Internet of Things
FTC Workshop
November 19, 2013
Segment 2
Transcript

>> IT'S MY PLEASURE TO HONOR OUR
KEYNOTE SPEAKER MR. VINT CERF.
HE NEEDS TO INTRODUCTION.
WE DO HAVE MATERIALS WITH HIS
BIOS.
LET ME GO OVER A FEW OF MY
FAVORITE THINGS FROM HIS BIO AND
NUGGETS.
AS MANY KNOW HE'S VICE PRESIDENT
AND CHIEF INTERNET EVANGELIST
FOR DOING WHAT.
HE'S BEEN KNOWN AS ONE OF THE
FATHERS OF THE INTERNET.
IN TERMS -FTS AWARDS HE HAS WON
THEY INCLUDE THE PRESIDENTIAL
MEDAL OF FREEDOM, QUEEN
ELIZABETH PRIZE OF EPG NEARING,
LIVING LEGEND MEDAL.
MY SIMPLE FROM STANFORD
ENGINEERING SCHOOL "HERO."
SO MR. CERF HAS AGREED TO TAKE
QUESTIONS.
WE HAVE PAIR HRAOELZ COMING
AROUND WITH NOTE CARDS.
I WILL TAKE THE NOTE CARDS AND
WE WILL HAVE TEN MINUTES OF
MR. CERF'S PRESENTATION.
MR. VINT CERF.
>> THANK YOU, VERY MUCH.
[APPLAUSE]
>> I WAS GET NERVOUS WHEN PEOPLE
CLAP BEFORE YOU SAID ANYTHING.
IT WON'T GET ANY BETTER THAN
THAT.
MAYBE I SHOULD HIT DOWN.
I HAVE A HARD STOP AT NOON.
I WILL TRY TO LEAVE TIME FOR
QUESTIONS.
IT'S IMPORTANT FOR ME TO KNOW
WHAT YOU REALLY WANTED TO HEAR

OPPOSED TO WHAT I COMPOSED.
I WILL START OUT GIVING YOU A
SENSE OF WHAT THE INTERNET IS
LIKE TODAY.
IT LOOKS SOMETHING LIKE THIS.
THE PICTURE IS REALLY COLORS OF
DIFFERENT INTERNET SERVICE
PROVIDERS.
THERE ARE 500,000 INTERNET
SERVICE PROVIDERS THAT MAKE UP
THE GLOBAL INTERNET.
WHAT IS INTERESTING IS THAT THIS
IS NOT CONTROLLED FROM THE TOP.
THIS IS COMPLETELY DISTRIBUTED
SYSTEM.
EVERY ONE OF THOSE INTERNET
SERVICE PROVIDERS HAS HIS OR HER
OWN BUSINESS MODEL.
FOR PROFIT, NOT FOR PROFIT,
GOVERNMENT, AMATEUR.
THEY CHOOSE THEIR SOFTWARE,
CHOOSE TO INTER CONNECT PEOPLE.
NO DICTATED REQUIREMENTS, YOU
DON'T HAVE TO PAY OR NOT PAY.
IT'S GLOBAL IN SCOPE.
IT'S ASTONISHING.
HE T. HAS BEEN EXPANDED BY RF,
RADIO FREQUENTLY DEVICES
INCLUDING WiFi AND MOBILE
COMMUNICATIONS CAPABILITIES.
I WOULD LIKE TO POINT OUT TO YOU
HOW INTERESTINGLY POWERFUL THE
MOBILE HAS TURNED OUT TO BE.
THE TWO THINGS.
THE INTERNET AND MOBILE MUTUALLY
REINFORCE EACH OTHER THE MOBILE
ALLOWS YOU ACCESS TO THE
INTERNET AT ANYTIME.
ASSUMING YOU ARE IN RANGE OF THE
BASE STATION.
AND YOU GET ALL THE POWER AND
THE FUNCTIONALITY.
THE TWO ARE RAPIDLY EXPANDING AS
A CONSEQUENCE.
THERE R THESE ARE STATISTICS
THAT ARE PROBABLY MID YEAR.

SLIGHTLY UNDER A BILLION DEVICES
ARE ON THE NETWORK.
THESE ARE -- THESE ARE DEVICES
THAT HAVE DOMAIN NAMES AND FIXED
IP ADDRESSES THAT YOU WOULD
TYPICALLY FIND IF YOU'RE
SEARCHING FOR THINGS.
DOES NOT INCLUDE LAP TOPS, DESK
TOPS AND MOBILES INTERMITTENTLY
CONNECTED TO THE NETWORK.
THE ABSOLUTE NUMBER OF INTERNET
DEVICES COULD BE IN THE BILLIONS
NOT ALL CONNECTED AT THE SAME
TIME.
THE NUMBER OF USERS AGAIN IS NOT
EXACTLY WELL KNOWN.
THERE IS THE ONE PLACE TO SIGN
UP TO KEEP TRACK.
A REASONABLE ESTIMATE IS ABOUT
3 BILLION PEOPLE.
WHICH MEANS THE INTERNET
EVANGELISTS HAVE FOUR BILLION
MORE PEOPLE TO CONVERT.
I COULD USE HELP IF ANYONE IS
INTERESTED.
THERE ARE ON THE ORDER OF
7 BILLION MOBILES IN USE.
MANY PEOPLE HAVE MORE THAN ONE.
MAYBE A BILLION AND A HALF OF
PERSONAL COMPUTERS AND LAP TOPS.
IT'S VERY LARGE, DISTRIBUTED
GLOBAL SYSTEM.
THIS IS MID 1975 WE'RE
EXPERIMENTING WITH MOBILE RADIO
IN, WE NEEDED THIS GIANT VAN.
WE WERE IN MENLO PARK,
CALIFORNIA.
THE RADIOS WERE A CUBIC FOOT IN
SIZE AND COST $50,000.
THE WHITE BOXES BEHIND THE LADY
IN THE BOTTOM PICTURE ARE THE
CUBIC SIZE RADIOS.
THE POINT IS WE WERE
EXPERIMENTING WITH PACTELLIS
VOICE.
MANY OF THE DEVICES YOU THINK

ARE KNEW TODAY HAD PIONEERING
EXPERIENCE 35 YEARS AGO.
THIS WAS AMUSING.
TO DO THIS WE HAD A TO +* TAKE THE
VOICE SIGNAL 54,000 BITS PER
SECOND AND COMPRESS IT TO 1800
BITS PER SECT.
THERE WASN'T MUCH CAPACITY IN
THE NETWORK THOSE DAYS.
WHEN YOU DO THAT YOU BASICALLY
MODEL THE VOICE TRACK AS A STACK
OF CYLINDERS.
YOU SEND THE PARAMETER, DIAMETER
OF THE CYLINDER TO THE OTHER
SIZE.
THE OTHER GUY INVERTS THAT TO
MAKE SOUND.
IT MADE EVERYONE WHO TALKED
THROUGH THE SYSTEM SOUND LIKE A
DRUNKEN NORWEGIAN.
THERE IS A STORY ABOUT
DEMONSTRATING THIS TO THE AGAIN
RALZ IN THE PENTAGON.
IT'S AMUSING.
THEY CAME AWAY IMPRESS WED COULD
DO OTHER DATA WITH SYSTEMS LIKE
THIS.
WE WERE EXPERIMENTING WITH VIDEO
AS WELL.
YOU HEARD IT IN THE EARLIER
PANEL, WHICH WAS REALLY GOOD.
I ENJOYED LISTENING TO THE
COMMENTS THAT WERE MADE.
THE LIST IS REALLY QUITE LONG
NOW OF THINGS THAT ARE EITHER
CURRENTLY NETWORKABLE OR WILL BE
NETWORKED IN THE FUTURE.
TELEVISION IS MOBILE, TABLETS,
PICTURE FRAMES AND THAT SORT.
SENSORY SYSTEMS ARE PART OF THE
ENVIRONMENT.
IN THOSE SYSTEMS THEY'RE USED
FOR A VARIETY OF DIFFERENT
SERVES.
SOME MAYBE FOR SECURITY.
SOME FOR ENVIRONMENTAL

MONITORING.
ONE CASE OF AGRICULTURE A GUY
HAS A GPS LOCATION FOR EVERY
VINE IN HIS VINEYARD.
HE TAKES TRACK OF THE STATE OF
THE SOIL, PH AND EVERYTHING ELLS
ON A VINE BY VINE BASIS.
HE USE THAT'S DATA TO DECIDE THE
WATER AND NUTRIENTS FOR EACH
VINE IN THE VINEYARD.
THAT'S NOT UNREASONABLE.
MEDICAL INSTRUMENTATION BECOMING
VERY COMMON.
HERE IS A SIMPLE EXAMPLE.
A INSULIN PUMP KEEPING TRACK OF
THE BLOOD SUGAR LEVELS ON A
CONTINUING BASIS, THEN INSTRUCTS
THE PUMP, BASED ON THE SAMPLING
INFORMATION WHETHER TO INJECT
INSULIN INTO THE BODY.
THAT INFORMATION COULD BE
CAPTURED, FOR EXAMPLE, BY A
MOBILE.
THEN USED FOR ANALYTICAL
PURPOSES.
I THINK THIS NOTION OF
CONTINUOUS MONITORING THAT CAME
UP BRIEFLY IN THE PANEL
DISCUSSION IS IMPORTANT FOR
SEVERAL REASONS.
NOT THE LEAST OF WHICH
CONTINUOUS MONITORING TELLS YOU
ABOUT THE PROCESSES IN A MORE
REFIND WAY THEN IF YOU SHOWED UP
AT THE DOCTOR EVERY THREE OR SIX
MONTHS, ONLY WHEN YOU'RE SICK.
THIS TURNS OUT TO BE VERY
IMPORTANT IN VALUABLE WAYS OF
OBSERVING DYNAMIC PROCESSES AND
USING THAT DATA TO ANALYZE THEIR
STATE.
FITNESS KINDS OF MEASUREMENTS
MANY MAY WEAR FITNESS OR KEEPING
TRACK OF MOVEMENT.
WHETHER YOU WENT UP OR DOWN,
SIDE WAYS OR STEPS YOU TAKE.

THIS IS IMPORTANT BECAUSE THERE
IS A FEEDBACK LOOP HERE.
ONE OF THE INTERESTING THINGS
ABOUT GATHERING DATA IN THIS WAY
IS THAT YOU GET FEEDBACK THAT
TELLS YOU SOMETHING ABOUT THE
CONSEQUENCES OF THE CHOICE OF
YOUR BEHAVIOR IN THE COURSE OF
THE DAY, MONTH OR YEAR.
IN THE CASE OF ELECTRICAL
APPLIANCES AS IN THE SMART GRID,
IF YOU GET ENOUGH INFORMATION
BACK ABOUT THE DEVICES YOU USE
DURING THE COURSE OF THE MONTH
THAT GENERATED A BILL THIS MAY
TELL YOU, CAUSE YOU TO CHANGE
THE CHOICE THAT'S YOU MAKE.
BECAUSE THE COST MIGHT BE LESS.
YOU CAN IMAGINE A THIRD PARTY
ANALYZING THE DATA WHICH YOU
PRESUMABLY AUTHORIZE TO TELL YOU
THE STEPS YOU TAKE TO CHANGE THE
WAY YOU USE ELECTRICITY AND
POSSIBLY OTHER CONSUMABLE
RESOURCES LIKE WATER, GAS AND SO
FORTH.
THERE IS ANOTHER IMPORTANT
BENEFIT, POTENTIAL BENEFIT HERE
WITH FEEDBACK TO US ABOUT THE
CONSEQUENCES OF OUR BEHAVIOR
WHETHER IT'S HEALTH CONS CONSEQUENCES
OR SOMETHING ELLS.
REMOTE CONTROL DEVICES ARE
IMPORTANT ESPECIALLY IN A CRISIS
RESPONSE.
IT WAS MENTIONED KNOWING POWER
IS OUT IN YOUR HOME IS, MIGHT BE
A IMPORTANT THING TO KNOW
ESPECIALLY IF YOU'RE NOT THERE.
IT'S ALSO HELPFUL FOR THE POWER
COMPANY TO KNOW WHAT HOUSES ARE
OUT OF POWER.
OFTEN THAT'S NOT AS EASY TO FIND
OUT.
IT'S CLUMSY TO HAVE PEOPLE
CALLING A PHONE NUMBER TO REPORT

THAT.
THERE ARE AN INCREASE NUMBER OF
DEVICES CALLED WEARABLES.
I WANT TO EMPHASIZE SOMETHING
ABOUT THIS INTERNET EN TABLED
DEVICE.
THE GOOGLE GLASS IS A
EXPERIMENT.
WHAT IS INTERESTING IT'S
ESSENTIALLY NO DIFFERENT THAN
STRAPPING THIS TO YOUR FOREHEAD.
I CAN TELL YOU THIS IS VERY
UNCOMFORTABLE.
THE GOOGLE GLASS IS EASIER.
IT HAS A CAMERA, MICROPHONE, IT
HAS A BONE CONDUCTION SPEAKER.
YOU CAN HEAR WHAT IT IS SAYING
AND NOBODY ELLS DOES.
IT LEAVES YOUR EARS FREE TO HEAR
AMBIENT SOUND AND IT HAS A VIDEO
DISPLAY.
IT BRINGS THE COMPUTER INTO YOUR
AUDIO AND VIDEO ENVIRONMENT.
IT SEE WHAT'S YOU SEE.
IT HEAR WHAT'S YOU HEAR.
HERE IS AN EXAMPLE WE CAN ALMOST
DO.
IMAGINE YOU HAVE A BLIND GERMAN
SPEAKER AND A DEAF AMERICAN SIGN
LANGUAGE SPEAKER.
THEY'RE BOTH WEARING GOOGLE
GLASS AND WANT TO COMMUNICATE
WITH EACH OTHER THE GERMAN GUY
SAYS -- SPEAKING GERMAN.
GOOD AFTERNOON MY NAME IS VINT
CERF.
THE DEAF GUY DOESN'T HEAR.
THIS THE TKPWAO +*L DOING WHAT THE
GLASS PICKS UP AND TRANSLATES
THE GERMAN FROM GERMAN TO
ENGLISH AND PRESENTS THE ENGLISH
ON THE DISPLAY.
SO THE DEAF GUY CAN SEE THE
CAPTIONS.
NOW THE DEAF GUY RESPONDS BY
SIGNING.

THE BLIND GUY CAN'T SEE.
BUT THE CAMERA IN THE GOOGLE
GLASS OF THE BLIND GUY CAN SEE
THE SIGNS, TRANSLATES THE SIGNS
TO ENGLISH, TRANSLATES TO GERMAN
AND SPEAKS INTO THE HEAD OF THE
BLIND GERMAN SPEAKER.
SO THE TWO OF THEM ARE
COMMUNICATING THINKS TO THE
INTER MEDIATION OF THE GOOGLE
GLASS.
I DON'T WANT TO YOU MISLEAD YOU
THINKING WE CAN DO ALL THAT.
WE CAN COME CLOSE.
WE CAN'T CORRECTLY INTERPRET
SIGNS AT SPEED.
THIS IS NOT CRAZE THAOEFPLT IS A
ENGINEERING THING THAT'S
POSSIBLE.
OF COURSE AUTOMOBILES WITH
ONSTAR BEING AN EXAMPLE.
THERE ARE LOTS AND LOTS OF
THOUGHTS ABOUT AUTOMOBILES
COMMUNICATING WITH EACH OTHER
WHEN YOU GET INTO SOME OF THE
EXOTIC CASES OF GOOGLES SELF
DRIVING CARS YOU SEE FASCINATING
ABILITIES FOR CARS TO TALK TO
EACH OTHER WHEN ALL FOUR AT A
INTERSECTION.
INSTEAD OF ONE BEING MACHO THEY
RUN A STANDARD ALGORITHM TO SEE
WHO GOES NEXT.
THERE IS NO ROAD RAGE OR
IMPATIENT YENS LIKE HUMAN
DRIVERS.
HERE ARE EXAMPLES OF THINGS IN
USE.
THE INTERNET ENABLED
REFRIGERATOR IS INTERESTING.
I THOUGHT, WHAT WOULD YOU DO
WITH A INTERNET ENABLED
REFRIGERATOR.
ONE THING, IT MIGHT HAVE A NICE
TOUCH SENSITIVE PANEL ON THE
FRONT.

IT AWEINGMENTS THE ORDINARY
AMERICAN FAMILY COMMUNICATION.
PAPERS AND MAGNETS.
NOW WE HAVE BLOGS AND E-MAILS.
IF YOU HAVE AN RFID DETECTOR AND
WHAT YOU PUT IN HAD CHIPS.
THE REFRIGERATOR WOULD KNOW
WHAT'S INSIDE.
WHILE YOU'RE OFF AT WORK IT'S
SEARCHING THE INTERNET FOR
RECIPES WITH WHAT YOU HAVE.
WHEN YOU COME HOME YOU COULD
HAVE A DISPLAY.
HERE ARE THE RECIPES TO MAKE.
COULD YOU EXTRAPOLATE.
YOU ARE ON VACATION.
YOU GET AN E-MAIL FROM THE
REFRIGERATOR.
IT SAYS YOU PUT THE MILK IN
THREE WEEKS AGO.
IT'S GOING TO CRAWL OUT ON YOUR
OWN.
OR YOU'RE SHOPPING AND THE
MOBILE GOES OFF, DON'T FORGET
THE SAUCE, I HAVE EVERYTHING FOR
A SPAGHETTI DINNER TONIGHT.
NOW THE JAPANESE HAVE A INTERNET
ENABLED BATHROOM SCALE.
IT FIGURES OUT WHAT FAMILY
MEMBER YOU ARE.
IT GOES TO THE TKOGTER AND
BECOMES PART OF YOUR MEDICAL
RECORD.
IT'S REASONABLE BUT THE
REFRIGERATOR IS ON THE SAME
NETWORK AS THE SCALE.
SO WHEN YOU COME HOME YOU SEE
DIET RECIPES COMING UP.
EVERYONE IS FAMILIAR WITH
INTERNET ENABLED PICTURE FRAMES.
SOME PROBABLY HAVE THEM.
THEY'RE ON THE NET.
THEY PULL IMAGES FROM A SELECTED
WEBSITE AND CYCLE THROUGH.
WE USE THEM IN OUR FAMILY.
WE HAVE MOBILE PHONES WITH

CAMERAS.
WE TAKE PICTURES UP AND LOAD
THEM TO THE WEBSITE AND FAMILY
PICTURE FRAMES DOWNLOAD THE
PICTURES.
YOU WAKE UP AND SEE WHAT THE
NIECES AND NEPHEWS AND GRAND
CHILDREN ARE DOING.
THERE IS A SECURITY ISSUE HERE.
IF THE WEBSITE HAS THE PICTURES
ON IT AND IT GETS HACKED.
THE GRANDPARENTS MAY SEE
PICTURES OF WHAT THEY HOPE ARE
NOT THE GRAND CHILDREN.
THE GUY IN THE MIDDLE HERE,
BUILT A INTERNET ENABLED
SURFBOARD.
I HAVEN'T MET HIM.
I HAVE AAGE OF HIM WAITING FOR
THE NEXT WAVE THINKING IF HI A
LAP TOP ON MY SURFBOARD I COULD
SURF THE INTERNET WAITING FOR
THE NEXT WAVE.
SO HE BUILT IT IN NOW HE SELLS
IT AS A PRODUCT.
IF YOU WANT TO GO OUT ON THE
WATER AND SURF THE INTERNET
WAITING FOR THE NEXT WAVE IT'S
TH +* IS FOR YOU.
MOBILES ARE EVERYWHERE.
INTERNET ENABLED LIGHT BULBS.
I USE TO TELL JOKES ABOUT THIS
TO YEARS AGO.
I SAID SOME DAY EVERY ELECTRIC
LIGHT BULB WILL HAVE IT'S OWN IP
ADDRESS.
I THOUGHT THAT WAS FUNNY UNTIL I
WAS GIVEN A RADIO ENABLED LIGHT
BULB.
THEY COST ABOUT $20 LAST ABOUT
20 YEARS.
THE COST OF THE RADIO IS 50
CENTS OR SOMETHING LIKE.
NOT BAD FOR THE PRICE OF THE
LIGHT BULB.
IF IT LASTS FOR 15 YEARS MAYBE

IT'S NOT SO CRAZY.
AND GOOGLE GLASS THERE.
LET ME GIVE YOU ANOTHER EXAMPLE.
I HAVE A SENSORY NETWORK IN MY
HOUSE USING IPV6.
IT'S A RADIO BASE 6LOPAN SYSTEM.
IT'S A PRODUCT.
NOT ME IN THE GARAGE WITH A
SOLDERING GUN.
THE COMPANY WHO MADE THIS IS
ARCH ROCK WHO WAS ACQUIRED BY
CISCO SYSTEMS.
IT RUNS ON TWO DOUBLE A
BATTERIES FOR NEARLY A YEAR.
AS A EXPERIMENT I LET IT RUN
UNTIL IT WOULDN'T WORK ANYMORE.
WE GOT DOWN TO 2.4 VOLTS WHEN IT
POOPED OUT.
THE GUYS AT ARCH ROCK WERE
ASTONISHED IT LASTED THIS LONG.
THIS IS TH +* IS A MESHED NETWORK
AND IT SELF ORGANIZES WHEN YOU
TURN IT ON.
THE HOPPING TAKES THE DATA FROM
EACH SENSOR AND DELIVERS IT
THROUGH THE MESH NETWORK TO A
SERVING THAT IS DOWN IN THE
BASEMENT IN A RACK OF EQUIPMENT.
SO, IT'S MEASURING TEMPERATURES
IN EACH ROOM OF THE HOUSE EVERY
FIVE MINUTES.
THE COMMENT MADE EARLIER.
THE COMMENT MADE EARLIER
ABOUT -- IT'S POSSIBLE TO
PRODUCE A SUBSTANTIAL AMOUNT OF
INFORMATION.
NOW IN MY CASE I'M INTERESTED IN
GATHERING THE DATA THAT WAY.
I KNOW IT SOUNDS LIKE SOMETHING
ONLY A GEEK WOULD DO.
THINK ABOUT HAVING A YEARS WORTH
OF INFORMATION ABOUT HEATING,
VENTILATION OF EVERY ROOM IN THE
HOUSE.
AT THE END OF THE YEAR YOU HAVE
AN IDEA HOW WELL THE HEAT WAS

DISTRIBUTED AND COOLING.
YOU HAVE REAL ENGINEERING DATA.
THAT'S USEFUL.
I HAVEN'T GOT TO THE PRIVACY
SIDE OF THIS.
I'M NOT IGNORANT OF IT.
NOWHERE WERE THE PANELISTS.
I WANT TO KEEP GOING A LITTLE
FURTHER.
ONE OF THE ROOMS IN THE HOUSE IS
A WINE CELLAR.
I AM CONCERNED THE TEMPERATURE
STAYS BELOW 60° TPAEURPB HEIGHT
AND HUMIDITY ABOVE HOW % TO KEEP
THE CORKS FROM DRYING OUT.
THIS ROOM IS ALARMED.
IF THE TEMPERATURE GOES ABOVE
60° OR A HUMIDITY CHANGES I GET
A SMS ON MY MOBILE.
ONE TIME I WAS AWAY FOR SEVERAL
DAYS.
MY WIFE WAS SOMEWHERE ELLS.
EVERY FIVE MINUTES FOR THREE
DAYS I GOT A MESSAGE, YOUR WINE
IS WARMING UP.
WHEN I GOT BACK HOME I CALLED
THE ARCH ROCK GUYS AND THEY SAY
YOU MAKE REMOTE ACTUATORS.
>> I SAID DO YOU HAVE A STRONG
AUTHENTICATION.
I HAVE A 15-YEAR-OLD NEXT DOOR
TKAO +*R I DON'T WANT TO MESS WITH
THE WINE CELLAR.
I COULD TELL SOMEONE WAS IN
THERE ABOUT DIDN'T KNOW WHAT
THEY DID.
IF YOU DID A TAG ON EVERY BOTTLE
YOU COULD DO A INSTANT INVENTORY
TO MAKE SURE NO BOTTLES LEFT.
I DESCRIBED THIS TO A FRIEND.
HE SAID THERE IS A BUG.
COULD YOU GO INTO THE WINE
CELLAR AND DRINK THE WINE AND
LEAVE THE BOTTLE.
SO, NOW WE HAVE TO PUT SENSORS
IN THE COURT.

NOW YOU INTERROGATE THE CORK.
IF THAT'S THE BODY UP TO 80° OR
SOMETHING THAT'S THE BODY YOU
GIVE TO SOMEONE WHO DOESN'T KNOW
THE DIFFERENCE.
THIS IS A ENTIRELY PRACTICAL
THING TO HAVE AROUND THE HOUSE.
IN ALL HONESTY THOUGH THIS IS
VERY COMMON KIND OF THING TO DO.
I WOULD EXPECT THIS TO BE BUILT
INTO MOST NEW HOMES.
IT WOULD BE CERTAINLY THAT PLUS
MANY OTHER KINDS OF SECURITY
CONTROLLING.
HEATING VENTILATION AND AIR
CONDITIONING.
BUILDING ON THE NOTION OF THE
SMART HOME THAT WE HEARD ABOUT
EARLIER.
HERE IS AN EXAMPLE.
THIS ISN'T ABOUT THE BEER AS IT
IS ABOUT A SENSOR THAT IS
CLEVERLY DESIGNED TO FIGURE OUT
IF A KEG OF BEER IS EMPTY.
NORMAL WAY THIS IS DONE IS A GUY
GOES BACK BEHIND THE COUNTER AND
RATTLES THE KEGS AND LIFT THEM
UP TO FIGURE OUT HOW MUCH BEER
IS LEFT.
THIS COMPANY MADE A DONUT SHAPE
SENSOR THAT GOES UNDER THE KEG.
YOU OUT FIT IT WITH WHAT IS IN
THE KEG WITH A SCANNER.
YOU KNOW, UNIFORM PRODUCT CODE.
THAT OUTFITS THE SENSE WE ARE
THE CORRECT INFORMATION.
SO IT KNOWS HOW MUCH WEIGHT TO
ANTICIPATE FOR A KEG FULL OF
BEER OF THAT PARTICULAR VARIETY.
SO, YOU JUST INTERROGATE THE
SENSOR.
THIS DONUT THING AUTOMATICALLY
TELLS YOU BASED ON THE WEIGHT
HOW MUCH BEER IS LEFT IN THE
KEG.
THIS IS A GOOD EXAMPLE OF SIMPLE

KINDS OF IDEAS THAT MAKE THINGS
A LOT EASIER THAT WOULD
OTHERWISE BE AWKWARD.
THAT'S ALL ABOUT USING SENSORS
AS A WAY OF MAKING LIFE A LITTLE
EASIER TO SOLVE A VARIETY OF
PROBLEMS.
THIS ALSO INTRODUCING A LOT OF
THE PROBLEMS WE HEARD FROM THE
PANEL.
SMART CITIES ARE ANOTHER
EXTENSION OF THE SMART HOME.
THE SMART GRID, SMART DEVICES.
GIVEN THAT I HAVE TO BE CAREFUL
WITH MY TIME HERE I DON'T KNOW I
CAN GO THROUGH EVERYTHING HERE.
YOU CAN IMAGINE FOR A MOMENT
THAT A CITY THAT IS ABLE TO
MONITOR WHAT IS GOING ON IN THE
CITY, TRAFFIC FLOW BEING A
OBVIOUS EXAMPLE, COULD MAKE
QUITE A DIFFERENCE FOR PEOPLE
SELECTING ROUTES TO TAKE.
AT GOOGLE WE BOUGHT A COMPANY
CALLED WAVES.
YOU CAN IMAGINE INSTRUMENTING A
CITY TO GET PRECISE DATA NOT ON
VOLUNTEERING REPORTING.
YOU CAN SEE OTHER INFORMATION
LIKE OUTAGES AND OTHER GASES AND
SO ON, ALL OF THAT INFORMATION
COULD BE AVAILABLE TO A CITY.
FOR USE IN MEDIATE OPERATIONS
AND POSSIBLY ALSO IN USE OF
PROJECTING DEMAND IN THE FUTURE.
SO, I HAVE THIS SENSE OF
MONITORING AND REPORTING AND THE
CITY BEING POWERFUL IDEA.
SOME CITIES LIKE BARCELONA ARE
RAPIDLY MOVING IN THAT
DIRECTION.
SO, IF YOU'RE INTERESTED IN
SMART CITIES YOU MAY DO A GOOGLE
SEARCH FOR BARCELONA AND SEE
WHERE THEY ARE.
IT'S OBVIOUS THERE ARE ALL KINDS

OF THINGS THE GOVERNMENTS CAN DO.

LOCAL AND STATE GOVERNMENTS TO COMMUNICATE WITH CITIZENS ABOUT THINGS THAT THEY CARE ABOUT.

WHETHER IT'S LICENSE FEES, TAXES OR OTHER THINGS.

IT'S YET ANOTHER EXAMPLE OF SMARTNESS.

NOT SO MUCH SENSE RAOEZ BUT CITY SERVES BEING PRESENTED TO USERS ON A 24 HOUR BASIS.

IT IS INTERESTING THAT THE GOVERNMENT, AFTER COMPANIES REALIZE THAT SHE SHOULD BE AVAILABLE TO CONSUMERS 24 HOURS A DAY THE CONSUMERS SAID WHY CAN'T THE GOVERNMENT DO THE SAME THING.

I DON'T WANT TO HEAR SORRY OUR OFFICES ARE CLOSED.

ANOTHER ISSUE IS ACCESS TO THE INFORMATION THAT THE CITY MIGHT BE ABLE TO PROVIDE.

IN SETTING ASIDE PRIVACY CONCERNS NOT TO IGNORE THEM BUT RATHER TO SAY IF THERE IS INFORMATION THAT DOES NOT HAVE PRIVACY ISSUE ASSOCIATED WITH IT OPEN ACCESS TO INFORMATION THAT THE CITY KNOWS ABOUT COULD FACILITATE THE CREATION OF NEW BUSINESS THAT'S GATHER THE DATA OR ANALYZE IT FOR PURPOSES OF BEING USEFUL.

THIS NOTION OF USING INFORMATION FROM AN ON-LINE ENVIRONMENT, MONITORED ENVIRONMENT IS ACTUALLY A OPPORTUNITY TO CREATE NEW BUSINESSES, JOBS AND THAT SORT.

IN FACT ONE OF THE INTERESTING STATISTICS I WISH I HAD AND DO NOT HAVE FROM THE, FROM THE LABOR DEPARTMENT IS SOME SENSE OF HOW RAPIDLY JOBS ARE

CHANGING.
IT WOULD BE INTERESTING TO LOOK
OVER A FIVE YEAR INTERVAL AT
JOBS THAT ARE COMMONLY BEING
OCCUPIED AND WHAT THE TASKS ARE.
DO THOSE JOBS STILL EXIST OR HOW
MANY JOBS ARE THERE THAT DIDN'T
EXIST FIVE YEARS AGO.
I THINK IF YOU LOOKED CERTAINLY
IN THE HIGH-TECH INDUSTRY WOULD
YOU DISCOVER QUICKLY THAT JOBS
IN THAT SPACE CHANGE VERY
RAPIDLY.
THINK ABOUT THE WORLDWIDE WEB IN
1994.
THERE WERE NO WEB MASTERS.
OF COURSE THERE ARE LOTS OF THEM
NOW.
THEY FIGURED, THEY FIGURED OUT
HOW TO BE WEB MASTERS LOOKING AT
THE HTML CODE IN THE WEB PAGES.
FINALLY THERE IS A SMART GRID
PROGRAM.
I'M ASSUMING THAT WAS DISCUSSED.
I WON'T BORE YOU WITH A REPEAT.
HERE IS AN EXAMPLE OF A SELF
DRIVING CAR.
THIS MAN IS BLIND, HE'S ONE OF
OUR EMPLOYEES.
I HAVE A VIDEO HERE.
IT RUNS ABOUT THREE OR FOUR
MINUTES.
HOW MANY ENGINEERS DOES IT TAKE
TO TURN ON A COMPUTER.
I THINK I PUSHED THE WRONG
BUTTON.
ADD TO FAVORITES.
I DON'T WANT TO DO THAT.
THERE.
NO.
THIS IS A MICROSOFT PRODUCT.
THAT'S THE PROBLEM.
THERE WE GO.
>> LOOK, MA, NO HANDS.
>> NO HANDS, NO FEET.
>> NO NOTHING.

>> I LOVE IT
>> SO WE'RE HERE AT THE STOP
SIGN.
YEP, CAR IS USING RADARS AND
LASER TO MAKE SURE NOTHING IS
COMING ANYWAY.
>> I FIND MYSELF LOOKING.
>> OLD HABITS DIE HARD.
>> THEY DON'T DIE.
>> ANYONE UP FOR A TACO.
>> YA, WHAT DO YOU WANT TO DO,
STEVE?
>> I'M ABOUT TACOS MYSELF.
>> LET'S GET A TACO AT THE
DRIVE-THRU.
>> WE'RE TURNING INTO THE
PARKING LOT.
>> HOW NEAT.
>> HERE WE GO.
CREEP ALONG HERE.
>> DOES ANYONE HAVE MONEY.
>> I HAVE MONEY.
>> I HAVE MY WALLET HERE.
>> ROLL DOWN THE WINDOW AND
ORDER A BURRITO.   .
>> HOW ARE YOU TODAY?
>> WELL, THANK YOU.
HOW ARE YOU TODAY.
>> SOME GOOD, THANK YOU.
>> THIS IS SOME OF THE BEST
DRIVING I HAVE EVER DONE.
>> 95% OF MY VISION IS GONE.
I AM WELL PAST LEGALLY BLIND.
YOU LOSE YOUR TIMING IN LIFE,
EVERYTHING TAKES YOU MUCH
LONGER.
SOME PLACES YOU CAN NOT GO.
SOME THINGS YOU REALLY CAN NOT
DO.
THIS WOULD CHANGE MY LIFE.
IT WOULD GIVE ME THE
INDEPENDENCE AND FLEXIBILITY TO
GO THE PLACES I BOTH WANT TO GO
AND NEED TO GO WHEN I NEED TO DO
THOSE THINGS.
[APPLAUSE]

>> ISN'T THAT GREAT.
HOW DO I GET BACK TO MY SLIDES?
THERE WE GO.
I NEED TO GET TO SLIDE MODE.
>> I'LL DO THIS.
>> THIS IS AMUSING, ISN'T IT.
>> OOPS.
THE NEXT ONE.
HERE WE GO.
ANYWAYS.
ONE OF THE THINGS I WANTED TO
POINT OUT ABOUT THE SELF DRIVING
CAR IT'S ONE THING TO GET A CAR
TO DRIVE ON THE ROAD IN TRAFFIC.
IT'S ANOTHER THING TO GO DOOR TO
DOOR.
YOU HAVE TO NAVIGATE UNDERGROUND
PARKING AND THAT.
IT'S ACTUALLY HARD.
LET'S MOVE BACK DOWN TO THE
INTERNET OF THINGS.
THIS ARE ENORMOUS POTENTIAL HERE
FOR ALL KINDS OF OPTIMIZATIONS
BASED ON THE DATA THAT'S
ACCUMULATED AND SHARED.
WE SHOULD NOT LOSE TRACK OF THE
FACT THAT HAVING GREATER
KNOWLEDGE OF HOW RESOURCES ARE
CONSUMED, WHEN THEY'RE CONSUMED,
AND AT WHAT RATE, AND AGGREGATED
OVER LARGER AND LARGER REGIONS
COULD REALLY TELL US A GREAT
DEAL ABOUT HOW TO MANAGE THE
RESOURCES BETTER.
THE SECOND THING IS STANDARDS
ARE IMPORTANT HERE.
INNER OPERABILITY IS VERY
IMPORTANT.
SO, FINDING STANDARDS THAT
EVERYBODY CAN FOLLOW, EVEN
THOUGH THERE IS A NATURAL TEND
TENTENT SEE TO DO THINGS TO LOCK
YOU INTO THAT STANDARD THERE IS
PRESSURE RISING IN THE END TO
HAVE COMMON STANDARDS.
IF YOU GO AND BUY A INTERNET

ENABLED DEVICE FROM COMPANY A
AND ANOTHER FROM COMPANY B THERE
ARE GOOD REASONS TO KNOW THEY
CAN BE MANAGED BY A PIECE OF
SOFTWARE THAT UNDERSTANDS WHAT
THE STANDARDS ARE AND NOT
ADAPTED TO EACH PROPRIETARY
PROTOCOL.
IT DOESN'T TPHAEPB WE WILL END
UP WITH ONE PROTOCOL BUT YOU
DON'T WANT TOO MANY OF THEM.
BY CREATING THE STANDARDS YOU
CREATE THE OPPORTUNITY FOR NEW
BUSINESSES TO FORM.
MANAGE DEVICES, MAKE DEVICES,
ANALYZE DATA FROM THE DEVICES,
CONTROL THE DEVICES.
THERE ARE NEW BUSINESSES THAT
CAN BE FORMED.
WE SHOULD CARE ABOUT THAT.
THEY CREATE NEW JOB
OPPORTUNITIES FOR ALL OF US AND
IMPROVE GDP GROWTH.
IT'S OBVIOUS WE HAVE HEALTH
MANAGEMENT OPPORTUNITIES THROUGH
THE CONTINUOUS MONITORING THAT
WE TALKED ABOUT BEFORE.
IF YOU HAVE INTERNET ENABLED
DEVICES YOU MAY GET ACCESS TO
INFORMATION FROM ANYWHERE.
WE SEE THAT EFFECT IN THE
INTERNET WITH MOOCs.
IF YOU DO THE MATH WITH THE
REGARD TO THE ECONOMICS IT'S
PRETTY STUNNING.
IF YOU A SRA +*EU HUNDRED THOUSAND
PEOPLE TAKING A CLASS AND CHARGE
EACH TEN DOLLARS IT'S A MILLION
DOLLAR CLASS.
THIS AREN'T MANY PROFESSORS THAT
CAN CLAIM THEY'RE TEACHING A
MILLION DOLLAR CLASS.
THE COST PER STUDENT IS LOW
BECAUSE OF THE SCALING EFFECT.
I'M EXCITED ABOUT THE POTENTIAL
TO PROVIDE LARGE ACCESS TO

EDUCATIONAL MATERIALS AT MODEST
COSTS TO A VERY BIG AUDIENCE.
BY REDUCING THE COST YOU MAKE IT
AFFORDABLE TO A LARGER GROUP OF
PEOPLE.
THEY'RE ON-LINE AND YOU CAN TAKE
THEM WHEN YOU WANT TO.
CONTINUING EDUCATION NOW BECOMES
A PRETTY ATTRACTIVE POSSIBILITY
FOR THOSE WHO WANT TO CONTINUE
TO GROW IN THEIR JOBS.
IT'S PRETTY OBVIOUS AS SOON AS
IT'S EASY TO INTERNET ENABLE
THINGS THEN PEOPLE WILL DO THAT.
THERE WILL BE NEW PRODUCTS AND
SERVICES INVENTED ON THAT BASIS.
THERE ARE CHALLENGES.
SO, I THINK WE SHOULD BRIEFLY
LOOK AT THOSE.
ONE OF THEM IS AGAIN STANDARDS.
I'M A BIG FAN OF IP VERSION 6.
I WOULD LIKE TO ASK YOU ALL A
FAVOR.
YOU UNDERSTAND THAT WHEN WE DID
THE DESIGN OF THE INTERNET IN
1973 WE DIDN'T KNOW IF IT WOULD
WORK OR HOW BIG IT WOULD GET.
WE GETTED AT 4.3 BILLION
TERMINATIONS SHOULD BE ENOUGH
FOR A EXPERIMENT.
THAT WAS A 32 BIT ADDRESS SPACE.
IN FEBRUARY 2011 WE RAN OUT OF
VERSION 4.
SO WE STANDARDIZED VERSION 6 TO
128 BIT ADDRESS SPACE.
WE TURNED THAT ON WITH ANY
ISPs AND SERVICE PROVIDERS
READY TO IMPLEMENT VERSION 6 ON
JUNE 6th OF 2012.
THE 21st CENTURY INTERNET IS
FUNCTIONAL BUT NOT ENOUGH PEOPLE
HAVE IMPLEMENTED THIS AS THE ISP
LEVEL.
WHAT I WOULD LIKE YOU TO DO IS
ASK YOUR ISP WHEN WILL THEY HAVE
IT AVAILABLE FOR YOU.

THE REASON IT'S IMPORTANT IS A
LOT OF THEM ARE SAYING NOBODY IS
ASKING FOR IT NO REASONABLE
CONSUMER SHOULD KNOW WHAT IPB4
OR IPB6 IS.
YOU CAN HELP BY ASKING THE PLAN.
 THIS IS A NUMBER ONLY THE CON
GREENS TKPWR +*ES CAN APPRECIATE I
THINK.
THERE IS A VERY BIG PROBLEM IN
CONFIGURING LARGE NUMBERS OF
DEVICES.
YOU KNOW THE, ANYTHING WE CAN DO
TO MAKE THAT EASIER, THE
COMMENTS ABOUT SECURITY RESONATE
WITH ME.
IT'S HARD TO EXPECT USEERS TO
UNDERSTAND AND EVEN HAVE A
REASONABLE, YOU KNOW, WORKING
MODEL IN THEIR HEADS ABOUT WHAT
THESE THINGS ARE DOING.
THE COMMENTS ABOUT PRIVACY AND
ALERTING OF USERS TO THE USE OF
INFORMATION, ALTHOUGH I THINK
IT'S WELL INTENDED I THINK ABOUT
THE ORDINARY USER WHO ISN'T
REALLY EITHER SURE OR MAY NOT
HAVE THE PATIENCE TO TRY TO
FIGURE OUT WHAT EXACTLY IT MEANS
AND WHAT ARE THE IMPLICATIONS OF
THIS PIECE OF INFORMATION BEING
MADE AVAILABLE.
SO, PEOPLE ARE LAZY.
THEY DON'T WANT TO BE BOTHERED.
THEY WANT STUFF TO WORK.
IT PUTS A BIGGER BURDEN ON THE
IMPLEMENTER SKP-SZ OPERATORS OF
THE SYSTEMS TO BE COGNIZANT OF
PROTECTING USERS SAFELY AND
PRIVACY.
>> IT'S NOT SIMPLE TO FIGURE OUT
WHAT TO DO WITH THE
INSTRUMENTATION AND DATA COMING
BACK.
I THINK THERE ARE HUGE
OPPORTUNITIES FOR ANALYSIS OF

THE INFORMATION.
THE OTHER BIG PROBLEM IS THERE
ARE GOING TO BE BUGS.
THOSE BUGS CAN EITHER BE
HAZARDOUS BECAUSE THEY'RE
OFFERING AN ATTACK SERVICE TO
ALLOW SOMEONE TO TAKE CONTROL
OVER THE ADVISOR POSSIBLY
THROUGH CONTROL GET TO OTHER
DEVICES IN THE HOME NETWORK OR
THEY WILL SIMPLY CAUSE PROBLEMS.
GETTING THINGS FIXED IS HARD.
ESPECIALLY IF YOU DON'T HAVE A
GOOD MODEL IN YOUR HEAD FOR
EXACTLY HOW THIS STUFF WORKS.
BY THE WAY THAT MAY CREATE
ANOTHER SET OF JOB OPPORTUNITIES
FOR PEOPLE TO COME OUT AND HELP
FIX THE INTERNET ENABLED DEVICES
WHEN THEY DON'T SEEM TO WORK.
THAT SUGGESTS AGAIN POTENTIAL
OPPORTUNITIES FOR THIRD PARTY
BUSINESSES.
>> THAT SAYS LUNCH.
BEFORE WE BREAK FOR LUNCH I'M
HAPPY TO SPEND TEN MINUTES ON
QUESTIONS OR GO TO LUNCH EARLY.
>> SHEAR THE FIRST QUESTION THAT
HAS KOPLD IN FROM COMMISSIONER
BRIL.
DO YOU WORRY WHAT IOT WILL DO TO
DEEPEN THE DIGITAL DIVIDE FOR
THOSE WHO CAN AFFORD A SMART
HOME AND CAR AND THOSE WHO CAN
NOT?
HOW SHOULD SOCIETY ADDRESS THESE
CONCERNS?
IS COST ISSUE A CORRECT
INVESTMENT HORIZON, SHORT-TERM
VERSUS LONG TERM.
>> MY FIRST REACTION IS I'M NOT
TOO WORRY ABOUT IT.
IT'S NOT A CAVALIER ANSWER.
PHYSICS IS WITH US HERE.
THE COST OF THE THINGS HAVE BEEN
DROPPING ON A REGULAR BASIS.

THE COST OF INTERNET ENABLING
THINGS HAS COME DOWN.
COST OF SERVICES AND DEVICES
THEMSELVES.
THEY'RE ALL DROPPING.
THAT IS WHY WE SEE A EXPANDING
NUMBER OF USERS OF THESE
SYSTEMS.
WE STILL HAVE DIVIDES BUT I
THINK THEY WILL EVENTUALLY CLOSE
UP BECAUSE THE COSTS WILL TEND
TO COME DOWN.
SCALING HELPS IN MANY RESPECTS.
SO, MY BELIEF IS THAT WON'T BE A
PROBLEM.
AT LEAST IN TERMS OF AFFORD
ABILITY.
>> ALRIGHT.
THIS IS A QUESTION --
>> THAT'S THE ONLY QUESTION
THERE WAS.
>> I HAVE A BUNCH.
I WILL ASK ONE.
>> GO AHEAD.
>> SO, I THINK EVERY TIME WE
HEAR THAT THERE IS A TRANSFORM
TIFF TECHNOLOGY TAKING PLACE WE
HEAR, WELL, PRIVACY IS DEAD.
GET OVER IT.
OR WE HEAR THAT THE FAIR
INFORMATION PRACTICE PRINCIPALS
NEED TO BE MODIFIED OR ADAPTED.
I WONDER WHAT YOUR VIEWS ARE ON
THE SUBJECT.
>> I WOULDN'T GO SO FAR AS
BOLDLY A CERTIFICATE PRIVACY IS
DEAD.
ALTHOUGH SCOTT McNEALLY SAID
THAT ABOUT 15 YEARS AGO.
I THINK THAT'S ALMOST AN EXACT
QUOTE.
LET ME TELL YOU IT WILL BE
INCREASINGLY DIFFICULT FOR TO US
ACHIEVE PRIVACY.
I WANT YOU TO THINK FOR A MINUTE
ABOUT THE FACT THAT PRIVACY

MAYBE AN ANOMALY.
I DON'T KNOW WHETHER OF YOU HAVE
LIVED IN SMALL TOWNS.
I LIVED IN A LITTLE TOWN IN
GERMANY IN 1962 OF 3000 PEOPLE.
THE POST MASTER KNEW WHAT
EVERYONE DID.
NOBODY HAD TELEPHONES.
YOU WENT TO THE POST MASTER AND
THEY PLACE THE KALE AND END YOU
TO A BOOTH TO WHO THE CALLED
PARTY WAS.
ON TOP OF THAT THE TOWN OF 3000
PEOPLE THERE IS NO PRIVACY.
EVERYONE KNOWS WHAT EVERYONE IS
DOING.
IT'S THE INDUSTRIAL REVOLUTION
AND THE GROWTH OF URBAN
CONCENTRATIONS THAT LEAD TO A
SENSE OF ENMITY WHICH IN SOME
WAYS LEADS US TO BELIEVE WE HAVE
PRIVACY.
NOBODY KNOWS WHO WE ARE.
I'M OVER SIMPLIFYING AND I HAVE
DONE TERRIBLE DAMAGE TO THE
FUNDAMENTAL CONCEPT OF PRIVACY.
I DON'T WANT TO YOU THINK I'M
THAT SHAP OWE ABOUT IT.
I WOULD LIKE TO OBSERVE OUR
SOCIAL BEHAVIOR ALSO IS QUITE
DAMAGING WITH REGARD TO PRIVATE
SEE.
THE TECHNOLOGY WE USE TODAY HAS
FAR OUT RACED OUR SOCIAL
INTELLECT.
IMAGINE YOU GO TO EGYPT.
YOU'RE STANDING IN FRONT OF THE
PYRAMID OF GIZA.
YOU WANT A PHOTOGRAPH OF YOU
STANDING THERE FOR A WEBSITE
SOMEWHERE.
YOU HAND THE CAMERA TO SOMEONE
YOU DON'T KNOW TO TAKE A
PICTURE.
LET'S SUPPOSE THAT SOMEONE IS
NEARBY AND CAUGHT IN THE

PICTURE.
WE WILL CALL THIS PERSON "JOE."
YOU HAVE NO IDEA WHO JOE IS.
YOU DON'T CARE.
ALL YOU WANT IS TO GET THE
PICTURE OF YOU IN FRONT OF THE
GREAT PYRAMID ON THE WEBSITE.
YOU PUT IT UP.
SOMEONE ELSE IS CALLING AROUND
LOOKING FOR PICTURES OF THE
PYRAMID.
THEY RECOGNIZE JOE.
THEY TAG JOE.
SOMEONE ELSE IS LOOKING FOR A
PICTURE OF JOE AND DISCOVERS
THAT ONE.
EXCEPT JOE SAID HE WAS IN
LONDON.
THAT PICTURE SHOWS HIM IN FRONT
OF THE PYRAMID ON JUNE 25th,
19 -- 2015.
IT WOULDN'T OF BEEN 1970, YOU'RE
RIGHT.
SO THE POINT HERE IS THAT JOE IS
NOW EXPOSED AT HAVING MID LEAD
SOMEONE BECAUSE OF INNOCENT
ACTIONS.
SO, I USE THIS AS A KIND OF A
METAPHOR FOR OUR NEED TO DEVELOP
SOCIAL CONVENTIONS.
THAT ARE MORE RESPECTFUL OF
PEOPLES PRIVACY.
I DON'T THINK WE KNOW HOW TO
SPECIFY THAT.
THINK WE WILL LIVE THROUGH
SITUATIONS WHERE PEOPLE GET
EMBARRASSED, GO TO JAIL, HAVE
OTHER PROBLEMS AS A CONSEQUENCE
OF THE EXPERIENCES.
OUT OF THAT MAY COME SOME SOCIAL
PRACTICES THAT WILL BE MORE
RESPECTABLE OF PRIVACY.
I THINK THIS IS SOMETHING WE
HAVE TO LIVE THROUGH.
I DON'T THINK IT'S EASY TO
DICTATE THIS.

SO, THAT'S WHERE WE ARE I THINK
ON THE PRIVACY QUESTION.
>> A RELATED QUESTION SO, THIS
IS A STRAIGHT FORWARD QUESTION.
SHOULD THE GOVERNMENT SEEK
PRIVACY FOR INTERNET AND
PROVIDERS.
>> I HAVE TO TELL YOU REGULATION
IS TRICKY.
I DON'T KNOW.
IF SOMEONE ASKED ME WOULD YOU
WRITE A REGULATION FOR, THIS I
WOULDN'T KNOW WHAT TO SAY.
I DON'T THINK I HAVE ENOUGH
UPBLDZING OF THE CASES THAT MAY
ARISE TO IS A SOMETHING USEFUL
ABOUT THIS.
WHICH IS WHY I BELIEVE WE WILL
END UP EXPERIENCING PROBLEMS
BEFORE WE UNDERSTAND THE NATURE
OF THE PROBLEMS AND NATURE OF
THE SOLUTIONSES.
I ALSO WANT TO ARGUE WHILE
REGULATION MIGHT BE HELP PHIL AN
AWFUL LOT OF THE PROBLEMS WE
EXPERIENCE WITH PRIVACY IS A
RESULT OF OUR OWN BEHAVIOR WHICH
IS NOT SO MUCH ILLEGALITY OR
SOMETHING OR VIOLATION IN A
TYPICAL REGULATORY SENSE.
IT'S REALLY JUST THE FACT THAT
WE DIDN'T THINK ABOUT THE
POTENTIAL HAZARD.
SO, BEFORE WE RUN OFF TO WRITE
REGULATIONS I THINK WE BETTER
UNDERSTAND MORE DEEPLY WHAT THE
RISK FACTORS ARE.
I KNOW THAT I HAVE OFTEN WANTED
TO BUILD A CONGRESSIONAL COMIC
BOOK THAT I COULD MAKE AVAILABLE
TO OUR FRIENDS IN CONGRESS TO
HELP THEM UNDERSTAND -- LIT
RALLYINGLY A CARTOON LEVEL HOW
THE INTERNET WORKS.
BECAUSE WITHOUT A REASONABLE
UNDERSTANDING OF THAT IT'S HARD

TO WRITE LAWS, LET ALONE DEVELOP
REGULATIONS FOR THEM.
I NEED TO HAVE A LIGHTWEIGHT
CARTOON MODEL, USED AS A
METAPHOR, WOULD LEAD PEOPLE TO
CORRECT UNDERSTANDING OF WHAT
LAWS MAKE SENSE.
OTHERWISE IT'S LIKE SAYING THIS
NETWORK DOESN'T RUN FAST ENOUGH
SO LET'S DOUBLE THE SPEED OF
LIGHT.
WELL, THAT'S HARD.
SO, WE CAN'T DO THAT.
ACTUALLY YOU CAN DO THAT.
THE SPEED OF LIGHT IN A OPTICAL
FIBBER IS 90,000 MILES A SECOND.
IF YOU GET RID OF THE FIBER IT
WILL GO 180 MILES A SECOND.
SHE SAYS WE'RE OUST TIME.
YOU HAVE ONE MORE QUESTION.
ONE MORE QUESTION.
ONE MORE QUESTION.
>> SO, THIS IS COMING FROM A
INDUSTRY PERSPECTIVE.
HOW CAN INDUSTRY BEST CONTINUE
TO INNOVATE WHILE PROTECTING
AGAINST PRIVACY AND SECURITY
CONCERNS NOT ONLY U.S. AND
WESTERN COUNTRIES BUT FOREIGN
REGIMES THAT VALUE PRIVACY.
>> THE COMMENTS MADE EARLIER IN
THE PANEL I MISSED SOME OF IT
THE COMMENTS ABOUT SECURITY AND
RULES FOR WHO HAS ACCESS TO WHAT
INFORMATION UNDER WHAT
CONDITIONS IS ESSENTIAL TO
DEALING WITH THAT PROBLEM.
IT'S REALLY, REALLY HARD TO MAKE
SECURITY WORK WELL.
ESPECIALLY IF YOU DON'T WANT TO
OR DON'T BELIEVE THAT THE USERS
ARE GOING TO BE SECURITY EXPERTS
AND KNOW HOW TO DO CONFIGURATION
AND EVERYTHING ELLS.
FIGURING OUT HOW TO MAKE A
SECURITY SYSTEM WORK WELL WHICH

DOESN'T REQUIRE YOU TO BE A
EXPERT IS A BIG CHALLENGE.
I BELIEVE WE HAVE TO FACE THAT
AND TRY TO DO IT.
WE HAVE TO TRY TO DO IT.
SSL WHICH WE UNDERSTAND CAN BE
BROKEN.
THERE ARE MAN IN THE MIDDLE
ATTACKS AND OTHER THINGS.
IT'S AN EXAMPLE OF THINGS
RELATIVELY INVISIBLE.
YOU DON'T HAVE TO DO ANYTHING TO
MAKE THE CRYPTO EXCHANGE HAPPEN.
I'M NOT ARGUING THAT BUT IT'S
DOESN'T REQUIRE USER INTERACTION
TO EFFECT THE KEY DISTRIBUTION.
THOSE SORTS OF IDEAS I THINK ARE
IMPORTANT IN ORDER TO MAKE THE
SYSTEMS ACCEPTABLE IN A SOCIAL
SENSE.
>> THANK YOU, VERY MUCH FOR
ALLOWING ME TO CHEW UP YOUR
TIME.
>> THANK YOU.
[APPLAUSE]
>> BIG ROUND OF APPLAUSE.