San Diego Unified School District

i21 Infrastructure Subcommittee

January 15, 2014

In attendance: Toren Allen, Eric Bentel, Bruce Braciszewski, Jim Day, Scott Irwin (tele), Evan Leslie, Daniel Martinez, Tuan Nguyen (tele), Jeremy Recktenwald, Eric Smith (tele), Matt Spathas, Paul Villigan

Toren Allen called the meeting to order.

Introductions of those in attendance.

- Matt Spathas, Managing Director SENTRE Partners – has four children in public education and has a passion centered around reinventing public education
- Eric Bentel, Sales Director, AT&T – parents are music professors, has been involved with UCSD, works closely with project and where it's headed. AT&T is big they can help source knowledge
- Sharon Curtis, SDUSD, Office of Midori Wong, (formerly Office of Phil Stover)
- Bruce Braciszewski, Classroom of the Future Executive Director, SDCOE
- Jeremy Recktenwald, SDUSD Director ITSS Support Services – works with connectivity and infrastructure, and has preschooler at Carver Elementary
- Toren Allen, SDUSD Applications Director – works with HR, Finance, and has a junior in HS
- Evan Leslie, SDUSD Project Manager/Supervisor for bond program – working on 4 bonds, supervises project managers
- Daniel Martinez, Cox Sales Manager – has 2 small children in public schools, interested in education vertical, tries to chat with education leaders throughout the county.
- Paul Villigan, Government Accounts at AT&T Mobility – had a junior in high school whom he pulled out of High Tech High and put back into public school in San Marcos School District

Introductions of those on the phone:

- Scott Irwin – SDUSD, Principal at Dana Middle School
- Tuan Nguyen, Microsoft – has been working with district for past 15+ years
- Eric Smith, Microsoft – technology strategist, 8 years

Discussion led by Matt Spathas

Several were at the kickoff meeting. This is a social experiment that involves heavy, deep, and passionate stuff.

Asked all to pull back from your products and pull forward with your vision.

What does this vision look like?

Everyone should view with a lens of what it can be not what it has been.

Infrastructure plays such a key part, like legs under a table, needs to hit on all cylinders. SDUSD is a leader.

Everybody should have access to i21 website. All information should be transparent for everybody.

i21Now website: http://i21now.com is the website for the SDUSD i21 committee.

All information should be archived here: at bottom is an i21 meeting calendar with all subcommittee meetings (can click for location and other information). All will be archived and linked real time for everybody to view.

At committees tab – shows guidelines, if you scroll down you can see summaries of all committees including co-chairs. Scroll down for Infrastructure. Each committee has a Google doc with reference links and co chairs as well as links to other committees. If you select the link for the committee it will get you to the document and will get you to conversation starters.

This is work in progress and should be collaborative and should encourage everybody's participation. Chairs have had meetings to help shape the conversation. Look at Google doc.

Bullets were generated by co chairs. Subcommittees are to frame around vision, opportunities and challenges, not around recommendations. Keep dialogue to ideas, but passionate conversation is OK. We are challenging ideas. One co-chair of each subcommittee has access to Google to update. Web access can be available for these meetings if they know in advance (Jeremy). All subcommittees will meet twice. Toren: Next meeting is Feb 5. At mid point can the subcommittees be ready to report out? Sharon: Final meeting is March 19. Asked if there are comments or concerns:

Matt: what might be good is a 40,000 foot overview from staff perspective, high level on where you are.

Two bonds Prop S $2 billion Prop Z $3 billion – $400-500 million spent on technology. Bring ideas to the table.

Toren: Will tag team on that. Will tell where they are at and what is on the pipeline.

Overview of district's current network and plans for the future presented by Jeremy Recktenwald

Note: Numbers below may not all be correct as they were being discussed very quickly. See whiteboard pictures for more detail.

Props MM, S and Z really focused on wired and wireless infrastructure to get us where we are at. i21 program was a monumental step in the right direction, interactive white board and projector in each classroom.

SDUSD goes out to the net; they have a great WAN network. Look at the plumbing put in place.

Ed Center at top, bottom points are Mira Mesa HS and Hoover HS – 10g per second. Schools south of the San Diego Riverbed links to Hoover to get aggregated before getting back to Ed Center. Elementaries have 100mg per second; Middle Level and High Schools have 1g per second. 60g of traffic. Six 10g links at each location (Hoover HS & Mira Mesa HS). Ed Center goes out (4g per second to internet). Everyone in district shares that bandwidth.

This is basically the WAN network. Measures traffic. Average is 2.2 gigs per second.

New data center is in pipeline and this drawing will change drastically – will have 8g. They will have double the capacity and will be able to balance it.

Matt: Important to glean key metrics out of this. In bite size chunks, when you say 100mg per elementary school, what does that mean? How much is that per student? Measure is usually bandwidth per user in the industry.

They proactively monitor the network so if there is a problem they can figure it out.

Use the Council of Great City Schools network for trending on where we should be going.

Jeremy: Some schools use much more bandwidth depending on many things. They may have 2x students using half time. Depends on what king of students and what time of day.

Future Plans are: Ed center at top; Next to it is Data Center. They will get rid of bottlenecks from schools with oversubscribed links. All circuits will be hooked into the data centers. Moving into a more pristine environment.

Original drawing doesn't show that elementaries have path to both high schools so if one isn't working the other one is backup.

20g will be for IP activity. 20g for storage. Have contract with provider that will ensure quality

10g fiber channel if they lose data center from storage perspective, user won't know anything happened.

Will have redundant path to internet provider. Will have 4g pipe from both Serra High School and Data Center

If there is a fail, there would still have a single link. Currently no change in speed.

With Common Core on the horizon and online testing, there is still uneasiness about unknown.

Matt: Common Core is a big deal – there must be enough pipe to handle online testing and we need to make sure backdoor plumbing is ok.

District budget is roughly $30 million on Data Center; revised figures are $12 million for building + $6 million for the rest. Prop S funding must be used for buildings. Capital is available to do Data Center, whole bunch of reasons to do this. Some may get peeled off because Cloud is maturing.

Toren: if it makes sense and is cost effective we want to do it.

Matt asked Jeremy to take us to school level.

Jeremy: There are just a handful of schools lacking infrastructure – we are 95% there on rollout.

Currently standard is link comes in from Hoover HS or Mira Mesa High School.

Using elementary school. Connection comes in VOIP or router also hosting phone lines.

At high schools it lands on 6509 (large aggregate switch) can host 384 connections.

Eventually you get to the switch. MDF 9 main distribution frame connects to all end switches running 1g fiber going out to watering closet, whether in classroom or building there is edge switch. Currently 1g backbone. From there you have station runs. Currently station runs is capable of 100 per second.

This is a clean way of looking at it. Computer – phone – wireless access point. Either way

Good news is when we get to needs. Based on timing of Prop S and i21 project, 11n access points are AGN one of the premier radios of the time. Simultaneous radios, station runs, phone, all from access switch.

Inside classroom (30x30) they either have between 12 – 6 drops in the room. Fixtures are identified teacher wall where interactive whiteboard is placed. Teacher workstations are located within 15 feet of interactive whiteboard and doc camera.

Starting with iPad rollout, you will find apple TV, so they can mirror what any student is doing. Teacher workstation interacts with white board. Depends on device students have (netbooks or iPad, ipad2) teachers workstation is part of this.

Matt: Facility Committee (Lee Dulgeroff and Kate Miraw) conversation is around remodel of classrooms and can technology be layered into existing footprints or is it about knocking down schools and doing something totally different? Need plumbing tools, of engagement. What is the classroom of the future?

Students have answers in their hands; now they need to know what the classroom looks like. Learning environment is not yet flipped. We can make sure stuff works but collaborative work is to redesign what a school looks like to hit on all cylinders. How would this be different from the classroom today?

Matt: We must have the plumbing but we are now in a learning environment and what does that box look like?

Jeremy: We knew that classrooms wouldn't just be the devices bought and put into them. Teachers have 2-3 devices and students each have a device. How should we support this?

Wireless is a nicety not a necessity. We have switched to a density based model. We now have an access point in each classroom. 1:1 is now becoming 2:1.

Curriculum and assessment is using the web. The stuff must work. It is not just 1 device, it is multiple devices. They can see how many things are connected at any given time in a classroom.

Time it took to do infrastructure was several years. Started with Prop MM, Prop S added to it. Classrooms now have 40 students x 2-3 devices. In wireless they get into a per user bandwidth. What is a realistic need for bandwidth? All users should have a good experience (maybe not the best due to budget). Need new access points.

802.11 is the new wireless – 100mb per second. You may have 1, 2 3 points aggregating at bandwidth. Station is 100 port speed. You run into a bottleneck. You have fiber links. Copper at station.

Picture looks the same as far as flow goes. 1g fiber link will change type and speed of fiber. Another version is being worked on in the industry will be 2 cables per access point. When cable gets placed by people who put in pathways, they are only leaving one cable.

Matt: could make send to bundle that, and use fiber not copper.

Jeremy: new standards is 6, you can run 10g. They haven't been pulling 5g. It is currently Cat 6. 2 cables in the ceiling where access point is. This will simplify the upgrades.

Wrap-Up

Matt: This was great overview. Has seen districts around the country, but when he saw diagram it wasn't that. SDUSD's done a phenomenal job. Matt invited comments from around the room.

Jim (?): Has worked with lots of districts, with our staffing and the work that has been done is

Doing BYOD at a scale. They've set the bar pretty high.

One thing that they can do (budget thing) is to prioritize video or storage. It's good that they are looking ahead and can plan for the funding.

Big thing is looking at what the bandwidth is going to be and be sure it is up and running.

Textbooks are going away so if it goes down, education has to continue.

Daniel: what is the plan to replace existing infrastructure:

Matt: it's lonely when you go to school board when you talk tech and they are not.

Metrics coming out of this is important – whatever that needs to be.

Whatever it might be, there is money to haggle about.

Plumbing is key to learning and it can promote different conversation.

We need to communicate the vision

Daniel: What does it mean, what else do we need to plan for in the infrastructure?

Jeremy: Plan to overcome bottlenecks with cat 6 or different fiber in cases where it makes sense, like wiring closet, or replacing all of them. Age of current access points, should we be addressing now.

What should we be doing to ensure teaching environment stays up? We need to continue that. 2 cable drops, new access points, switches, fiber is especially important getting to 10g.

The money has been approved; now we need to implement. Evan and his team are ready to implement tomorrow.

How high level will we come out with? Will we stay conceptual?

Matt: It is up to this group to figure out.

Lean to a little higher rather than a little lower. If we can come up with bite size nuggets, per student, per square foot, so infrastructure can be taken forward (is it $200, $300 or $400 per student) so it doesn't get lost in translation. We are getting a good lay of the land.

Jeremy has some nice videos of this.

Bruce: It's impressive but going back to the question of is it classroom or learning environment. Form follows function. Figure out function then you can get the form. Not everything will take place inside the 4 walls.

Jim (?): Issue is also security. Students' records etc need to be secure.

Sharon: Staff just wants to be sure things work. There are a lot of issues beyond it working, like to ensure there is support.

Bruce: Where does the learning environment being and end. From a carrier perspective, what is the conversation?

Phone: Applauds the work of district, Jeremy, Darryl and Barbara, defers to technical department.

Phone: Appreciates the overview. Would appreciate getting the pictures form the white board.

Jeremy has present and future in PowerPoint or raw pictures.

Matt will link to Google doc.

Scott: Not his job to worry about WAN working. Think about where does learning take place? It also goes to the home. Dana is LOGO program. FCC and now district is paying for 3G access for student devices. Some have wifi at home but others use 3G provided by school. Williams act requires district to provide certain services to all students like providing all students a math textbook.

Our infrastructure needs to be connected to the home environment. Experience of students using device at home: some use different ways. There is a digital divide, not all students have access to the tools. Maybe we cannot provide the jump. One of the tools students need is internet access. That type of equity would make it easier for educators. Also "bring your own device" he has thoughts about this. If conversation changes, he has thoughts on that.

Jeremy: we need to envision network that supports BYOD. Early on we have tried to change lens to support multiple devices per student. Getting into details is really outside of infrastructure subcommittee, but there is some overlap.

Matt: It's OK for some overlap. We might infringe on other committee or not. But Scott Irwin started in district IT department so he has a good overview.

Matt: wants to tag onto conversation.

Internet filter that gets you onto the internet – e-rate. It is part of infrastructure that needs to be figured out. What are we opening the floodgates to? Where is the learning environment? Where does it start and stop? Once you are on the network, you are on the network. Jagged line out to the campus and one out to home - where does this stop? How do we scale this? The conversation is much bigger than broadband, but he is exited to see conversations happening.

As students are getting onto i21wireless, it is the same for teacher student or guest. Maybe these could be scaled to what does this look like. How to I log on and what do I have access to or not have access to.

Lastly, overview should have been helpful to everybody; District has done a phenomenal job on plumbing. Can we visualize in a more organized way? Opportunities and challenges need to be addressed at the next meeting.

Evan asked how to connect the dots – opportunities – how does that feed into the vision.

Matt says we are buying a lot of bandwidth, which is expensive. Are there opportunities to aggregate more?

Challenges are bottlenecks, and if there will be no textbooks, that all learning is web based, they see roadmap going out. Bring your own device, or standards to keep down costs. Weakness is having multiple platforms. Think about the Cloud for services. As student work moves to the Cloud, it doesn't matter what device, it just has to work.

Jim (?): Needs flexibility – things change so frequently. Will the infrastructure support that and what are the security problems? Technology out there does lots of this stuff. We may not know what the policies are but we need to be able to adjust.

Matt: How timeless can timeless be with the plumbing? We will be capturing some of these comments.

Scott at Dana: Jeremy's comment good about infrastructure to adjust to the policies of the moment. Flexible open thinking is important. SDUSD is second only to SDSU. Need to use school system to make equal opportunities for all children.

Jeremy: Plus or minus is multi platform. How do you ensure everything you want to use in the classroom with multiple or old devices you need to.

You can design the infrastructure but can you support it? This could present a problem.

Scott: provide infrastructure to work with any kind of device. Need to make sure the infrastructure is in place to make sure that happens.

Matt: Network will have IP address, what are we plugging into it? Whole other world is they haven't spoken about business applications. Should they carve out for next meeting touching on building systems and applications? Framework for agenda.

Jeremy: There are things we are doing today in that arena.

Matt: Hopes this was worthwhile. Thinks support of district is based on support of this group. Whatever we come up with will be powerful with enough money to implement it.

Next meeting is February 5, IMC Conference Room.

Adjourned at 5:04 p.m.