Clem is a computer scientist who helped create the internet. He aims to inspire young software engineers to keep pushing to solve problems that truly by showing them that they are more like him than they might think.

**Version 2**

Audio	**B-roll**
The old saying goes "Engineers make and maintain the world"	Various young engineer working shots Shots of clem getting presentation ready – pan room
These are the young engineers that are going to be the next generation at intel, that are going to be, um, our future leaders – they're going to be the ones that are going to create the next generation of products for us and take us into the future and we've got to capture them.	Shot of people paying attention to Clem Pan shot up from checking phone to Clem talking Clem on camera, lower third
I have a very strong belief in young people.	Meduim shot clem working on computer taking off his glasses
The internet um, was as we know it today created in the 1970's, um, I'm… lucky enough to be one of the people that wrote some of the original code that you use. I think kids find that kind of fascinating that here's this old, you know, this guy, that you know towards the end of my career… I mean, I'm in my late 50's early 60's and yet the things that I built, that I've been building, are things that they find cool.	Meduim shot clem working on computer taking off his glasses Close up shots of clem using mouse/keyboard Close up shot of clem's glasses
"WOW" this is, you know, "how'd you guys come up with those ideas?" Well the truth of the matter is we bumbled along sort of the same way they do now, exploring things that seemed cool and it seemed like the right thing to try.	Clem on camera

There's a ton of problems that are unsolved. I don't think we're ever gonna be in a situation where there isn't something new.	Student speaking in small circle
How do we, as the leaders of Intel, how do we provide a mechanism that's safe for them to explore, safe for them to make some mistakes, have us as a company move forward, um, it can't just be a playground, we're in business to be business, but help provide a place to, that they can feel like "hey Intel gets it, Intel wants me to try, Intel wants me to, wants me to work on something that's kinda cool"	Clem talking to students 1x1 Over the shoulder shot of student talking to clem
What I really hope for "them", is to be able to believe that they worked on something that mattered. Um, and mattered, it isn't that I worked on the next internet or whatever, but to be able to say I helped build something that changed the way we work with the world.	Various young engineer working shots
If we can send that message to the young people that we're hiring is that you're helping us invest, invent the future. We, we've done it. And, you know, the desire I have for them is that they keep pushing and they keep trying.	Clem on camera

VERSION 1

Audio	B-roll
The old saying goes "Engineers make and maintain the world"	Young engineers, working, in their element
These are the young engineers that are going to be the next generation at intel, that are going to be, um, our future leaders – they're going to be the ones that are going to create the next generation of products for us and	Any type of footage of young people will work here. Go for facial expressions...interactions, and if for have any footage of Clem talking to young engineers, use it here (with audio only).

take us into the future and we've got to capture them, we've got to find them.	
My name is Clem Cole. I have a very strong belief in young people.	A-roll: Clem Lower Third: "Clem Cole, Intel HPC Architect and Recruiter"
The internet um, was as we know it today created in the 1970's, um, I'm… lucky enough to be one of the people that wrote some of the original code that you use. This concept that we're our own network, and you're your own network, was not something that was natural at that point in time. Yet today without that, that's is the key piece, that's the "internet". I was very lucky to be here when those ideas were being explored. I think kids find that kind of fascinating that here's this old, you know, this guy, that you know towards the end of my career… I mean, I'm in my late 50's early 60's and yet the things that I built, that I've been building, are things that they find cool.	
"WOW" this is, you know, "how'd you guys come up with those ideas?" Well the truth of the matter is we bumbled along sort of the same way they do now, exploring things that seemed cool and it seemed like the right thing to try.	
And, you know, the desire I have for them is that they keep pushing and they keep trying.	
I've been fairly involved with Boy Scouting, I'm an Eagle Scout from troop 1, the original	

troop, um, and, part of my involvement as a parent and as an adult, um, we developed a program which is a STEM program for the boys where we do all of the science and technology merit badges.	
One of the other guys I was working with on it, he and I were bemoaning the fact that we both have very bright young daughters and here it is we've actually got Scouting to do something for in science and technology for the boys but we don't have anything for our daughters.	Might be good to have a photo of Clem during this time.
It took, um, another 5 to 6 years before we really got something going, um, it's now called the All Girls challenge, um, and I am doing everything in my power to help them get it going.	Any photos of All Girls Challenge in years past?
It's fun to find out that my daughter ended up in computer science. She took a computer science course as a freshman and said, "Dad it's a big puzzle!" and I said, "yeah", she goes "you never told me", I said "you never asked", um, but I'm thrilled that she discovered it on her own and that's what I want. I want for her and her, her friends to discover engineering and discover science and the wonderful things that you can do and the opportunity it brings.	Any photos of his daughter? Did you go through any albums with him?
The trick is that we know fixing this, the girls, is not gonna happen in a year. This is something that we've gotta do over many years and frankly it's an international problem.	
There's a ton of problems that are unsolved. I don't think we're ever gonna be in a situation	

where there isn't something new, and that's good.	
I think that's where the satisfaction is. The satisfaction of trying something, and by the way, I, I don't believe everything you try is going to succeed.	
How do we, as the leaders of Intel, how do we provide a mechanism that's safe for them to explore, safe for them to make some mistakes, have us as a company move forward, um, it can't just be a playground, we're in business to be business, but help provide a place to, that they can feel like "hey Intel gets it, Intel wants me to try, Intel wants me to, wants me to work on something that's kinda cool"	
What I'm doing is I'm working on the next generation of what computers are gonna be like. What society's gonna be like." If we can send that message to the young people that we're hiring is that you're helping us invest, invent the future. We, we've done it.	

My name is Clem Cole. I have a very strong belief in young people and um, a few years back, um, the intel folks, um, wanted somebody to come and give a talk and, uh, at CMU, um, knew I was an alumnus, knew that I uh believed very strongly in young people and said, "hey, would you come do this?" and I said sure.

These are the young engineers that are going to be the next generation at intel, that are going to be, um, our future leaders – they're going to be the ones that are going to create the next generation of products for us and take us into the future and we've got to capture them, we've got to find them.

The old saying goes "Engineers make and maintain the world", um, this is where, um, places like Carnegie Mellon, places like MIT, um, are where the future is… is created, invented, um, and ah, first off I'd like to be a part of that, um, and secondly I like to see what the, you know, people are coming up with, um, you know, CMU started putting a car um, driving a car around the campus without somebody inside of it a few years ago, um, people thought they were absolutely nuts, um, today we're talking about, you know, when are we gonna actually start seeing driverless cars like that on the road. Um I actually think, um, where we're going to see it

before we see driverless cars is I think it's gonna make a huge, huge change, for instance, in… the trucking and material handling, um, is gonna be very, very different. Um, but that was a dream that some people on this campus had in the robotics group. Um, you know, you ask, ah, what it is about science and engineering… this is where people take things that were blue sky and make them reality. Um, you know, the internet um, was as we know it today created in the 1970's, um, I'm… lucky enough to be one of the people that wrote some of the original code that you use… we were trying to solve a different problem. Um, but, ah, you know, that problem is exactly the problem that gave birth to what we now call the internet.

Me: That's really interesting because you said something earlier, and one of the things I was curious about is, what about you resonates with the next generation leaders. You mentioned something about the fact that you had done some of that work on the internet what the internet was. Can you maybe say a little bit more?

Clem: Sure, um, in the late 1970's um, computing was primarily was driven by a couple of companies um, IBM, Digital Corporation, Hewlett Packard, Burrows, Control Data, etc., um, each one of these companies had their own way of doing things and everything was very closed, um, what made the internet was an accident as it turns out, um, I always refer to it as Dave Clarks' observation and I don't even remember today what it was that caused it, but, there was a mistake that occurred here at Carnegie Mellon and it caused a major reboot of some computers at MIT, and Dave Clark's comment was, you know, "why is it the clowns at CMU are forcing stuff on us?" That observation, this concept that we're our own network, and you're your own network, was not something that was natural at that point in time. Yet today without that, that's is the key piece, that's the "internet", the "IP" aspect of things, that observation… extremely important and it's really what allows you to add or subtract your cell phone, or a car or whatever, cause if your cell phone stops functioning it doesn't take out everything around it, it's just it. And, you know, I was very lucky to be here when those ideas were being explored, Um, and helping to create some of them and, and, my contributions, um, the system today we call LINUX, um, when I was in school, um, there was this novel way of putting a computer together, those times it was called UNIX, it's a nasty joke, um, there was a system that had been developed at MIT called multix, um, and this was sometimes referred to as "castrated" multix, um, and the idea a bunch of us said we can take some of these things that people were doing… a multix machine in those days cost millions of dollars, it was huge, was the idea of building a computing utility. Guess what… we talk about that same idea today, a computing utility. The way we're actually putting it together is very different, though, interestingly enough what's the core of it… it's UNIX. (Laughs) The ideas were there stayed on, um, and I've been lucky enough to be part, you know, one of the people that helped explore those ideas, and um, make them richer.

Me: Would you say, um, maybe, that's an inspiration… so I want to come back to sort of the recruiting side because you seem to kinda move, you still have the deep engineering piece, but you are doing a lot of these speaking engagements and it seems, you know, from what I've heard and we've talked about earlier, is that you, you have a... that it resonates with a lot of

younger students and people coming out of college. Um, do you think part of that has to do with your history and that, that you actually have something that you've done that contributed to where kids are today?

Clem: Absolutely! I mean I think, I think kids find that kind of fascinating that here's this old, you know, this guy, that you know towards the end of my career… I mean, I'm in my late 50's early 60's and yet the things that I built, that I've been building, are things that they find cool… that let them do what they're able to do and "WOW" this is, you know, "how'd you guys come up with those ideas?" Well the truth of the matter is we bumbled along sort of the same way they do now, exploring things that seemed cool and it seemed like the right thing to try. And not all of them worked, just like today. And, you know, the desire I have for them is that they keep pushing and they keep trying and that they come back to CMU in 20 years, 30 years, and smile and look at that group and say, "Wow… look at the cool thing that you're using that I helped put together"

Me: So one of the things also in what we talked earlier is you said something about your daughter in the, um, I wrote this down here about the girls, ah, yeah the "All Girls" challenge, can you speak to that?

Clem: Sure, um, it's funny about 10 years ago I've been fairly involved with Boy Scouting, I'm an Eagle Scout from troop 1, the original troop, um, and, part of my involvement as a parent and as an adult, um, we developed a program which is a STEM program for the boys where we do all of the science and technology merit badges, um, for the boys and we were developing that, one of the other guys I was working with on it, he and I were bemoaning the fact that we both have very bright young daughters and here it is we've actually got Scouting to do something for in science and technology for the boys but we don't have anything for our daughters. And it took, um, another 5 to 6 years before we really got something going, um, it's now called the All Girls challenge, um, and I am doing everything in my power to help them get it going. Um, the difference in that case is that we're actually working at something that's really a societal problem, and, so what we realized is that… just having a single event is not going to be the solution. What we really need is a long, you know, a program that's actually an international program… the woman that's running it is um, tied to the UN… um, Kim is just amazing… and what we're doing is we're targeting middle school girls and we're making sure that the middle school and high school girls have mentors of young women that are in college that are, girls that are at Carnegie Mellon or at MIT, um, you know, that are acting as their sponsors. And then for those young women that are in college we're getting young women like my daughter who is a young engineer working for GE… she's mentoring a couple college students. Equally for her as she steps into the working world and, you know, as she's struggling in her 20's with all of the issues that young women have, you know "Do I want a family", "How do I do all those other things", she needs help. So we're providing those mentors role models of women that are really successful and that are my age but the trick is that we know fixing this, the girls is not gonna happen in a year. This is something that we've gotta do over many years and frankly it's an international problem. Um, we're starting in the US, why, because that's where we are to begin

with, um, but you know, I'm going to be doing a thing in Cambridge actually at Google next week for the All Girls challenge to help them get that thing going.

Me: Would you say perhaps that your daughter was an inspiration to you to maybe start with the recruiting piece?

Clem: Um, well, I wouldn't say she was an inspiration but she certainly is someone that I keep in mind, I mean she is exactly the kind of young person that I wanna see excited. Um, It's fun to find out that my daughter ended up in computer science. If you had asked me when she was in high school, actually when she first went off to college, I would not have expected, I, I, I kinda thought she was gonna end up in math or science, um, she took a computer science course as a freshman and said, "Dad it's a big puzzle!" and I said, "yeah", she goes "you never told me", I said "you never asked", um, but I'm thrilled that she discovered it on her own and that's what I want. I want for her and her, her friends to discover engineering and discover science and the wonderful things that you can do and the opportunity it brings and, and their energy and their excitement and their ideas and let's get 'em applied let's go do build something with it.

Me: You sound, I mean, the passion comes through there's no question about it, what advice would you give to these next generation leaders about technology and especially Intel.

Clem: Well, I, I, I think the one thing I can tell you is, is that, in technology does not stop, you know, it's a continuum, um, you know, people have said Moore's law was dead for years, we continue on, um, we're not gonna solve the Moore's law problem the same way we have previously, but I don't think that's the end of Intel. I don't think it's the end, you know, the end of the road for any of these young engineers, I think there's a new class of problem, um, it happens to be the class of problem that I am working on, it's very parallel. Um, and how do we apply multiple processors to the same problem, um, so you know, I think the good news bad news is that, um, there's a ton of problems that are unsolved. I don't think we're ever gonna be in a situation where there isn't something new, and that's good. I mean you can say that that's frustrating 'cause you feel like, "well, you know, I'm still working on the same thing". Well yeah I am and I'm not, but I'm applying different techniques. Um, one of the things about Intel and uh, about computer science, things that were considered absolutely ridiculous to have tried in the 1970's are de rigeur today. Um, I kick, because we, we have the day of the cheap processor, because we have the data, I can throw certain pieces of technology that I couldn't, you know, when I, when I was at this institution the big machine, there was one, cost about 10 million dollars. That computer is about a hundredth of the power of what is in my watch at this point.

Me: That, that's really interesting to see how technology has changed from when you were first here, and I think maybe to some extent it gives you credibility when you are speaking with some of these leaders about "hey, this guy has seen it, he's been here and look at where he's come from since then…"

Clem: …And, and I don't think it's going to be any different. I think somebody coming back 20 years from now is gonna have exactly the same, you know, just think of the kind of processing power that was in their little cell phone at that point in time. Imagine what's going to be in, in the devices they are using… I think it's gonna be the same world but it'll be different. You'll have this idea of the interconnection, of internet of thing, is going to be de rigeur, most things are going to be smart, and you're going to be interacting with them in some way shape or form. What is that, what's the technology structure behind it, what's the societal structures behind it, who's gonna figure that out? I'm not gonna wait for Congress to try to try to do that. It's gonna take engineering by the way folks, and, and I think it's places like here, Stanford, MIT, whatever, that are going to be, you know, these are the people that are going to figure it out.

Me: Do you… so we talked a little bit about legacy earlier, what, could you articulate maybe a little about when you're done in this role, what is it that you want to leave, to, to start that next generation?

Clem: Well again, what I really hope for "them", is to be able to believe that they worked on something that mattered. Um, and mattered, it isn't that I worked on the next internet or whatever, but to be able to say I helped build something that changed the way we work with the world. Whether it's a car that can drive itself, a, you know, EMT system that helps us be able to solve a problem when somebody has a heart attack, um and we save X many lives because somebody's built a smart system that can inject the right medicine in the right time, I mean, those are things that have got to be done. Those problems are gonna continue to come to us, um, it's only going to become more complicated. Um, and I think that's where the satisfaction is. The satisfaction of trying something, and by the way, I, I don't believe everything you try is going to succeed. I mean I can count on a gazillion things that we tried that didn't work out. Um, that doesn't mean I am any less proud of having tried and you know, some of, some of the projects that I think I had the most fun on and I learned the most, um, we're not financially as successful as some of the one's that actually did end up, you know, surprisingly lived on.

Me: Well I think that's a key message too is, is that it's not just succeeding, it's, you have to fail to succeed.

Clem: Absolutely! And, and what's the definition of failure? Um, something may not be financially successful but you will take away from that project, take away from that experience a set of things, some of them will be "I don't want to try it that way before… I've seen that movie, I know how it ends. Don't wanna do that, ok", and now I can recognize a bad mistake before I get into it. Some of it's gonna be coming, "you know that really was a good idea, it wasn't economically interesting", I couldn't, technology wasn't behind me at that point in time but maybe I can try that idea again 20 years from now when I have a different technology. That's been absolutely true in my career. Things we do in computer networking today actually are some of the ideas we had, um, a long time ago that were completely impractical, we could have never done them then, but today it's so inexpensive I do it in a very different way.

Me: So I'll wrap up with, with one last question to you. Is there anything that, um, would be interesting for you to, and I don't know if you know Pat McDonald, but um, this is for her program at Stanford about, you know, figuring out how we resonate with this next generation of leaders. Is there anything that would be interesting for her to know or take away?

Clem: Well I think the takeaway, and I, and I, in some ways I think she knows it, and that is that our future are the young people that are here. How do we, as the leaders of Intel, how do we provide a mechanism that's safe for them to explore, safe for them to make some mistakes, have us as a company move forward, um, it can't just be a playground, we're in business to be business, but help provide a place to, that they can feel like "hey Intel gets it, Intel wants me to try, Intel wants me to, wants me to work on something that's kinda cool" and you know, "I'm not just a cog sitting, doing something in a spreadsheet in a cubicle. What I'm doing is I'm working on the next generation of what computers are gonna be like. What society's gonna be like." If we can send that message to the young people that we're hiring is that you're helping us invest, invent the future. We, we've done it. We're gonna get the best, they're gonna come to us if we can, if they feel like that's what we want to do and that's what we are, you know, our mission is to put a computer, make computer technology available to every human being. What is that mean? That, that really really means something, let's, let's show them that they can help make that happen. Does that make sense?

Me: Yes, completely. [This is where I wrap up]