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Speaker 1: Thank you all for coming. In these speaker series it seems time like we have a mix of 2 different things. First we invite in speakers who've really built really neat systems and have something exciting to talk about and then we have the people who have really changed the way we look at the world and I think Doug Engelbart here really fits in that second category.

A lot of you maybe are too young to know that most of what we see as a modern computer system today has risen out of the vision that Doug had 30 years ago, the invention of the mouse and Windows systems, and the idea of hypertext which is not yet fully realized but it what this company is built on as well as other ideas and help systems and so on and so on. Having Doug here is really like having a time machine that helps us look out 20 or 30 years into the future. Let's let him take it away and see where the world is going to end up.

Doug: If he did a good job there well I could say thank you very much and leave but interview tried to think a long time about how can I make a presentation that will teach you something or educate you or keep you awake and still tell my whole story. It turned out that that probably wasn't doable so I had 2 women who are very energetically oriented about how to tell stories come this morning and they paired me way down. If I get off track it's their fault. This title is very meaningful to me and what's a collective IQ will come out a little bit early in the thing and we'll dive down thank you deeply pretty soon. This stems from way back that just engaged the 25 year old country kid, that's me then; I'm a 79 year old country kid now.

Anyway I'd just gotten engaged and heading in for work. I worked as as electrical engineer out at [Ames 00:02:28] Lab, as a matter of fact. I said, "Oh boy, it's going to be excited to get married." I was thinking all the planning and family stuff and then started to try to think about the job and I realized I had never thought about having career goals. I was too much of a country kid, ingenuous so I did that. What do you think happened? This is what popped out of my head. If I run it get a professional goal and I just bought it, "OK, that's what I'm going to pursue." I had no idea what it meant.

By 3 months later I was reading and studying and talking to people, etc. I got to this [inaudible 00:03:13] so that goal emerged "As much as possible, to boost mankind's collective capability for coping with complex, urgent problems." That every big problem I was good picture that I could go after to make the first goal be right I begin to realize how complex the big problems are because they involve so many people and so many factors, critical things as well as praying [inaudible 00:03:40] dollars or whatever and that they have to be dealt with collectively. Our collective ability to deal with complex, urgent problems isn't increasing anywhere near as fast as the complexity of the problems. That's still true today.

That complexity it's own is going up faster and faster so I feel like going after that ability for collectively coping and I call it Collective IQ is to me it's just a matter of almost of how we have a chance to survive as a race because there's no guarantee. I got this image of ants that grew up and climbed up and made a nest in a tree and it got bigger and bigger and the valves were bumping like this. This visual ants inside that could tell everybody nobody would believe them; that's something no one [bothered about 00:04:34] until the thing broke and it fell in the water below and all the ants died. There are problems facing the earth today that could be that bad and we just can't get them in sight.

I didn't know where to go to school to learn about that or [inaudible 00:04:53] so I thought I'll go learn about research so I went to Berkeley and got a PhD because they were building a computer. That's before there were computers. If I could just tell you a lot of stories about what you call the paradigms that exist in society; that's their perception about what's going on in the world and what you can do and void. If you were talking about things that didn't fit into the paradigm zone you just got out of it. So I got explained to me carefully that I probably wouldn't do very well staying and teaching like I thought I was going to do in the university because peer review if they hear this kind of stuff coming out of your mouth you'll never get there. There were lots of stories from the old day that you kids would like to hear.

I think the world is slowly changing. Here's one way to look at this [inaudible 00:05:50] any collection of quite a few people that you see around this blob here all communicated to each other what their commonly supposed to handle some big tough problem out there. They're been interacting, ingesting, bringing and scanning information, etc., recording their dialog, collecting intelligence, and some way they've got to generate a knowledge product which is so to say how do we get the understanding we need. This thing of collectively developing, integrating, and applying knowledge, CODIAK, I started calling that the kind of capabilities that you need.

This whole thing is a problem and then this particular set of knowledge in there I came to calling it dynamic knowledge repository; that's going to follow us all the way through this talk as the central thing of [mix technically 00:06:43] human kind of things that how do develop a body of knowledge that give you the best possible understanding of the kind of challenge you're facing together. We're far sure that a group who does a good job of saying, "Hey, what's out there that might be useful" but how do you take that and integrate that into "here's what the current state seems to be of the knowledge. The conflicts at different places like this, these 17 conflicts they're going to resolve temporarily because this is what seems to counter them but here's some ones, etc." That's been the target but as we'll talk about.

How do you get the understanding you need? How do you unearth and assess the different candidate solutions? How do you assess your resources and your operational capabilities to select the appropriate solution commitment you're going to make? How do you be effective in organizing and executing that selected approach? You're bound to have unforeseen complications come up that you have to monitor to be able to adapt to. All of that takes the best understanding you can and when they got really, really big problems, tough one that's a central challenge. That's not the only challenge but it's the one I decided to follow and [inaudible 00:08:02].

Capabilities, way back in the early 60s I spent a year and a half in solitary confinement generating a [thig 00:08:14] piece that I called Augmenting the Human Intellect. Out of that came a lot of perceptions that we hold true; they didn't do me much good in the early days because they didn't fit the paradigms but now to me they're very, very, meaningful. This thing about capability and capability infrastructures is something I'll go into now but I'll try to go by it pretty quickly and get down to things that might be more interesting technically to you. He says, "OK, for you or any organization or any collection of the civilization that is said, 'We have this problem in common' the capability for dealing with it and any capability say essential like maybe this central one here is your capability to handle your professional role. Well, that's depending on a bunch of other capabilities; they in turn are depending upon others and it's not a hierarchy, it's just a infrastructure that goes on down like this and way down here are some pretty basic capability you'll have to have.

The thing's so much orientation in the world today is sort of like, "Oh, it's the technology, boy, they're the things we're going to invent a technology; it'll come in and it'll fix everything. That was what I was hearing a lot in the 60s. Office automation for instance. I just say, "Wait a minute, you know, they coming in and making a change and there are probably a lot of other changes that go with it." "Like what? What do you mean other changes?" Well, I didn't have any ... I just invented the term human system and now anthropologist or anybody is [glomming 00:09:54] out about that but really are all those kinds of things that generally adapt on some new artifact or technology that comes forth to sort of serve society. Whatever image people had of the outset of boy what this is going to do, the evolution would start clanging the environment a great deal. I got very interested in old cars way, way back. I was aware of the kinds of dialogues and activities going on at the turn of the century when auto deals started appear.

If you went back 100 years from now and talked to some well-educated dynamic business person or whatever and started talking to him about what cars will become and they just pretty soon would not believe you. Women probably aren't going to be able to drive; that was pretty common in there. 35 miles an hour top speed. Boy, you just can't [inaudible 00:10:51] like that. Then if you try to describe freeway travel today, 70 miles an hour. Well, how do you get on? Get them to stop for you? No, you merge and then in describing the merging thing you can just see them cringe. You explain 70 miles an hour and he slows down a little bit to let you just come in because if he didn't you'd crash. That's right so he'll slow down. Well, how do you check to be sure? You use your rear view mirror. What's that? It's a mirror up here like that. You check on it. You got to be kidding me.

You realize they used it for shaving and powdering your face and no thought about that you can get judgement of what's happening 20 yards behind you at 70 miles an hour. How much do they weigh? 4,000 pounds. Oh, God. They simply wouldn't believe that you can get condition but nobody just takes it for granted; they don't even think about it today where you stop at a stop light. Oh, yeah, okay, well, I see. Well of course if it's a red light and there's nobody else there you go ahead don't you? No, no, no. Oh, you got to be kidding. New culture.

There's a great number of things you do when you're driving. Just stop to realize that you're driving in a lane 60, 50 , 60 , 70 miles an hour and how much attention o you pay about keeping the car in that lane? Just very little; you're talking to everybody and there's some odd kind of automatic things that your perceptual machine grabs for you and adjust for it. That would just e out of people's picture.

The many other things you look at, elevators coming in. How high was the highest building then? 6'8, maybe 10 stories. Oh my gosh. That was automating your way up to the 10th floor, huh? Yeah but look how much it changed the world; it's much higher. This is what goes on. The thing is I just say over and over again there's nobody that understands this dynamic system enough to know what in 5 years it's going to be like. how did the [inaudible 00:13:06] What kind of technological capabilities and stuff is really going to be in this world?

To complete this story a little bit more here this says okay there's these basic human capabilities that the uneducated, untrained, unconditioned person has so with that has to go skills, motives, and training. He says, "Yeah, that's right." All of that together I had to invent a name; call that the Augmentation System. That system is what provides us humans with the kind of capability we operate on today, in [inaudible 00:13:41] All of this tool system, human system, etc. has evolved culturally and for a long. Long, long, long time. We're in the middle of a rate of evolution that's unprecedented. Here's something to think about is the world's full of human computer interaction kinds of studies but the real thing is how does the human interact without Augmentation System and learn to adapt and adjust. This is kind of the whole picture I've been operating on all this time and I go in this detail here because I want to ... Is there a clock in [the room 00:14:21]

Female 1: 2:18.

Doug: [She's a phys 00:14:26] I started at 2:15 and it’s a half an hour. Boy, I'm sorry. I wanted to go faster but this was just a fundamental sort of way in which the thing got established. We'll move to talking about some special subsets of the tool systems all based upon this dynamic knowledge repository as a real capability target. You look in a matter of scale that that same model I contend holds for every one of these organizational sizes and fits. Boy, so you look at that and says ah that question of scaling comes in a bit. You says, "Yes, here's my organization or my country or something sitting down there with its DKR development going and it’s got all these peers and they're part of the whole organization.

The whole thing has this DKR stuff for handling the largest scale problem. You just know that you can't have different structures and contentions, etc. among the different DKRs in there because they aggregate to be the common one the group fits on. This [cart'll 00:15:37] tells you the scale and it just won't work that if somebody uses a word and somebody else use something else that they don't have processes by which the respected contributions have been knowledge packages that you put in there can be really integrated and that integration is not just something that you can sight that document so we got things to to say about that. Does building using and evaluating DKR is a really central thing. It's interesting to say that the Google search function have an interesting role to play in there about how you find things but then there's that whole business of integrating it all that's left over that it could still facilitate that.

One of the things we talk about is homework are you going to get that evolution going. You have to get groups of people in organizations that start working together to help cultivate and develop that and we've come to call it a Network Improvement Committee. It can be improving any kind of capability that the different member organizations agree let's all work on this common sort of need for capability so the particular kind of capability then that we can special focus on is this dynamic knowledge repository, the capability for doing it and then important things to talk about it. This is a real kind of research. Everybody's been telling me we'll get through this stuff fast Doug so you can get at what these guys will want to see is some of the things that they might be able to do.

15 years ago I just said, "Look we got to have an open Hyperdocument System; I didn't now about Open Source then but it's the same thing. It's the knowledge containers and the processes on them etc. has the open source so that it evolves like a natural language because so much of what you're going to do with this kind of tool system is essentially dealing with natural language and knowledge. The operations and such need to be saying that you've got to have a common language about trying to tell somebody that they're ontology is mixed up on something like this an so and so. It's very much that and so that's something that is complicated.

Very early in the 60s even 70s when I was getting research money [inaudible 00:18:10] Ted Nelson coined the term hyper which is fine but I've been so puzzled by the fact that it seems to be just limited to having links that point to something and we were doing a lot more so I'm proposing that the world takes the term hyper and says let's say a hyperdocument is something in which everything you can do with computer support that is beyond what the old technology of printing could provide for you let's call that hyper because here are things that we were doing beyond just a link that our addressability for our links just from the beginning went ... let's say you want to be able to site any object in another document, not just a document so we had that provision ... What do you think,

Your link could address and point to any object. It all [inaudible 00:19:19] to other things too. It had indirect addressing just like it had direct addressing and programming. It just says hey I'm pointing to this call or this module or something like that. It has link in it so I want it to go there and take that link; that can be part of an address path. You can have implicit addressing for things like this word is implicitly linked to this definition in the dictionary or to its thesaurus in a given glossary or to its definition and description in the programming languages an operation [inaudible 00:19:54] we had that working; we had include function that at some point her you could say I want to include that whole chapter or that whole section and Nebraska of the viewing option said oh oi only want to see that thing it says it what to include or I want to ask to have the inclusion done. We had many, many things like this going and they just give you such a rich environment.

The prevailing paradigms were that the users have to have something very easy to learn or they're not going to get it. We learned our lesson and went into hibernation for a few decades but that system is something is something that it sort of broke a connection that disabled me from being able to come and actually demonstrate some of those things for you. The optional viewing, too, not just the way the page was printed so the very first kind of thing the option is oh you exercise this little option in you just see the first line of every paragraph and it turns out to be an extremely good way to scan, to see something. If you had a hierarchically structured document which is very useful just show me the top level and only one line. Okay, well, just the first line of the next level, too. Oh, I want to see their address if they all have a location address. 11234 or 1A1BC or 1B12 so that you could show that or not show that. You could say I want to see only those with certain content, you could see that. The flexibility in that just grew and grew.

The command line which actually turned out to be like object oriented in verbs and nouns. T's amazing how the flexibility of that grew but the vocabulary just grew until you would have operations like ... What's this verb called transpose do? Oh, it just interchanges. Interchanges what? Well, the object you describe in your [no 00:22:02] two paragraphs, two chapters. Anyway the flexibility of editing and moving around and viewing and then jumping to where you want to go without having a link just jump. Those things all provided a working environment which just is unequaled still today and we brag about it or something but it says okay it was ahead of its time, that's our word for it. It wasn't. It might be say oh it's a total failure because it will never see again but really its the kind of thing that this hyper term it says look why don't we really go after active duty capitalize on the fat that the computer can help us do that moving around.

That model of a augmentation system there is the human basic capabilities there and is one of the basic capabilities called perceptual. you say oh what's that? That's like you can look in a mirror and see what's happening but you can look at a set of characters that represent now consonants and vowels and you don't see that you see a word and you don't just see a word you see the meaning and just sweep along to it. That machine has been in your head for thousands of years. 5,000 years ago they had an alphabet but now we got things we portray symbolizing lots of flexible other ways and that machinery is there to learn to adapt to use that.

One thing I just waiting to do if I were smart enough I'd get an idea something's [parser 00:23:39] and now when I'm reading text I would start experimenting with what colors to make what participants of speech that pretty soon that perceptual machine is getting used to it and boy I'll bet you a great deal that we'll be able to read faster and more comprehensibly.

In this evolution this says we're starting with something called a hyperscope; we extend the viewing and making options. we'll add optional user interfaces systems and this what I really feel like I have this open hyperdocument system evolving you can plug in different user interface systems to say okay you got one for the pedestrians and one for the high performance. I'd be willing to bet that the programmers the heavy programming work that you'll really migrate to the really high performance kind of things that otherwise people say that's too hard to learn but you ought to have both. There's a lot of evolution there that's there to go after and I would like to see it get started.

Did some place did we lose the diagram of the hyperscope? [inaudible 00:25:15] Oh, so it starts with saying okay you got target C Legacy servers so we're saying let's provide linkage into everything we have this kind of knowledge packages not just H10O. The thing is that there's an intermediate server that's one that given this new kind of url to the point to any known legacy document type and it'll transform it into a intermediate file that's [inaudible 00:25:48] Then your browser sits there and can get a picture generated by the view generator as to what sort of a vie you want to see. H transformer will be able to give every paragraph as we learn more and more what kind of objects, [inaudible 00:26:08] solicit kind of tags with algorithms that you can count on so you can have a link now pointing to a given paragraph in a word document or a given something this.

Not only that but the links as we had can have view specks in them so that it says this link says go get that document transform it and show me this view starting from that point and highlight it in certain ways. This can start open the door for the kind of flexible capabilities we had for there and it means that you could put this in he middle anomaly of not today's environments or everybody doesn't have o move to this thing. Some people could start using this and have these kind of link and points to the kind of working file that everybody else is using and doesn't have that capability and it's a evolutionary approach. Then there's our link database that keeps track of what links are pointing to what that are using this server. They’re very interesting things that that can do.

He says okay you want to be able to link into audio and video at server 2 and movies or a cd rom linked to certain places at the [time 00:27:25] these are the legacy types which we don't have to go into details of something why it says okay how would you like to be able to link into any of those things, the particular things and the link database says okay or every link excise in this environment you know what the target object is, the high resolution location of the link that got you to that target and its home file. The link type designation because the links have syntax that say you can have a link type.

Anyway, you'd like to know what that is and for some link types also the content that come with it a comment note and that comment note might actually have another link or so it says hey Fred that's a pretty weighty thing you're talking about I wonder if you've checked with such and so on the link pointing out to there. Part of the viewing that you could look at this with would say in this document I'm looking at are there any links pointing to it. Oh, yeah there's 17. Well I just want to see those from a certain class of people. Okay. Or a certain types. Okay, let me see the comments that might be on them. This would give you a great deal. These are things I've dreamed about for years and we did quite a bit of them.

The value is that they be able to be done with legacy top so as I was getting ready to come over here for the last week or 2 thinking that home what about if there were a growing class of people out there in the world that started to use the hyperscope how much could Google services start doing it that they'd be able to indicate to Google that they're a hyperscope user so could Google start extending its service so that it would give them the explicit location of the passages that incurred the hit that they got and have [inaudible 00:29:32] areas.

Then the other thing about this high resolution linking is that it would be such good support for the thing that's grown up to be the Argument Structuring, explain this. Does anybody know what that means? Are they just very bashful? Anyway, that-

Male 1: You means the structure of conversation where people pay somebody to come [inaudible 00:30:03]

Doug: Evolved or whatever. In my mind that's an absolutely essential part of our future. As a group that doesn't get enough publicity about that isn't working. These are things that I just thinking about pulling together the knowledge that really represents the best understanding for any given situation that that certain going to be a patient. Here's one of them best books about it that's got a whole bunch of connections about describing it. For instance here's a diagram pulled out of it that says okay these are the associates who're doing it but all these different arrows between them are connections that would be tight as likes. That can be pulling out explicit passages from any place to sort of represent in an Argument Structure which would just be extremely valuable for all of that. I'm sure that there are in the software world specialty roles especially capabilities so if you hit it that way in the knowledge world, too.

This is the next thing if you're going to get these network information communities going who are the candidates, our universities, government agencies, professional societies, you got philanthropies, special improvement infrastructures, [inaudible 00:31:59] If ever did get that going and learn how it would be really nice to start showing the philanthropic organizations how the challenges they're trying to go that they could then fund people adding then capabilities, the know how to go after and build the best understanding they can of the situation they're trying to deal with. Then your hit says oh professional societies, too, that's what they're trying to do. Well, universities if you could get around their peer review things [inaudible 00:32:30] government agencies, yeah, have a chance and how about business? This is a special challenge in there about businesses. What I had explained to me that the tech support people don't want to bring in any alien unquote application packages inside their world. It's okay to have browser supported by a server or something. Okay, let's just have the hyperscope give a chance to be in there but how much more about really building DKRs in the machinery unique to doing that?

We did a kick off about finding a couple of university professor that had a chance to apply and get a course that they're trying to work with the undergraduates about this because to my mind they're very flexible citizens in the undergraduates universities that can start doing interesting things. One of them is Valerie Dinn down here who has a class like this at Cal State University so if you want to ask her questions and Jamie Dean works with her.

Here's some reference links and this I guess will be posted s you can go look at the kind of things were some of the background on this can be reached. If there are no further questions thank you. It's really kind of a puzzle to me that as I wave my hands and go through some of these things it take quite a while to digest each of the steps we've been through so if there's a discussion I'd welcome it or if you want to ... Yeah.

Male 2: You talked about enabling infrastructure as a kind of leverage a [button 00:34:31] in the knowledge industry example but it seems like we got certain problems that we're already kind of doing that. For example the human [inaudible 00:34:38] project; it's a worldwide effort where different lives are contributing to sequences and now that [inaudible 00:34:45] got people all over the world catching knowledge of that framework in terms of discovering protein structure and things like that. That's mainly a dis-tense of your [inaudible 00:34:54] framework. How would you relate those two like a particular instance towards the view of what we could do?

Doug: I feel that we need to do [inaudible 00:35:03] we could research the kind of [inaudible 00:35:07] and say, "Hey one of the examples [inaudible 00:35:08] is you can [inaudible 00:35:11] how many of them provide what kind of functional advantage and capability. Among those I listed there's still [inaudible 00:35:18] is not supporting the kind of argumentation that said are going and really getting some of them. He says, "Okay, if somebody starts outfit stared to get better and better understanding how you can actually do this DKR more effectively, what it requires of the community that is using them through the ways of studying it and contributing to it and where do you find the special teams that can probably do the high quality integration. It's there to go after and going after that would be terrific because the better here's big problems they'd be able to go better with that.

Getting the best examples you can and then just like in the programming they did for a while of how do you judge what it had with the capability level, how do you judge the capability level with dynamic knowledge repository development of a given community. It would be very handy to start getting measures of that which is almost like saying, "Hey, what's your relative IQ?" That's my dream. Yes.

Male 3: Give your slide on [guys 00:36:44] making arguments active duty I think about [inaudible 00:36:48] politics. Places where we're having a lot arguments going back and forth from 2 organizations that aren't necessarily looking to share all of their structure and so essentially they collectively for trying to solve the problem of for example for [inaudible 00:37:04] that we have two bodies of knowledge or more than that. Due to particularly globalized knowledge but the 2 communities are probably not willing to share all of their knowledge of all of their interface of their knowledge with each other or with someone else. I'm wondering if there's any sort of way of or wondering if it's worth thinking about a [inaudible 00:37:34] particular or means for I guess for sharing or gently working out what you're not willing to essentially completely expose everything in your knowledge base?

Doug: That's exactly the kind of thing that I think, "Oh, boy, if we really got that going." A lot of people educated in our society about what make a really going on DKR. You could use it in your businesses and all of that. He says, "Okay, our society really, really better built good DKRs that are equivalent to the news services, what's really happening? Then you say I need to know more and more about what's going on in our government in order to facilitate the democracy because now all the vestibules vote for somebody then what kind of picture you're given by the time it gets twisted in the different kind of releases and such as that because you have a very, very hard job to make a decision based upon what would be the best for the country in this situation or something. That's part of what I feel if we don't as a culture develop this capability of getting lot more effective with our collective IQ we'll be spiraling into no man's land. It's really important and that's what keeps me stumbling along is [inaudible 00:39:01]

Male 4: I guess what I'm a little concerned that as we build better [inaudible 00:39:07] dealing with all your pioneer classes and evaluation that [inaudible 00:39:16] I feel we just take that and then go form complicated system rather than spending efforts to make simple systems and the extremist say, "Ah, now that I see plus, plus [inaudible 00:39:27] to its complexity because some people feel that [inaudible 00:39:33] some people like that and deal with that program that there's hat much less bran power left to deal with the actual problem we have. Are we that slighted here over the last few decades? Are we making progress?

Doug: That's the kind of thing we got to get smarter at, assessing. How do you get to understand what the situation is. I hate to keep using that as the thing but almost every significant issue you talk about how are you going to educate people better while there's so much more to learn, so much more pressure. Well, should we break them up into specialist very early or what. How many of our citizens have to know how to read to know how to analyze to know how to check an argument out to see if okay, etc. how much trust do they need to have in the people who are doing it in their behalf like how much trust do you have on the accountants here that can tell you what he overhead figures are. Lot of people in here probably couldn't o looking at the books and derive it so you depend upon these certified people that are accountant. Te probably certified magicians that can go through the argument structures and they ought to be open so anybody can go through and check them.

To me it's just not something that would be nice that would add profit to the companies. It's something that if we don't learn how to do that in a very significantly, effective way I just don't see that there's the slightest thing that guarantees our continued survival. I got this picture I wish I had a cartoonist that could do it, great big lumbering vehicle got wheels all over the place, lots of compartments in it with different kinds of of people living in them. It goes lumbering over rougher and rougher ground and the ground is getting rougher and it's moving faster and the headlights won't shine far enough ahead and besides no one can be quite sure who's steering it or how. You say what's the chances that vehicle is not going to just go crash? It's going oh so it propel faster. I just grow more and more sure not very happy about it but more and more sure that that's the situation. Anybody want a cheerier?

Male 5: Kind of a comment on that. Why did the intelligence that we've used t get here bee enough to help us to just going forward? Why would you think we need this? I think more and more increasing in others that just creates more and more complicated processing [than this 00:42:32]

Doug: Lots of intelligence is at working out through all over in accepted cultural frameworks that don't necessarily say we're collaborating. I guess talk about it you know the kind of things that if you're a rabid liberal, is not the term now a liberal? You say, "Hey how come our national debt went up so high in just 4 years and we have people taking care of it and such?" Well, yeah but how come? What does that mean. They're thinking about PayPal just slightly older than you they're going to start being able to retire and simply it won't be enough money for their Social Security. How'd that happen? Whom did we depend upon? Why wasn't that we're something we're all aware of? Where would we go look to see what the certified logical knowledge about it would be.

If you don't want to be that global about it just think about if you could do it inside the given kind of project domains you are how 10 people could get it together a lot better to understand what it is the project is. What opportunities, possibilities has etc.

Male 6: Your model for the DKRs combining to form larger DKRs is there kind of an implicit assumption that people who are contributing knowledge are being correct and honest or is there some concept of weighting these things by authority or going by reputation or some mechanism to ensure that when you're looking at the large scale picture you're actually getting reliable information rather than just what somebody had [inaudible 00:44:35]

Doug: [inaudible 00:44:36] evaluating structure things are that anybody can contest it and point to something and say I contest that because of this or that. As long as they're sort of open contest like that to say there's a question about whether or not this assertion is valid. That can be open so where dad you get the data, etc. to tie it down to get in finally finding second but it isn't done that way now. People can make assertions that we just have to trust them and oh yeah today's world with ... Anyway.

Unless we do that it's sort of like adding up the arithmetic or adding up the accounting system t see that it adds up and somebody's been filing false expense claims that could throw everything off until you find out something wrong so it must be old. [inaudible 00:45:38] One of the things I would be interested in sort of with people with the k skill and talent in here about having some more discussion at that hyperscope idea and getting it tried, getting going. Another time if I get this dear old system we call Augment we got the money from [DARPA 00:46:05] 8 years ago that we're going to rewrite that in small talk and visual works. All we Dianne McIntyre. At the client server thing so the client was out for the minimal local computation for power you can imagine it was usable in the 70s and it could work over more bandwidth than the 9600 volt [modem 00:46:31] but it's so worked very nicely; everything was done in the server and serve said what the change on the screen and we got all the information.

We need a new client that work through the internet and just had lots of flexibility to have any number f windows open at once but that were all under the control of one kind of thing they weren't that many different applications running or different images of one application. They were one application controlling them all so you could copy and move things between them etc. you have one for viewing something in one way. I want to jump to that but in this window say jump there and move to the other window and whatever you views speckling there we'd hope bingo, that's what you'd see. Many, many flexibilities so that provide a way in which we could actually demonstrate some of those things.

Three months ago the connections suddenly stopped working over the internet and we're trying to find people that can resolve it for us and figure out why [inaudible 00:47:36] so it'd be really a real examples of the kinds of of things I was thinking about and telling you about earlier. I was a professor for a while and I figured I can tell when I've put them to sleep.

Male 7: [inaudible 00:48:05] I'm trying to see your [inaudible 00:48:07] the dancing with the web thing is it like a extended version of the existing web or is it flexing on some of web where having one of these sources plugs into it or [crosstalk 00:48:18]

Doug: Http kind of thing and still be able to go get documents. When I got them it would bring them into the intermediary server and transform them and then you're viewing and dealing with transformers. Later on you'd start saying well let me just start editing that xml kind of document and store it and I've got an application growing that can grow to be my open hyperdoucument system but as the first stages of this hyperscope it just means that now the link you formed can actually look into directly right into any of these other document forms and into a particular spot in them. Give the viewing and the manipulation etc. which would increase the capability of that user a lot to study and move around, find things. It would e increasing in an interesting way the kind of service Google cold offer that class of user. Do you need something more specific?

Male 7: Well, [inaudible 00:49:26] replace it with [inaudible 00:50:20]

Doug: I think would it it replace it completely in edging; can it just be an added feature? [crosstalk 00:50:27]

Male 7: [inaudible 00:50:29]

Female 2: Doug, [inaudible 00:51:21] one of the many things that he's talking about is [inaudible 00:51:28] base and imagine if [inaudible 00:51:33] the users had actually been given [inaudible 00:51:35] in their old system actually tracked your passage and those that they miscommunication on a database say Google. This is my actually hypotheses about how his stuff could translate to relate Google is that you could actually have sit for hyperobjects in which you could actually specify the main types or view types as well as the normal search so that was just one potential extension of [perks 00:52:05]

Male 8: I guess from the hyperscope [inaudible 00:52:10] applying this sort of this schematics or[inaudible 00:52:14] for schematics to a set of documents [inaudible 00:52:18] that versus [inaudible 00:52:25] in those documents correcting them. There's all this I guess work to create a schematic [look 00:52:35] where you've essentially more directly describe what certain things on certain pages means and you can do all sort of new things with this new information you have [invested 00:52:49] back in the page. How could you proceed like that [inaudible 00:52:54]I thought you were describing a hyperscope. I thought you were describing what a hyperscope could provide.

Right, the hyperscope is [inaudible 00 :53:05] side of the schematics are implied by sort of this external [inaudible 00:53:14] kind of this main structure of this [inaudible 00:53:16] and so on. There's this having not and all the information [inaudible 00:53:25]

As people evolved their document that they're developing and hose that shift into building on the hyperscopes intermediate file structure and start evolving in open hyperdocument system at every stage it would be interoperable with the legacy stuff but it could start having more richer metadata and things. It's like we improving something very interesting in ours that every node other it would be roughly a paragraph or a line of code or something it had a property that who was the last person that edited it within and boy if that didn't come into interesting things when you get new bugs showing up in the system. Implicit linking. came out of that very nicely and the inclusion such ... It was just a very rich thing ... It's sort of a showing that giving you the feeling of possibility. It's not saying that that was the answer but it want an example of a much richer environment and the kind that if we don't go after a richer environment we're short circuiting ourselves, shortchanging ourselves [inaudible 00:54:52]

[inaudible 00:54:55] the car moving forward sounds like a lesson in control and like the best [inaudible 00:55:06] book is those ideas that are coming into [flight 00:55:08] somehow to communicate with your fellow humans on a way it doesn't make you seem like [inaudible 00:55:14] so that you lose your credibility and basically you gain some [inaudible 00:55:20]

What'd you do about it? You can say, "Well, maybe I have to adjust so i don't see my cocoon" but if you want that community to be more effective and effective it just become very important that their education level kind of grows until the concepts that they have to deal with they have a good enough metadata with enough vocabulary. If what we're trying to talk about is really improving our collective ability we just have to be collectively improving the scopes of our vocabulary. A loan officer of these concepts I've evolve and I'm not sure I evolved them before the first examples of implementation but I really know that with the system we had we built so we could set the profile for a persons when they started at a very limited vocabulary, now it's [worse 00:56:40] just like in [inaudible 00:56:42] find and make it start adding more when they want it to. Once they have that freedom it was very secure but you'd be surprised at how rapidly someone would say, "I want more, I want ..." Then the invasive learning was much higher than it would be if you're there to have to drill everybody to say it's time for you to boost your vocabulary.

Speaker 1: [inaudible 00:57:11] give Doug Engelbart [inaudible 00:57:11] thanks for ...

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