

## Bob Metcalfe

Highlight Video Transcript



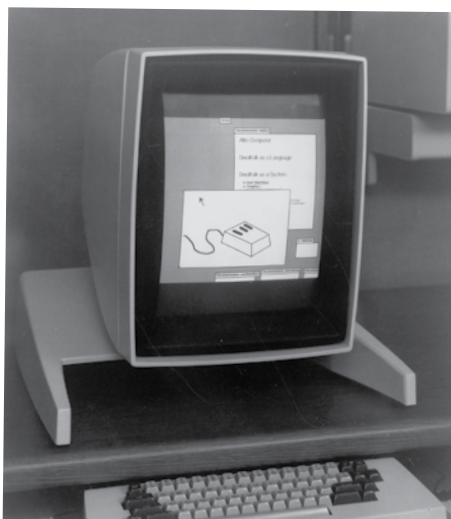
Would you ever literally eat your words if you were wrong?

Of course, most of the time inventor, commentator and venture capitalist Robert Metcalfe gets it right. He ate his words after his prediction that the Internet would suffer a catastrophic collapse in 1996. He didn't eat his words when, after initially setting out to link all the computers at the Xerox Palo Alto Research Center to the world's first laser printer, he developed Ethernet, the international standard for computer-to-computer communications—networking.

Once, the telephone switchboard was our most advanced source of connections. Night and day, operators used cables and plugs to link person to person and business to business.

Then came the advent of the computer age. And with it, a whole new platform on which connections could be built. It became known as "Ethernet."

Developed by Bob Metcalfe, a young engineer, Ethernet links entire computer networks. It did nothing less than revolutionize the way we communicate.



Top: Switchboard operators, 1896; Bottom right: Scientists at Xerox in the 1970s .Bottom left: The desktop Alto computer.

## Bob Metcalfe, Venture Capitalist, Engineer, Developer and Inventor of Ethernet, Pundit and Pro- vocateur

01:08:23

It was pretty exciting. It was . . . just beginning to be called Silicon Valley. . . . The Internet hadn't happened yet. So we pretty much invented the personal computer at Xerox Research, although that's – people will argue forever about that. So we built computers that look very similar to the ones that are used today.

01:08:53

And — and then, Silicon Valley picked up the personal computer and ran with it, unlike the East Coast, which didn't. And I had come from the East Coast. And . . . then we ran with the Internet in a way that no one else ran with it. So . . . I arrived in Silicon Valley at exactly the right moment in June of 1972.

01:09:24

Well . . . they started recruiting people from the ARPA, the Advanced Research Projects Agency community at MIT and Utah and Stanford and so on, to join this computer science laboratory. So we quickly believed we were the best computer science laboratory in the world, naturally. And we were well supported by Xerox, which was at the height of its powers, using the copier monopoly revenues.

## Designing Ethernet

01:10:31

And my colleagues turned to me and said, "We're going to fill the building up with personal computers, one on every desk, but we need a way to connect them together. Why don't you work on that?" And that was my good luck, 'cause out of that I invented Ethernet.



Bob Metcalfe

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01:12:23

So when it came time to do this invention, I had been studying networking for . . . four years. And the most advanced networking in the world, the ARPANET computer network, which became the Internet. And I was steeped in the technologies related to that. . . . So then, given the problem, how do we – how would you go about networking a computer, not one per city, which is what ARPANET did . . . one per desk, how would you do that? And then I combined ideas from ARPANET and then another network which I had encountered called the Aloha Network at the University of Hawaii. And those two sets of ideas convolved to become the design of Ethernet.

## 3Com

03:04:50

Well, after 8 years at Xerox . . . I decided I wanted to start a company. Like everyone else was doing.

03:06:11

And the company was called 3Com – Computer, Communication, Compatibility. The “compatibility” word meant we were gonna do a standard. “Communication” was a reference to the protocols in the hardware.

03:06:37

. . . So 3Com was founded to – actually, we promoted three standards: UNIX, which is today known as Linux; the TCP/IP protocols, which today is known as the Internet; and Ethernet. So we were three for three. And no wonder 3Com became – eventually – a \$5-billion a year company.

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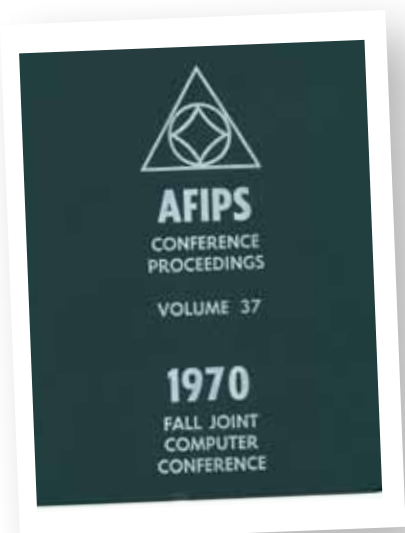
. . . So we had this Ethernet technology, but we had a huge advantage over everyone else in the world. We had lived at Xerox PARC for 8 years. We knew what the future was going to be like. There was going – even though the outside world didn’t know it – we knew there was going to be a computer on every desk. We knew that ‘cause we had them. And we knew there would be a laser printer in every office. How did we know? Well, we had one. And we knew it would be connected to the Internet. How did we know that? We were.



Bob Metcalfe and Ron Rider at Xerox PARC in the 1970s.

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— Bob Metcalfe



An article about the Aloha Network inspired Bob Metcalfe to develop Ethernet.

## Metcalfe's Law

04:06:44

All Metcalfe's Law says is, it's good to network things, which is . . . undeniably true. So . . . think of Metcalfe's Law as an effort to quantify the network effect. That is, when you build a network, there is a certain value of that network that accrues from other people being members of it. And the more of them there are, the better it is.

## Know What's Been Done

04:10:39

You're never gonna get any good at anything unless you enjoy it. So find something you enjoy and get good at it. . . . Innovation and invention is something that you do on purpose. It's not, you know, a lightning bolt from heaven. You set out to do it. You practice it.

04:11:06

. . . And there's usually a lot of preparation involved. You have to know what customers need or want. You have to know the underlying mechanisms for building whatever it is you're gonna build.

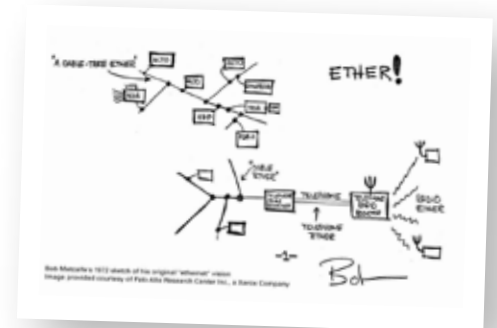
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So you have to know stuff. . . . In my field, venture capital now, I'm forever finding people who have had these great ideas. They forget the fact that 20 other people already invented that 30 years ago. So, haven't you done any research? Have you checked that there might be other people who did this before you?

## Polaris

05:10:09

Polaris is a classic venture capital firm in that we invest other people's money in . . . anything which is a high-technology, high-impact potential company – drug discovery, medical devices, enterprise software, computer networking and . . . now . . . energy – enertech.



Bob Metcalfe's 1972 sketch of his original Ethernet vision.

"You're never gonna get any good at anything unless you enjoy it. So find something you enjoy and get good at it. . . . Innovation and invention is something that you do on purpose. It's not, you know, a lightning bolt from heaven. You set out to do it. You practice it." — Bob Metcalfe

05:10:49

And we have about . . . 150 companies in our portfolio right now . . . We provide them money and advice and hope that they become the next Google. In fact, none of them have become the next Google. But, you know, we may get lucky in the future. That's what we do here.

## Making Enemies

04:21:35

. . . that's sort of something I'm proud of, that I'm the kind of person who makes enemies. And I guess it's because I think collegiality is overplayed. Collegiality is a pathology of the status quo.

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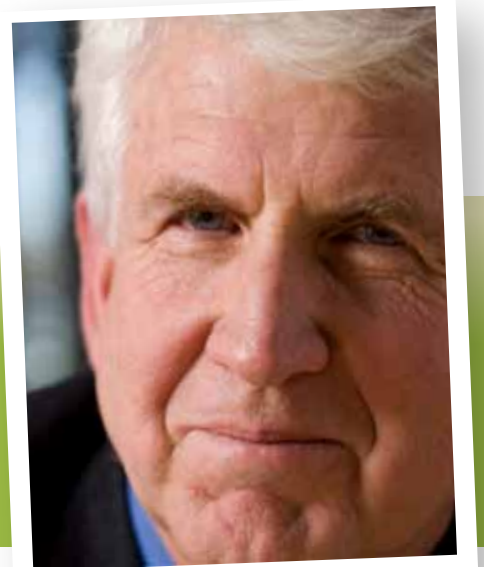
So to be an innovator, you have to be willing to make enemies. You have to be willing to fight the status quo. And the status quo is resourceful and nasty and mean and conniving. And so you gotta be unafraid to have enemies. And I have enemies. And I – I – rejoice in . . . what losers they are.



Bob Metcalfe in his office at Polaris Ventures

Bob Metcalfe has a lot more to say.  
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and connect with other visionaries thinking out loud.



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