Julio's head and into the School Dude PM module… well, it took awhile, but at least we had a place to go with it!
- As PM schedules triggered they created work orders in the Maintenance Direct module
- Task lists could include HVAC, BAS and other critical items in each PM work order
- It was a little cumbersome, but it was a start!!!

GAME CHANGER #4

Between 2004 and 2006, Carsie Denning and CommLogix find a way to integrate School Dude's SAS/IMMS with a district's BAS system… Huh?!? What does this mean?

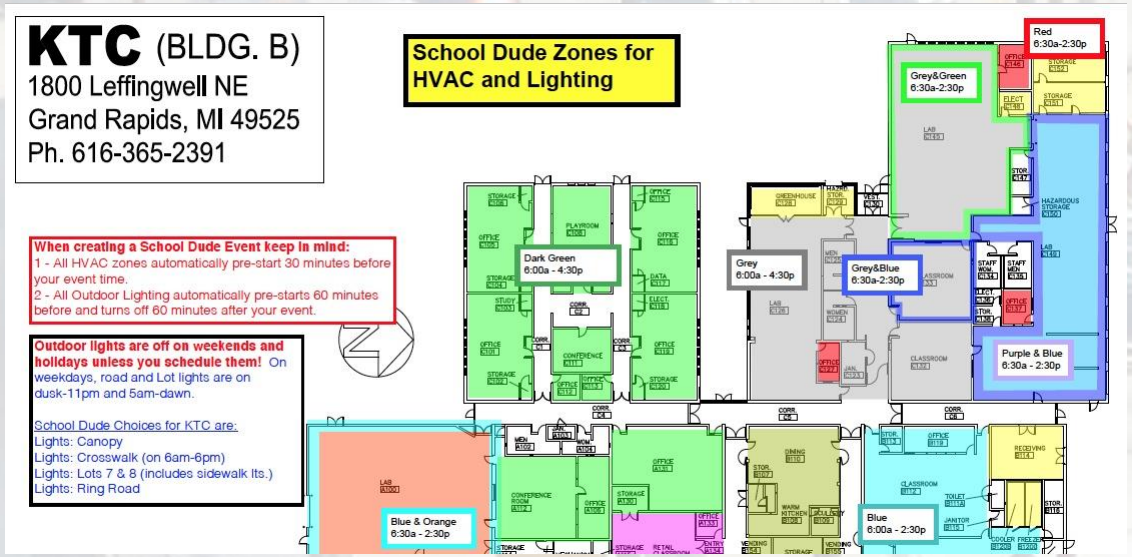
- What if the BAS critical alarms made one and only one work order per issue in your IMMS (School Dude)
- What if the work order auto-escalated to one's superior if it was ignored?
- What if this digital trail of accountability were retrievable with date/time stamps.
- Kent ISD liked the idea!
- So did underwriters like HSB

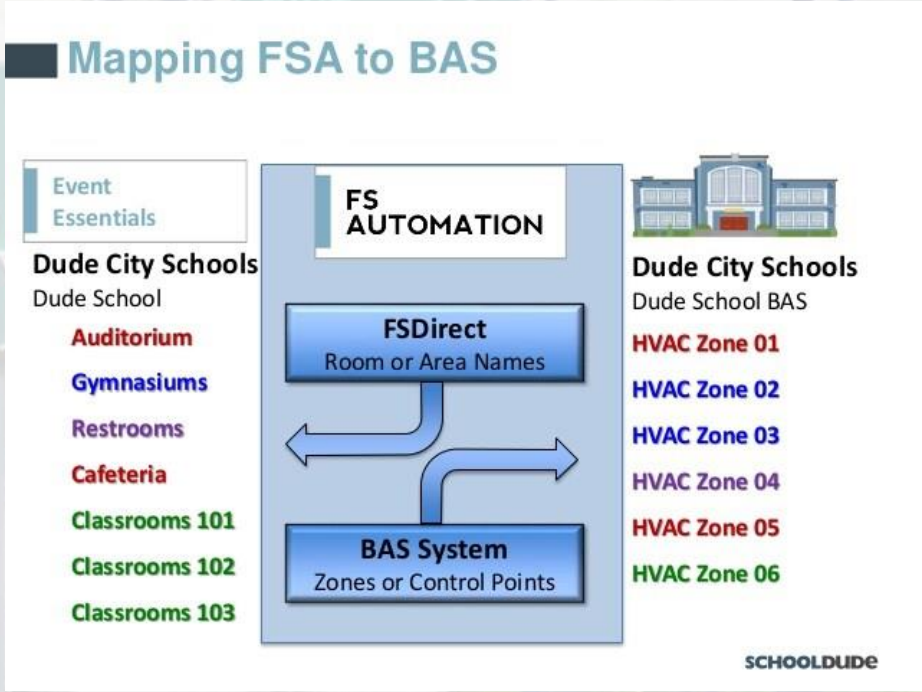
GAME CHANGER #4

(Part 2)

But that is only half of the story…

- What if your IMMS after hours scheduling tool (FS Direct) could trigger specific BAS zones on for after hours usage and then release them when done?
- How many HVAC tech hours would that save a month by automating menial data entry?





Automating after hours scheduling was an especially big deal at Kent ISD…

- At the time, Kent ISD was still leaving all it's buildings in occupied mode until late evening – not at all a best practice
- Once my boss Mitch Bart realized what I was trying to do he worked with me to make it board policy for all after hours events to be scheduled through School Dude
- Board directives are worth pursuing!

We were one of the first three school districts in the nation to connect our BAS to School Dude's IMMS!

In the mid 2000's our board made FS Direct Scheduling and Temp Setpoints Policy for the entire district. →

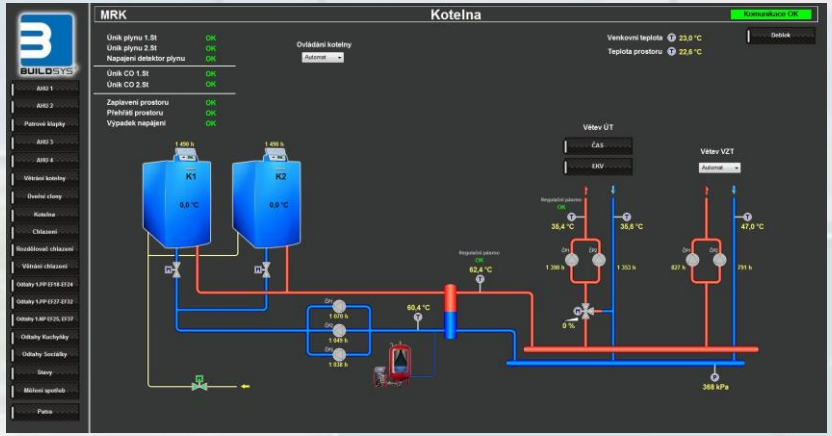
Staff would say to me “We heard the building get really quiet [mouthing a sound effect] like everything shutting off a few minutes after kids left… felt like you were telling us to leave!”

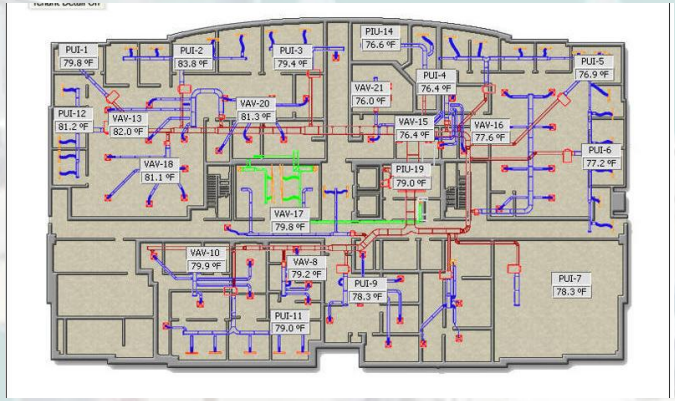
- Ya darn tootin’!!! Go home and use your own furnace and AC!!!
- Actually, we were much nicer about it, but c’mon, 1/2 million + sq. ft., right? Johnny Q. Public would definitely question wasting that kind of $$$!
- THEY CAN still get HVAC on if they ask nice… every building admin assistant had rights to enter requests into FS Direct.
- Head custodians use FSD for deep cleaning!

Our relationship with Carsie at CommLogix grew stronger over the years…

- They tried different products over the years to enhance the IMMS-BAS interface… what do you think they settled on?
- From what I've presented thus far, why do you think they went with Tridium Niagara?
- I helped Carsie integrate about three different versions before it was over, but it was worth it… and honestly… I kind of enjoy that geeky stuff.
- Bottom line I learned a lot of the nitty gritty design and integration tools in the Niagara platform that enabled me do what I do now.

Vendor Agnostic!!





Another one of my somewhat geeky skills that played into the Kent ISD BAS/HVAC story is that I'm a bit of a *layout artist*. (It took a former Disney animator to help me realize that is what it is called!)

- If you cannot drill down into your BAS to the equipment you're working on quickly and intuitively you are wasting your tech's time.
- I ***was*** and still often ***am*** that tech out in the field and I'm telling you, look and feel of the interface turns out to be very important!
- Speaking of field techs and navigating the BAS, the next game changer fits in here…

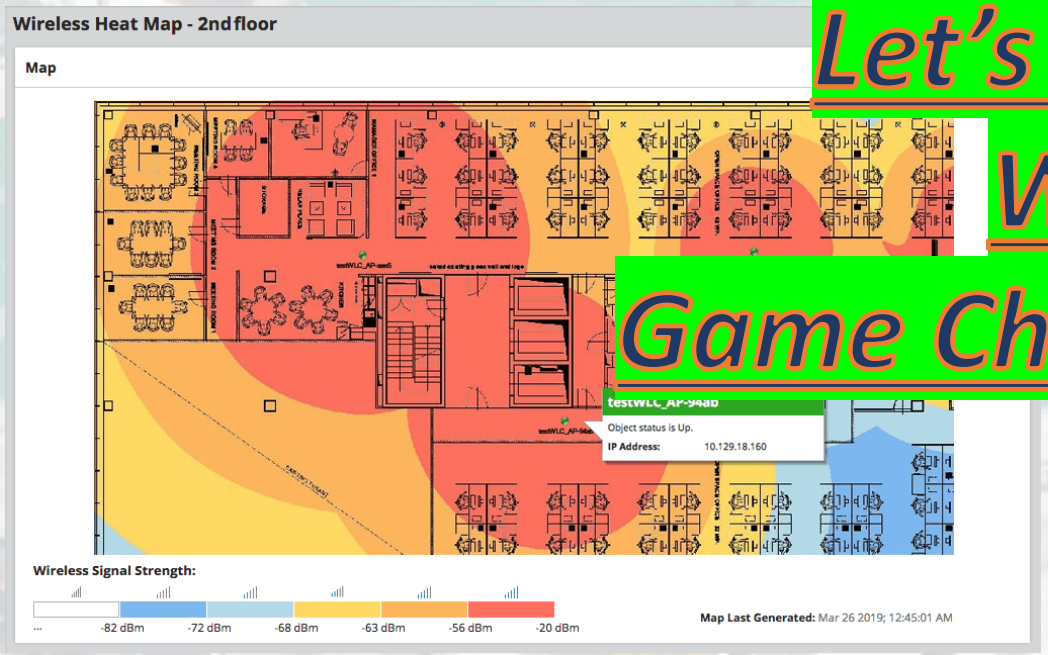
GAME CHANGER #5

While the early 2000's were unsuccessful at producing anything reliable and rugged, 2005-2010 witnessed the global takeover of portable web-enabled devices like iPhones and iPads. Why is this important to BAS and HVAC techs?

- There is an app for everything! Including BAS and HVAC interfaces like Niagara.
- No longer any need to waste another tech's time back in the shop when you are out in the field… you can override stuff in the BAS yourself, in real time, right in front of the equipment you're troubleshooting!

OYE VEY!!!

Now you can access your BAS from anywhere on the planet and make tweaks!!



Let's go Live With Game Changer #5!!!

As WiFi becomes more uniform throughout our buildings it only gets easier to access our BAS even in the most far-flung mezzanines and basements...

- Our IT department works with us to get Access Points virtually everywhere we need them.
- They also help us work that magic of setting up VPN's (Virtual Private Networks)... you know that thing that fools your local network into believing you are on Campus even when you aren't?

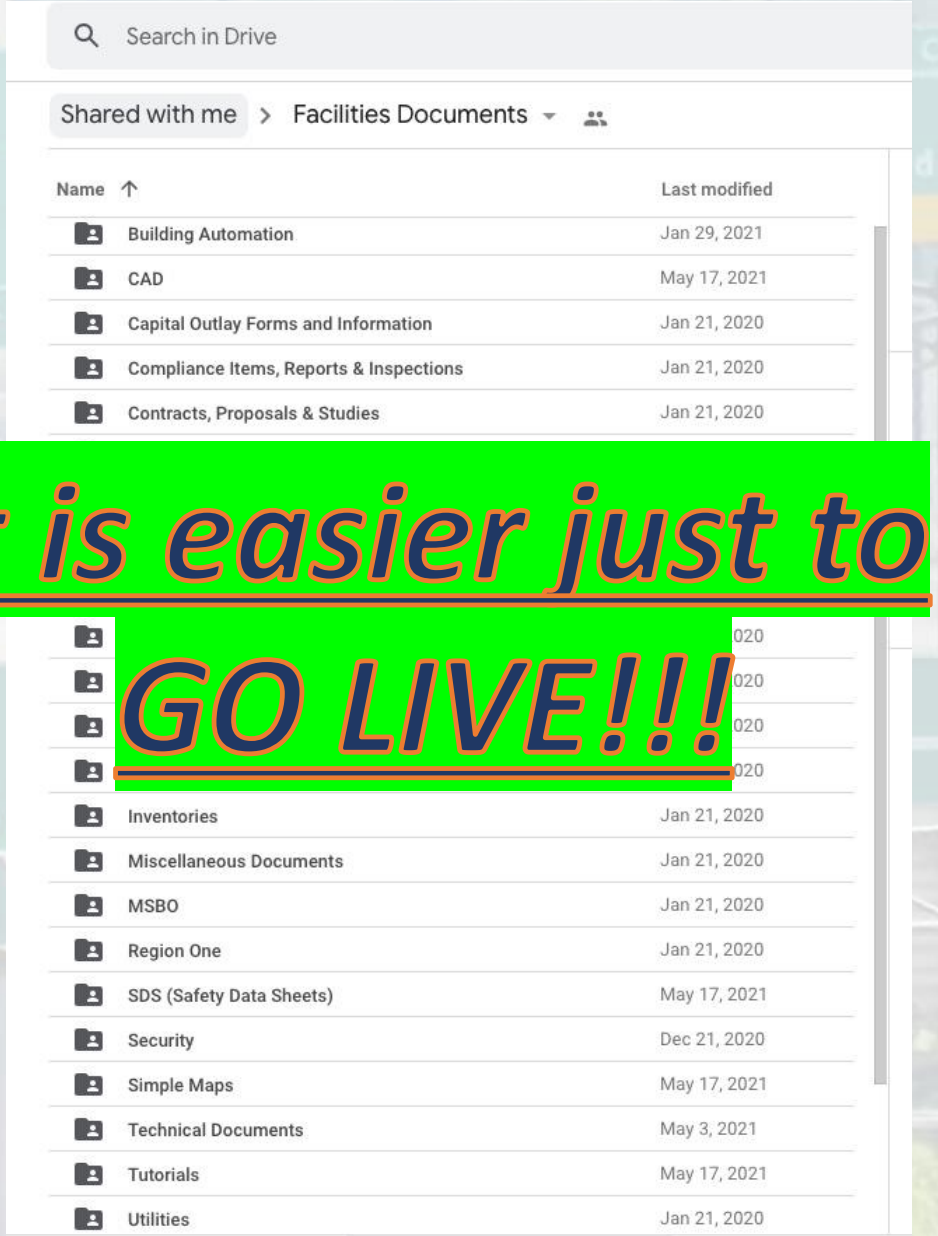
By the mid 2000's, Andy Egan (Hi-Tech) started being less competitive and bids and other work began going to Vertex (now under the Knight Watch umbrella. I'm so grateful to Bill Hephner and Matt Tomes for all the help they rendered (both on and off the clock) to Kent ISD and myself. They took us a little bit further down the Tridium/Niagara road, simplifying things along the way. To this day, even after the merger, they still provide great service!

KNIGHT WATCH.

Andy J. Egan Co., Inc.

The 2000's also brought enterprise editions of Google Drive to all Kent ISD staff. Getting documents in the cloud was a gradual process for us.

- Using Service Reproduction, a local art, print and large format scan shop we get our old prints into .pdf form and upload them to our Google Drive.
- We upload other documents as well, project specs, photos of projects, policies, inspection reports, equipment manuals, you name it!
- Folders or individual docs can be shared with anyone! View only or edit docs together.



It is easier just to GO LIVE!!!

I cannot overstate how important access to documentation has been for Kent ISD's facilities staff! It takes time and money, but don't forget the magic word:

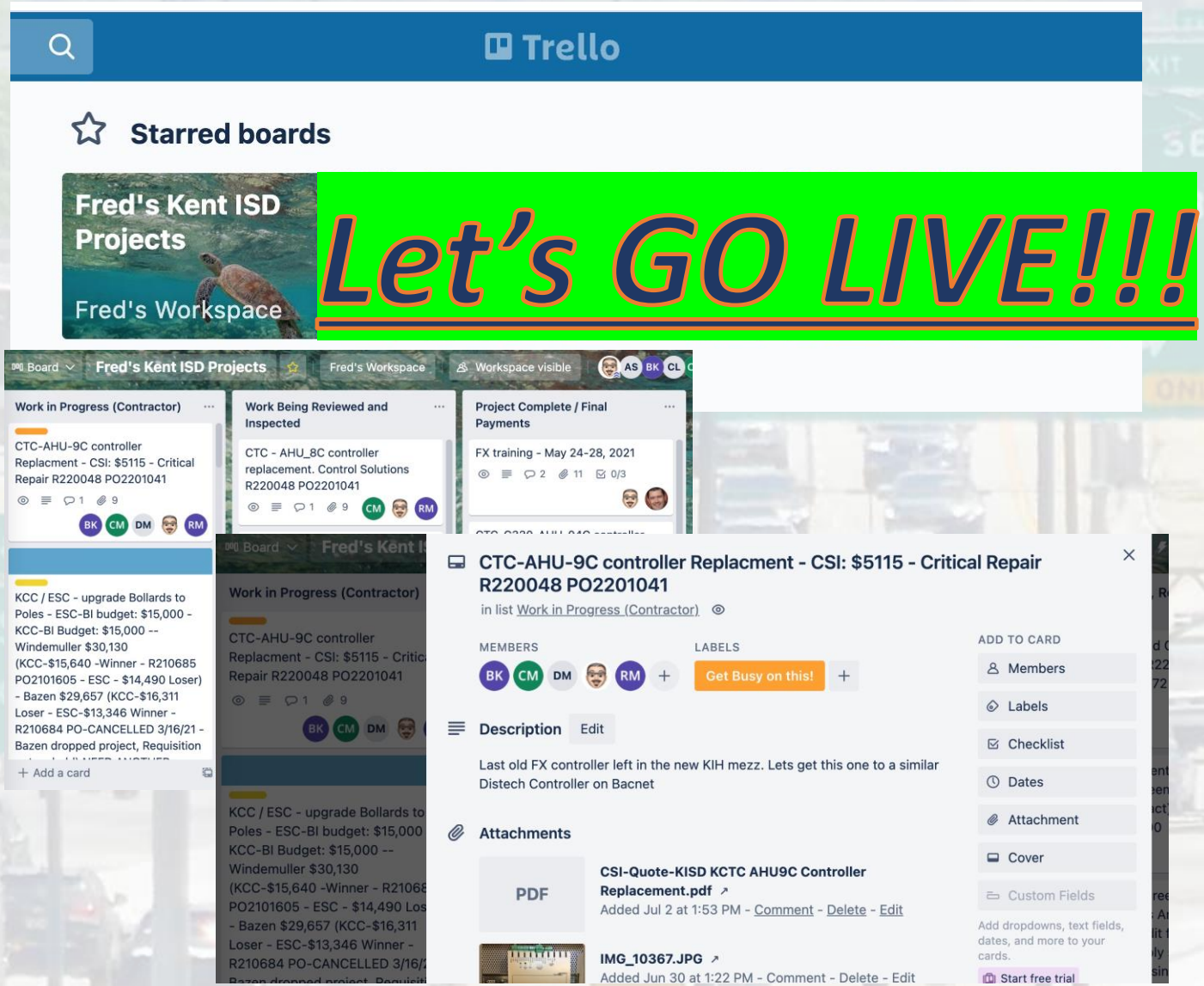
- **INTERNS!!!!** For example, Ferris State has a great facilities management program that produces high quality interns every year! Kent ISD took advantage of this excellent talent pool and wound up hiring several of them.
- Another option is to pay the big bucks and hire a firm to do this for you, some of them may even be at the MSBO Facilities conferences this year.
- But having documentation of building critical systems at your tech's fingertips is probably almost a game changer level investment.

facility MANAGEMENT
FERRIS STATE UNIVERSITY

FERRIS STATE UNIVERSITY
COLLEGE OF ENGINEERING TECHNOLOGY
School of Built Environment

Facility Management Program
915 Campus Drive
Big Rapids, Michigan 49307
231-591-3100
atfm@ferris.edu
www.ferris.edu/fman
www.buildyourfutu.re/ferris

GAME CHANGER #6

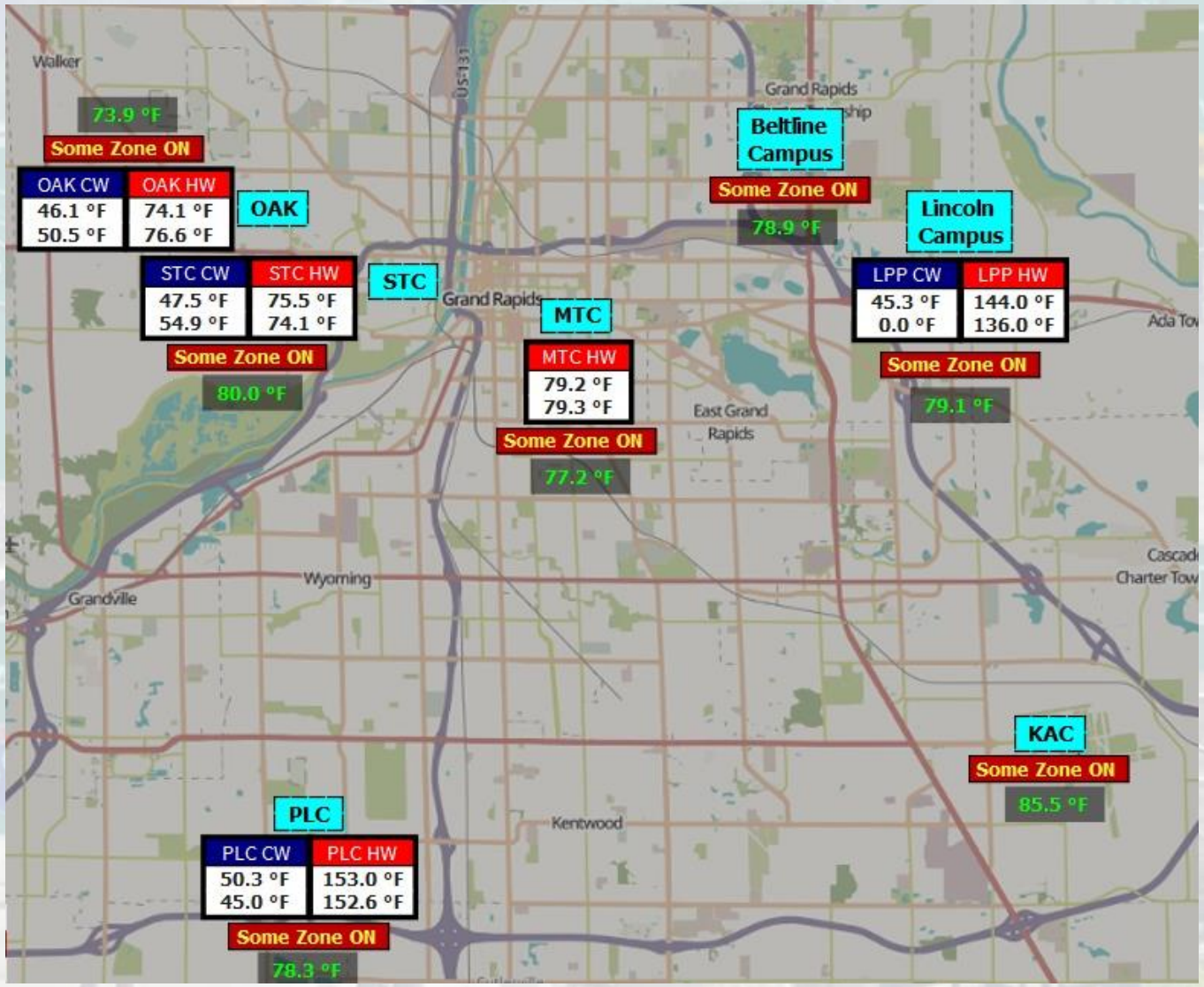


By 2012, our IT department had introduced us to another tool I'll call Game Changer #6 – well for me at least!

- Trello is an online tool that can be used for many things – I use it for project workflow
- I've tried MS Project and a couple other tools, but this one just works for me – even the phone app is great
- Share project access with other team members easily
- Upload tons of files per project along with text notes, etc.

Between 2011 and 2021 (my last decade at Kent ISD) we absorb more and more Special Ed. Buildings from Grand Rapids Public Schools

- It is now best practice for ISD's to fund special education
- Not sure how GRPS obtained fiscal authority originally
- Some buildings looked fine to the casual observer
- HVAC and BAS infrastructure issues are not as obvious
- Problems surfaced quickly



These buildings had legacy Novar and Staefa systems with many failed components. Due to lack of funding, the HVAC equipment itself also had many failed components. While I'm sure that the facilities staff were doing the best they could with the funding provided, this didn't change the reality for those of us taking over management. Some of these buildings housed our county's most fragile students so there was understandable pressure to improve HVAC and BAS quickly.

KNIGHT WATCH

CONTROL SOLUTIONS INC

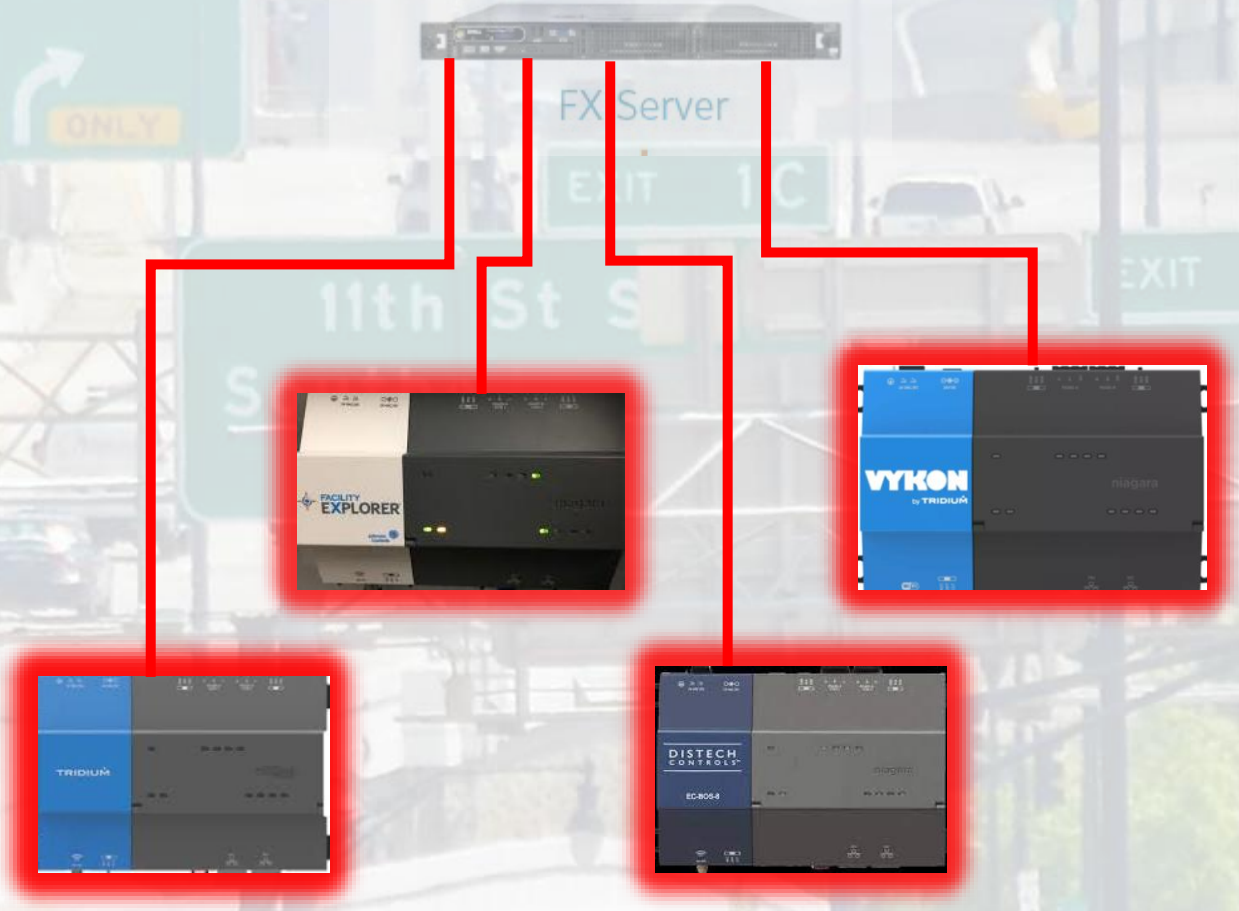
Andy J. Egan Co., Inc.

Johnson Controls

Building Automation System Game Changers

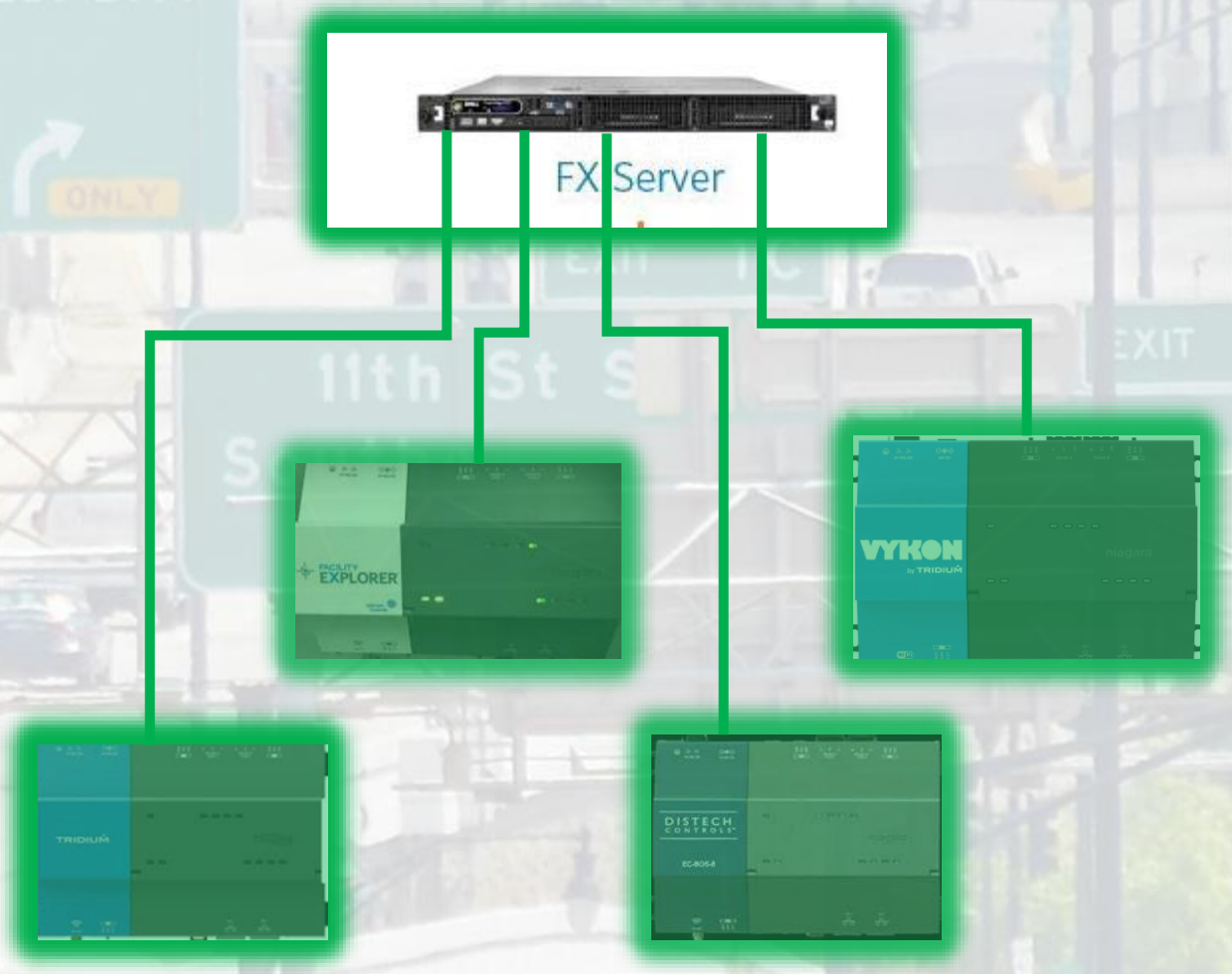
CSI helped us to adopt some best practices that Knight Watch had tried to talk me in to but I was too stubborn to listen.

- First they helped me to realize that a Jace is a Jace is a Jace… *Notice the different brands of JACE 8000 building head ends in our final lineup*
- Then they taught me how loading all our graphics and trends on the building head end controllers was overworking them and also creating security liabilities.



Nathan Deppe from CSI was the engineer that patiently brought me along with many benefits as a result:

- We were able to standardize all the old disparate graphics into one package. Look and feel is important!
- We were able to build a database at the server level to accommodate months of granular trend data
- Security was greatly enhanced allowing multiple user views and authority levels based on login info
- The server could handle all this without stressing out!



Let's GO LIVE!!!

Let's take time to do a deep dive into Kent ISD's BAS. In the process, let's look at the way end users can interact with:

- Building zone maps
- Tutorials
- Px includes / lists of equipment, etc.
- Attention to header icons, lighting overrides, data center details, generator details.
- Drill down into a Distech Local Controller!

I championed the power of School Dude's IMMS and BAS integration tools for about 20 years.

- Sadly, that has changed since School Dude was bought out and the newest line of products do not support BAS integration despite much pressure to do so over the last several years by myself and others
- Also, their latest product did not meet expectations for ease of use that Kent ISD had come to expect
- So, after much research and RFPs Kent ISD decided to move to…

FMX was chosen over School Dude, Fluke and Facilitron in the end because:

- They had already helped 150+ School Dude clients successfully transition to their suite of tools
- They had already helped 20+ clients integrate their BAS systems into the FMX suite
- It was less expensive
- It was very easy to customize
- Several of our staff had already used FMX and loved its ease of use
- The FMX staff made the transition to their product virtually painless

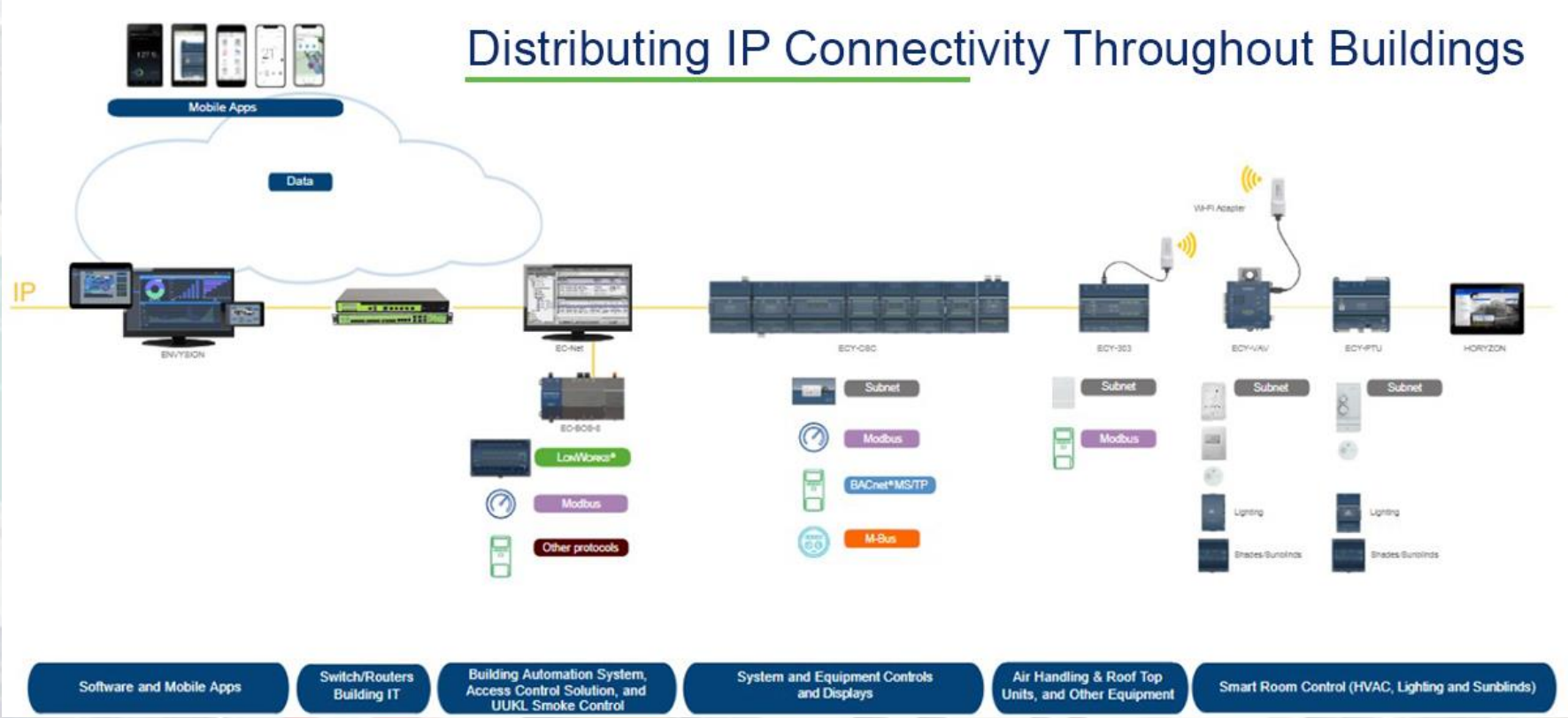
That was an overview of the BAS game changers I experienced in my career. Now I'd like to distill some lessons learned into four delicious jugs.

Building Automation System Game Changers

Let's start with a jug I'll label "Too Many Systems"

- This has been part of my experience and the experience of many of my peers
- Disintegrated systems do not allow for sharing of alarming capabilities or trending of data for trouble shooting purposes
- Some legacy systems succumb to the law of supply and demand, the parts and expertise to repair them become more expensive than replacing them.
- Now that nearly every major BAS supply company has branded a JACE that is readily available, integrating legacy systems into the Niagara platform is more possible and affordable than ever before
- But there other options out there…

With the advent of flat IP based networks that Distech, Schneider, Honeywell and others are producing, failing legacy systems can be replaced less painfully and integrated easily when the time comes.



DISTECH CONTROLS™

Let's move on to the 2nd jug called "Not User Friendly"

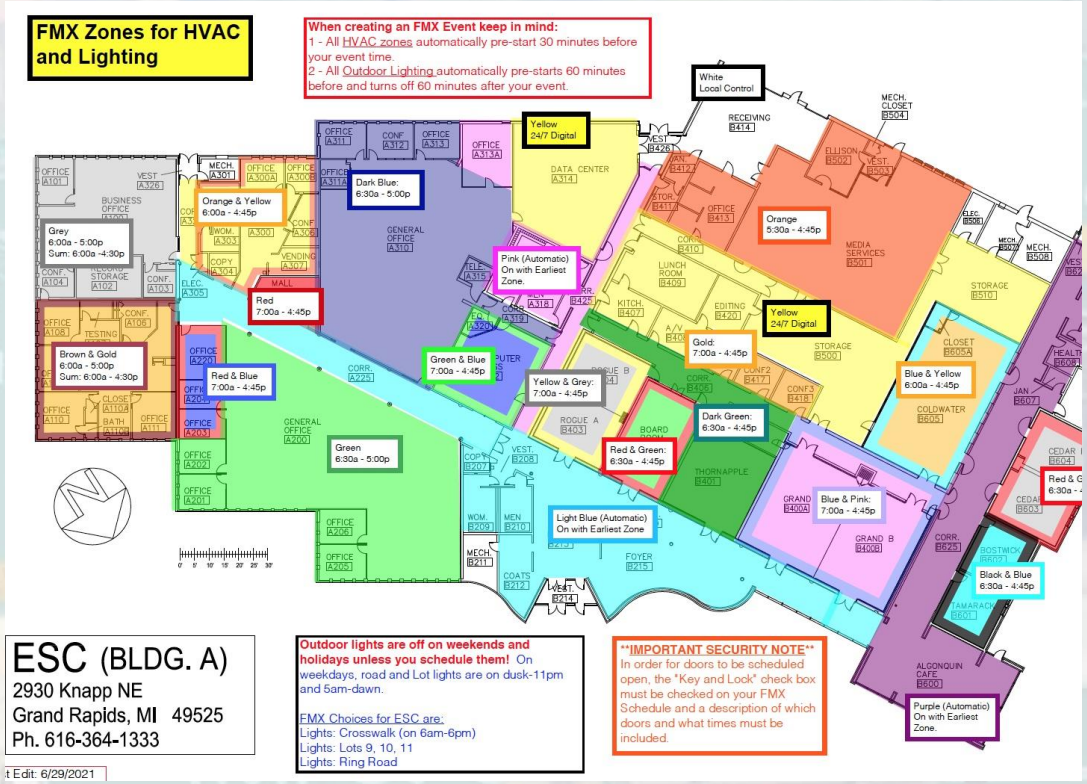
- The extremely advanced skill set needed to integrate diverse BAS's does not always come with the skill set needed for ease of use
- Sometimes intuitive design is the furthest thing from an engineer's mind as they apply their amazing skills to solving the highly technical challenges they encounter as they coax various systems to play nice in the same sand box
- It is worth taking the time and effort to insist on intuitive navigation in your BAS as well as ease of logging into it for your technicians.

It is difficult to overemphasize the importance of an intuitive interface for the everyday maintenance tech!

- They are often wedged in cramped and difficult work spaces, I've been one of those techs, I know firsthand!
- They have their laptop, tablet or phone with them and they are trying to troubleshoot a BAS component
- The last thing they need is a five-minute login process or a site that makes navigation slow or trending and graphics that are glitchy and unreliable

Let's move onto Liquor #3 and call it "Integrating your BAS with your IMMS tools" – First step… Zone Scheduling!!

- Not on the radar? ***Let's rethink this***
- Why waste your tech's time??
- FMX scheduling module integrates painlessly with most BAS's… (NOTE – Operations Hero is releasing their scheduling integration tools as we speak! – Competition is good, yes?)
- Let the data entry fall on the building level admin assistants or even route approval for usage through principals or other stake holders



The next big step is getting your BAS to create discreet unrepeated work orders in your IMMS

- Helps get a handle on the ridiculous number of email and text alarms a BAS can kick out!
- Otherwise, the “Cry Wolf” effect *WILL* kick in and critical alarms *WILL* get ignored!
- School Dude had this perfected before they abandoned it, let’s hope FMX or Operations Hero steps up!
- You’re doing yourself, your insurance company and your techs a favor!

ONE and ONLY ONE IMMS Work order that automatically escalates!

The last jug of distilled deliciousness we will label “Getting BAS training for you and your staff”

- Training staff on the fly only goes so far
- It is important to remember to include training in the specifications for larger HVAC and BAS projects
- Cochrane Tech Services, JCI and Distech have options

COCHRANE TECHSERVICES

DISTECH CONTROLS

DISTECH CONTROLS // TRAINING

Building Automation System Game Changers

Johnson Controls

activelogix

Andy J. Egan Co., Inc.

BAS Coaches Will Drink With You!

CONTROL SOLUTIONS INC

KNIGHT WATCH

So many good companies you can and should hire, but remember, a BAS Coach can help you drink any of this liquor in more cost-effective way. These are the consultants who have worked with BAS systems extensively in their day-to-day jobs and then went on their own to help others navigate all the intricacies of the BAS and IMMS world. Seek one out and see if they have time to help you. You won't regret it.

Lastly, there are two things on the horizon that you might just want to keep your eye on...

- Data analyzing tools for BAS – "Continuous Commissioning" (Sky Spark, Kodelabs, Buildingfit, Otto etc.)
- Operations Hero – perhaps the only potential competitor to FMX in the IMMS market that takes developing APIs for BAS integration seriously (Opened doors July 2021)

SkySpark EVERYWHERE

kodelabs

buildingfit

OTTO

OperationsHERO

New IMMS Kids on the Block that are pursuing BAS integration options.

Building Automation System Game Changers

Presenter: Fred Hayward,

Building Automation System Coaching and Design

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Web: www.bascoachfred.com