# Title: Strategies to Protect Critical Infrastructures and Assets

Subject: Safe Cities

* Safe Cities

Abstract:

Critical infrastructures provide the essential services that underpin city’s life and serve as a backbone of urban’s economy, security and health. Thus, preventing and reducing the risk of disruptions of assets, systems and networks, whether virtual or physical, becomes indispensable. What are the best strategies to protect critical infrastructures and help local governments to rapidly respond to and recover from all-hazards events?

Speakers:

#### Ramon Sagarra Rius

#### Juma Assiago

#### Tomas Roy

#### Ares Gabàs Masip

#### Jed Sundwall

Conference:

hello good evening the lunge is

difficult sometimes

we have a good presentation here and not

to sleep really good panel we were

waiting for the fourth person it mister

mister album Juma will not be here we

don't know if he will arrive we start

with the other three members I will be

the moderator

I am Ramón Sagarra and from there a

company of its a platform for Internet

we have a stand in the exposition I will

not explain here what company but it's

at the end of the Main Street near the

set near the car fabric of we understand

here they're very interesting Stan but

today is for for her for for for the

people if you want to make some

questions nothing like this there is a

an app a scam boat you can use it along

the presentation you can write your your

questions you can say I think this

question is interesting or not I will

have an iPad I suppose someone will

provide me an iPad and at the end of the

session I will I will make the questions

that I I understand it more more

interesting or more linkit with the with

the presentation let us start with mr.

tomorrow mr. tomorrow works in the

Generalitat of Catalonia in the local

regional government is the the security

strategy director of a saccade saccade

it's the it's a center of information of

Catalunya we will have two presentation

of of more soft light and data

infrastructure and one more more

physical please

okay thanks everybody for coming and we

are at the government of Catalonia so we

are responsible of a lot of services

which are critical for citizens and we

must take care of most of them from all

the kind of threats that we are exposed

so when we have to think about how to

handle this presentation we prefer to

have a practical work a practical

scenario on health because I think that

it represents which is the real

complexity that we must that we are in

front of when from a government we try

to protect political infrastructures

first of all I must also explain that in

Spain the responsable of protection of

critical infrastructure is the

government of Spain and it has this

competence by themselves so we must

coordinate with them on protection and

what we will spend here is just how to

maintain the resilience on our critical

services especially on and health so we

are the secret the secret is an

organization like an agency which is

responsible for planning management and

control of service security or not the

government of Catalonia we have people

and responsibles and functions and

organization all all around the several

ministers of of the government of

Catalonia and we must be able to handle

security issues and also functional

security issues so in our catalogue

health model we have obviously the

Catalan Health Ministry which define all

the strategy plan organization

assessment and all the controls of all

the centers that collaborate a

co-participant

in the delivery of the health services

and we are also in coordination with

Spanish planning and called an and

coordination we have so the citizens

with are related with the Catalan health

or the health gather and service cat

salud

and also the insurance companies and

then we have several provide the health

service providers most of them are

public but we have also private them and

also consortiums and foundations which

are welded form both of them all the

security like the pro like as you can

see there are several players what we

have done is to take the problem from a

coordination point of view in a

coordination security information

committee which is a responsibility of

designing approve implement and

supervise action related to information

security we have a savior we have a

cybersecurity model when we speak about

critical infrastructures and a

protection we don't begin just from the

technical and physical uses issues but

we have make an approach that we try to

deploy everywhere and in a single

provider that is in the health system so

first of all we work on governance

through an organization also we have bet

highly on digital identity management

also we have define it compliance

framework which we deploy and we audit

and also a legal assessment if we speak

about protection we are a bit from the

classic school and we are working on

hard on security perimeters management

also we work very close to projects and

development and every improvement and an

innovation through the security projects

methodology and also the secod is a

third

which is a computer emergency response

team which is responsible of the

security incident management which allow

us to have a lot of information of the

real problems so we also have the

prevention area which we solve it

through the compliance auditing risk

analysis vulnerability management and

practice security and least we have the

resilience or the most close to critical

infrastructure protection through

certification business continuity and

training and awareness programs this

level security model concrete's in a

security program which deploys based on

resources excellence as like most of the

strategy but programs but which for us

is really important is to have an

organization on cyber security which is

the main key to deploy and to translate

all the all the needs on requirements

and specifications and so with the with

those that comes out from cyber security

we really believe that cyber security

makes business possible and it's a help

and it's a it's a must so we must be

very clear near to the to the business

problems to solve it now I will share

you with you some of our challenges and

that we must take care of we have a very

complex organization most of our

services are very complex with a lot of

players as you can see here we have this

information committee security that

security information committee that I

explained to you but we must coordinate

a lot of players both of all of them

with their responsibilities and also we

must coordinate among among the

different responsible of security of all

the government of Catalonia

we also take care of data data to take

decisions and to prize and also we

deploy all the different standards that

we

like health we have to implement if we

speak about protein protection if I told

you we are a third which gives us a lot

of knowledge and tools to monitor and

also to handle incidents we are also a

shock security operational center and so

with these two tools we have most of the

protection capabilities held no we we

have also a problem with IOT which is

most which is every time more deployed

and we are not afraid of that of it but

it's true that for us is a big challenge

that I expect that we will be able to

speak about in our yes okay thanks

and there are the challenges of

prevention we have as old classical

models all the based on information

classification but what our main problem

is we have a lot of providers which

develop in our systems and maintain

them's so we must bet on security by

design and methodologies to implement

privacy and also security we use as much

building blocks as possible especially

on Identity Management and

infrastructures and we accept as an

opportunity and a challenge the cloud

and the use of IPP just because we

believe that especially the cloud

environment is born from the security

issue and it's they take care from the

beginning of the security compliance no

so we are not afraid of cloud we have a

problem on revolution and revolution

because we are in Europe but it's cloud

for us is not a big issue as can be

sometimes a very good player to work

with compliance of privacy standards is

a must so we must

periodic compliance auditing and then

our investment must be also directed

especially on users for all the treats

that they are faced directly salvation

of duties and need-to-know principles

are checked in every system and

especially we work on awareness programs

trying to make a stronger all the chain

of security understanding that if we

that the user wants to be a part of this

chain and wants to participate on it so

we must give them tools that allow them

to be active on protection and not just

a problem the resilience of our systems

is not just infrastructure but are also

centers also professionals and managers

and citizens so it's a problem that must

be taken from a high level and an high B

you know we have a ter eternity on IT

solution by the providers so what we

have decided is to centralize and give

centric solutions and data centralized

clinical records my health and platform

of electronic transfers electronic

prescriptions are examples on which

services we are providing to all the

system of the health system to be sure

that they are that that they are

compatible and also secure privacy and

security controls are a must

we have encryption and communication by

default and we must trust on

organizations that they are responsible

of authentication of their own

professionals so we delegate this part

and we try to implement know we have

implement digital sign it transactions

by all organizations and we try to have

an a pragmatic continuity solutions

approach not just high cost and highly

available solutions because it's really

difficult to to reach them

without investing a lot of money so

sometimes we find out that this is

to have a be plan which is based on

physical or written documentation or any

kind of other solutions that

implementing very expensive

technological ones so just thanks for

your time we will reach there we will

improve our explanation during day thank

you very much thank you very much Tomas

[Applause]

and now it's a pleasure for me to

introduce you what is kibosh we were

together many years ago and it's really

a pleasure this time to to see another

time she works in the Ursula

municipality in the a gentleman and

she's the head of the resilience

department of the Ursula no city please

thank you very much yeah I'm going to

talk about two points that we're

actually working on and and complement

each other through to two examples one

of them is how we need cities need to

improve the knowledge we have on how the

city is performing and also the capacity

to analyze what the problems the risk

that that we are facing and how the city

what is the ability of the city to to

absorb them and this I will explain it

through a project that it's we call it

the resilience platform and the second

one is about designing criteria for

infrastructures and in climate change

and I'm going to talk all day about the

climate plan and how we need to change

the paradigm in way the way we we design

the infrastructures facing uncertain

uncertainty there's a changing nature of

risk and also some uncertainty related

to it but we need to plan

infrastructures for the future so what

are the strategies we are using in order

to enhance more adaptive greener and and

software infrastructures so first of all

this is a diagram of how we approach the

resilience building project

process sorry in Barcelona and it

consists of basically of three three

different stages first of it is

responding management managing risk

whenever we have an incident on the

street or on the services we need to

respond and we need to improve the

capacity we have in order to minimize

the the affection then we also need to

assess we need to know what the problems

are we need to have the capacity to

determine what the vulnerabilities of

the city are so that we can finally as

the first stage implement actions in

order to reduce them or eliminate them

and this confirms a continuous

improvement process where we would

ideally get to a position where we are

better than that we were in the in the

in the beginning of the process and that

is that an operative level complimented

through a more strategy at a more

strategic level with the roadmap design

and the planning of the of the strategy

to improve the resilience of the city

with a longer vision so one of the

things we realized when we started

working on resilience that we needed to

improve the knowledge that we have on on

how the city was performing and that we

needed to share this information with

many different areas within the city so

we needed to build the tools and the

capacity within the organization to be

able to do that so we started working on

the resilience platforms which is

actually a set of tools that provide a

comprehensive overview of the city and

how its performing allowing for a

holistic approach of the governance of

the city and also integrating and

sharing information that is there is

useful and there is relevant so we have

have this overall vision to support

decision-making some examples of that we

are already using it using it within the

organization is for instance we have an

incident on the on the street but we

don't know what's going on we don't know

what what lies beneath what are the

layers of infrastructure of the

different services that are running

maybe behind this this this Street so we

need to be able to overlap them and to

give light to that so that we can maybe

determine the dakotas but also prevent

failure

also on the incidences we need to to be

able to to locate them to be able to

know what the affection the potential

their potential affection is and

actually using this information has

proved to reduce the stock of incidences

by more than 140 percent and also the

average resolution time for sixty

percent so having the information right

information at the right time really

matters and also we need to analyze at a

different speed not just problem-solving

but also analyzing what the problems

have been in the past so that we can

learn and we can improve actions in

order to to reduce them or also even

facing new new challenges or new new

risks as the ones that will be related

with the impact of climate change for

instance this is a map that we've been

working on on the vulnerability

assessment on the flooding the sewage

system of the city and how it is how

prepared it is to respond to that ten

time

return period rain now but also for the

future scenario so that we can determine

the affection areas and also implement

measures in order to protect the

critical infrastructures that are within

the area and very fast well this is some

of the information that that we are

collecting that we are generating and

we've become aware that is information

that is relevant for more people than

just asked so we are creating a new

initiative which is called the resilient

Atlas which is a compilation of all

these information that is territory lies

because we mainly work territorially and

problems happening in a certain place so

and we need to address them in

particular areas of of the city so

another dimension of this project is

also the information sharing and given

like to this to this problem and and

making this information new and basis

based information for many other people

working in in the city and secondly I'm

going to talk about the climate plan and

how we need to change the change in the

paradigm on the way we are planning for

infrastructure for the long term

regarding the uncertainty that

with that there is in the future

scenarios so we have this climate plan

which is focused on on the people the

center is is the people so improve the

quality of life because all these

infrastructures and services are serving

the people and also in a comprehensive

way and that provides measures that

improve the adaptation of the city in

order to absorb all the shocks that in

some cases we know more or less whether

what they look like but in the longer

term of the projections the more level

of uncertainty and how the future is

going to look like it so and also

enhancing other types of the renovation

of the current infrastructure and

including introduction of renewable

energies and and so so yeah the we have

some objective or some numeric

objectives worthy for the climate plant

which is the 40% reduction of the

greenhouse emissions in respect with the

basin of to 2005 also including more

greening the city one more square meter

per inhabitant which is quite ambitious

for a city like Barcelona so lands and

so so compact also reducing energy

poverty and also making providing

engaging citizens to co.design and they

call implement the measures of the of

the plan

so enhancing citizen participation and

an action so we have studied what are

they what is the house climate change is

going to affect Barcelona and what I was

saying before it there's a level of

uncertainty on how it's going to to

affect us so this means that we need to

make sure that all the infrastructures

that we are building all the services

all the actions meet some values such as

making healthier Barcelona more socially

just more available and safe a

low-carbon and distributive in hunting

also efficient and renewable renewable

energies learning through the projects

and when we

the citizen with a committed committed

citizenship and also in looking for

solutions that solve more than one

problem in order to maximize the

investment and also that are as adaptive

as possible so we are enhancing greener

softer more adaptive infrastructure

versus more rigid gray or traditional

infrastructure we have come with 15

lines of action some of them have a lot

to do with with energy and the

introduction of more renewable energies

which also contributes to having well

being more resourceful and not so

dependent on one type of particular type

of energy also protecting naturalizing

as much as we can the city and so all

these measures we again we match them

with with this with these values to make

sure that no matter what the future

looks like what we are now foreseeing or

or not all the values all the measures

and actions that will implement and have

a value in in themselves and provide

also Co benefits thank you very much

very good presentation at the end I have

many questions but we wait the next one

is mr. jetson wall he managed the open

data program at Amazon Web Services and

in Munich please thank you very much por

estar de buenos tardes Thank You Tomas

and others for your presentation so I

don't have slides so I'm just going to

tell you a little bit about what I do at

Amazon Web service is a little bit about

what Amazon Web Services is and how the

cloud can be applied to secure critical

infrastructure when you need it so first

of all I think it's always important to

start with the definition of the cloud

so the way that Amazon Web Services

defines the cloud is it is the on-demand

delivery of IT resources this is

computing power storage applications etc

over the internet with pays you go

pricing so what this means is that if

you need to have access to computing

infrastructure or whatever it is you

need you can get it on demand and you

will only pay for what you need now it

probably sounds like I just said exactly

what I just said but just just in case

it helps to rephrase it but one of the

huge benefits of the cloud when it comes

to disaster recovery is that you can you

can have access on demand to computing

resources that aren't close to where you

are ok this is especially important if

we're dealing with with natural

catastrophes or things that might be

impacting your physical infrastructure

and as Tomas pointed out there's a huge

benefit that comes with the cloud which

is that we are built from the ground up

with security top of mind so security is

our number one priority at Amazon Web

Services because it's if you think about

it at all it's absolutely core to our

business if people don't trust us to

ensure the security of their

infrastructure that they're they're you

know purchasing from us we have no

business right and so we invest heavily

and constantly in insecurity and and

resilience because it's absolutely core

to our business and in fact this may not

give people as much confidence it gives

me but I really love this quote which is

for

Amazon CTO Verner Vogel's which is that

everything fails all the time that is

the mindset with which we approach how

we build services is is that we

understand or at least expect that

things are always going to fail and so

that you have to architect for failure

all the time to ensure security to

ensure redundancy and make sure that not

if failure curves but when failure

occurs that the data will be still

secure and then will be backed up and

available now I'm so I'm going to share

a few examples of how people have been

able to create more secure solutions in

the cloud or at least more resilient

solutions and so one of my favorite

stories comes from Asheville North

Carolina

so in Asheville they had a they had a

disaster recovery site so they had their

their city's infrastructure there their

IT infrastructure that was used to

manage all sorts of transactions and

ensure that you know operation of

certain systems and then they also and

they had a backup site that had the same

infrastructure the same applications

loaded everything else they needed in

case anything went wrong with their

their their main infrastructure it just

so happens that their backup

infrastructure was two blocks away from

their main infrastructure okay and so

this is this is a really good example

now and I'm not exactly sure what that

what sort of compliance regime they were

under at this time but this is the sort

of thing that like somebody somewhere

might say this is compliant right

okay we have our infrastructure we've

got to backup great we're compliant

fortunately somebody pointed out at some

point you know if anything actually

happens like if there's an earthquake or

you know some major storm actually makes

reaches Asheville our backup is going to

be absolutely useless to us it's just

two blocks away it's going to go out as

soon as the power goes out for the main

one and so so they they developed a

solution that would allow them to have

their backup infrastructure in the cloud

quote quite a bit further remote from

where from Asheville itself and one

strategy that you can take in these

cases is having a pilot light

infrastructure and this this is actually

what's pretty interesting in in the

context of smart cities as we're talking

more and more about sensors is that with

a pilot might pilot light model you can

have

your infrastructure ants on standby so

you might have the applications and all

everything loaded and ready to go but

you don't actually have all this all the

servers running so you'd basically just

have like an image waiting to be

deployed as soon as you need to turn on

a bunch of servers in the case of a

catastrophe so it's sitting there

waiting basically for a trigger to turn

it all on so it's what's interesting

about this approach is that if you have

sensors within your city so perhaps you

know something that's sensing flood

water or a seismic sensor or anything

that you want you can actually have

those sensors trigger operations that

would then turn on and automatically

activate this infrastructure that's

remote now so I I leave the open data

program at AWS and so I tend to focus on

organizations that have data they

actually want to share publicly with the

world and so we work a lot with

satellite data and a lot of mapping data

and some of you may have heard of Open

Street Map we have a lot of customers on

AWS that use Open Street Map and so we

we provide infrastructure to support

some of those the operations of that

community I bring this up now because I

think another thing that's important for

cities to understand now is that because

of I won't even say because of the cloud

but of course the cloud is part of this

but just because of the Internet you

also have assets at your disposal that

you can make part of your city's

infrastructure so what do I mean by that

with OpenStreetMap you have access to

mapping data that's updated in in as

close to real time as possible that you

can use and I understand why many cities

and many organizations might have a

certain fear of using a crowdsource

mapping service but I can tell you that

there are many many large companies and

also organizations including the Red

Cross that rely heavily on Open Street

Map data the data is very good it's very

useful and it's better than having no

data in the case of some sort of event

so so consider looking at things like

Open Street Map as a part of your

infrastructure as part of the assets

that you can use for your city in the

case of a disaster

also satellite data so fortunately we

have some very generous governments in

the world that produce satellite imagery

that is that is publicly available the

European Space Agency for instance has

its Copernicus program which includes

the Sentinel satellites so the the

Sentinel 2 satellite is an optical

satellite that produces optical data

imagery of the entire planet and I think

at this point it's it's something like

every five days you can get imagery of

most places in Europe now the data isn't

very very high-resolution but it can be

used in disaster response and a really

awesome example of how this has been

used is in 2016 is either 2015 or 2016

there's an earthquake in Ecuador and a

group called Zooniverse so this is a

nonprofit organization a run out of them

I think like Oxford but it's a

non-profit group that they run these

really interesting crowdsourcing

interfaces for volunteer response so

there's an earthquake in Ecuador they

went so we actually host Sentinel to

data through my program on AWS and so

Zooniverse said ok we've got access to

the satellite imagery let's go grab it

out of AWS we'll create this interface

in this website where people can come

and actually look at the imagery the

latest imagery post earthquake and

identify where there had been landslides

you know where can we see that there

there roads that have been disrupted and

things like that and then that data and

that imagery was used to notify

first responders and also update

OpenStreetMap for instance with updated

routing information and so again this

isn't this is an example of thanks to

the internet cities have access to

satellite data

you know most cities in fact I don't

know of any cities that have launched

their own satellites but the point is

that you actually have this asset

available to you and then finally

there's social media so social media is

it can also be used to monitor basically

what's happening in your city whether

it's through Twitter or Facebook posts

or Instagram things that you can you can

actually source and analyze a really

cool example of this comes from Chicago

they have an application called open

grid that they've actually open sourced

that that allows city staff you know

police law enforcement and first

responders to browse social media data

within a certain polygon basically

within their city to basically draw a

polygon and say like what's going on in

this part of the city what do we know

that's actually happening here and it

combines both their information that

they get from the city as well as

information from social media there's

another group called petabyte Ben Khanna

out of Indonesia and all the people

involved in this I've lost track but

it's a group out of Australia and then

MIT as well as involved in here they've

also built an open-source application

that can do this they've built for

Indonesia they started in Jakarta but

they've expanded to the entire country

to use social media to track information

about flooding and up-to-date time so

anyway so that so those are a few

stories here of how the cloud can be

used not only to you know basically

create a redundant backup of your own

infrastructure that you know that's very

secure and reliable but also how it

gives you access to massive volumes of

external data that you can also

incorporate into your city and then I'll

just close with with three words am I

out of time okay so there's there's um

the three words are undifferentiated

heavy lifting so this is a phrase that I

love to use it describes really one

thing that the cloud is very good at

which is it removes undifferentiated

heavy lifting from from people's jobs so

when I say that what I mean is everybody

who works in IT has to deal with servers

and running out of space and running out

of capacity securing those servers

cooling them powering them etc etc the

cloud lets you not worry about that

stuff as much okay so you can just turn

on whatever servers you need whenever

whenever you want to so you can focus on

the stuff that really differentiates

your city which is your people your

staff you know your hospitals and and

really focusing on the critical

infrastructure that only the city can

provide so anyhow I look forward to our

discussion of the panel and thanks again

for the opportunity thank you very much

we have 20 minutes I received two or

three questions - and I have one or two

comments the first one we heard about

climatic change you think there is many

levels probably the name of the session

that the session have to be different

and strategies to protect person's data

and critical structure and assets

because we see that there is an order

here and probably the the strategies for

the persons for the data and for the for

the the infrastructures and assets are

not exactly the same at the end we have

seen with the same with with the data we

can protect the the physical the

physical things and when we talk about

the data we suppose the rest are are

okay now probably the is the we have to

make some layers in this there is one

one of the questions that links with one

thing that I write when we say protect

in the in the name of the session what

what do you what do you think about to

protect in front what in in the in the

question says talking out data sensitive

data and open data have the same range

of protection and and and also if you

consider terrorism aggressions of the

for this reason each one its an expert

in in materia well you should protect

the the first things that you think to

protect that you have to protect him

from something which would which

subjects are there is a micro it works

yes when I think of protecting I think

about city service continuity but

services that are for for people like

you said you finish your your

presentation that what what really

matters is what the city is offering to

to the citizens its citizens or the the

hospital education the cultural services

or what the services that the city is is

offering that we need to guarantee that

they meet certain standard and that they

can continue to function no matter what

the disturbance is or what the

disturbances are so for me that is what

I think of when I think about about

protecting the access of the services to

for to the people

yeah I mean I certainly agree with that

you know you want the service to be

available all right so that's not a

number one we were talking about

protection in these in these cases the

the question though about you know like

health data versus open data you know

how important is it to protect both of

those you know sometimes I'm able to say

well open it is open so you can be you

know you don't have to worry so much

about security when you're opening up

data that's absolutely false it's like

crazy talk from my perspective because

especially when say you're a city that

you're producing somewhat of some sort

of open data asset you're making it

available to people you really want to

make sure that data is accurate you know

you really want to make sure that data

is valid and the people can trust its

provenance it's being you know being

authentic and so security yeah I mean

it's absolutely critical and and you

know and I'm not like you know I'd like

to talk about like terrorism is like all

these like crazy risks that might happen

but it is a real threat that you know

somebody could come in to a city or a

government that's producing a data asset

and change it just a little bit you know

just just D calibrate things or mess

with a sensor or something like so it

sort of produces inaccurate data so

that's a real threat security is really

really important for for open data for

me the protection is becoming harder

stronger trying to make things more

difficult to pay national but there is

one point that sometimes we don't speak

about that that that is especially

important to protect someone that is

detection I think that the capability to

detect to understand to analyze what is

happening and then to react but if you

are not able to detect you don't know

that you are in danger so you cannot

protect so you must put protection in

act but also you must be sure that you

are able to detect that someone is

happening

another question where do you have a

city and ization have to put more

resources in protect or in in good

reaction that means in resilience or in

reaction it's not easier because it's

administration have different actually

both are I mean both are for me are part

of building resilience of the city being

able to respond and also being able to

prevent and actually there are some

figures but I think it's by world bank

that by every dollar invested in

protection you can save five in

reconstruction so the number say that

and personally I think if we can go to

the root if we can anticipate risk and

implement actions in order to reduce the

probability of occurrence of this of the

risk its it's always I would because

sometimes sometimes it's about service

continuing but sometimes it can be even

be about our life and well now we're

talking about al Barcelona but in in

other cities in the world risk are

affecting directly to to people yes the

answer is both

I of course that now of course here you

talked and of course I do think you know

that but being able to prevent is

perhaps more important but at the same

time I feel like that instinct probably

a lot of people have that instinct and

as a result communication strategies and

response strategies get overlooked which

is just awful because you know so like I

said before everything fails all the

time you can invest all that you want in

prevention but something is gonna happen

if you don't have a means by which you

can communicate clearly and and

accurately and with authority with your

citizens in response to something it's

you're in pretty bad shape and I don't

think people take that as seriously as

they

our main business and success is on

protection and we came from there not

this is where we we win trust on us

protection I think but however it we

must admit that there are a lot of

emerging threats that we every one

dollar that we put on protection have

their can be lost no and every

investment can be cannot be useful if

there is a change or interruption in

innovation and also in threats No so we

must be able to recover in any case from

not just our if our protection fails but

in any case I will also like to speak

about that most of us have been working

for years to be with a debt debt

protection citizens feel protected and

technology gives us protection and now

there are there has been changes new

technologies that sometimes they don't

arrive to the level of protection we

were used to it is strange to ask

someone to patch their computer or to

speak about having a password or to

upgrade the software something like that

now there are some technologies that are

coming up that when you see the problems

that you have to protect from it seems

that is back to the past and you find

out that there are things that you

suppose that you have been working hard

not to work again in towards that and

not absolutely with citizens taking care

of that because they don't they think

that that you will give them secure

services and I expect that from

innovation I will respect the level of

security that people assumes that must

be given by out of the shell

okay and I want exam in your

organization's do you think you can

continues providing service after crack

electrical networks in two hours ten

hours one day can you continue providing

your your job your with one day energy

fail electrical energy disappear you

mean an interruption of one day one day

you can say two hours years because I

have a machine you can also you need to

accept a little a certain level of risk

also because trying to investments to

protect yourself against everything one

you don't need you don't know what

everything you can you can face in the

future and then and and secondly it

would be very expensive so so you need

to accept that that you will be exposed

to certain risk and and you have to find

the balance between the investment and

they and the level of of protection so

back to your question if we if we could

well depending on the so we we provide

service level agreements for for many of

our products that would provide that

authorization or so that assurance and

of course again if anything ever happens

because everything fails all the time

the way our service level agreements

work is we pay people we actually pay

people back anything that they would

have paid on us start doing that debt

failure but I would say that you know

the answer is basically yes everything

that we do is massive massively

redundant to the point that our data

centers are actually located you know

within a certain region we have clusters

of data centers that are on separate

power grids separate flood plains they

are designed specifically to to be

resilient to power outages and things

like that

we put your eyes and we protect which

are more critical and we have we try to

recover the minimum resilience services

but however in health system

the most important resource are doctors

so without doctors with we will fail

this issue without electricity

we they'll do their best it's more

critical than energy electrical energy

the doctors well last question

we found that our societies over the

infrastructure that civil engineers

designed over the criteria this criteria

that was historically historical serious

rs8 the for the cigarette system of

barcelona they got their twenty years I

think you said but with the climate

change discrete area disappear because

the historical series doesn't work that

probably means that the infrastructures

that that we found our buildings our

roads our highways our homes now nobody

knows if they are ok ok you understand

how do you think we have to affirm this

this this this history it is this

amazing situation that all the people

says well I put this Ridge here and I

know after 500 years of range and

everything this Ridge will be there now

nobody knows how long a ridge will be

there how do you front not the crater

for the future I see you work on this

but but what sensation do you have or

what do you think how people kind of run

this it's the complicated time managing

these this uncertainty and that's what I

I mentioned in my presentation that we

need to include criteria think of

multifunctional infrastructures that are

maybe because they require a great

investment and we need to maximize this

investments oh and maybe think of

software also measures that can be

adaptive in the in the future so there

are no they are not rigid and that we we

are aware and that we recognize that

well we plan them now we build them now

but they need they have a lifetime a

longer a very long lifetime and we will

need to be able to adjust them to to new

challenges so I think we need to think

in terms of of making them more more

flexible because we will for sure need

to to be evolving them and and also this

this other point trying to think of

solutions that solve more than one

problem that provide Co benefits and

also that provide multiple functions

because maybe most of their lifetime

they won't be in use if you only think

about 500 time return period rain so we

may never never happen so in the

meantime we need to be to be able to do

something with without thanks this is

actually one of the things that excites

me about Internet of Things which I

think you could appreciate is that as we

instrument more of our infrastructure we

can know a lot more about our

infrastructure so one way I talk about

this a lot is I that was talking about

lowering the cost of knowledge so

previously like so you talk about a

bridge how many times can you afford to

spend a human inspector out to a bridge

and have them pay attention long enough

to every detail the bridge to determine

you know if its bearing its its load

appropriately an example how this works

as Transport for London they instrument

everything within their system to the

point they know how fast the the

escalators are running they know the

weight of cars of trains and based on

the data that they have that sensors are

producing it's very cheap for them to

know like that escalator is running

anomalously slow or you know these

trains are really heavy or you know

they're going slow and things like that

so as we as sensors get cheaper and

managing and analyzing this data gets

easier it lowers the cost of us knowing

of what the health of our infrastructure

I'm not a climate expert but what I what

I think about it is that which changes

can have for a city like Barcelona if

there is a weather change which changes

have for a country like Andorra when

there is a climate weather change and

and we we must be aware and take an

economy way also to resilience and

continuity in in a city that is so so

beautiful and with so many things that

they have attractive that are the near

of the weather and the climate no and

that's the reflection thank you very

much jet a little bit I was I have an

idea to close the our places we have

three four more minute yes we have here

mister Amazon so okay and if there is a

data bridge or there is any attack you

must you are obligated to inform your

clients absolutely yes we lose all

credibility if we're not transparent

with our customers about about such

things

yes do you have any policy from

connections that are from for example

tour networks I do not know the answer

that question I'm sorry

there are really critical services that

are depends on Amazon services from for

example cities that they are or industry

that they put their critical services

not backup services their business on

Amazon can you say one example and which

can of insurance or which kind of

coverage do you have to offer them in

case of measure or this this risk that

you cannot transfer how can they

transfer them to them you okay this is

called the hot seat so I don't I don't

know examples or any information about

insurance or policies that we provide

for anything like that other than our

publicly available service level

agreements but we have many many banks

[Music]

thousands at this point of government

organizations that use AWS for for their

infrastructure many of those including

for for mission critical infrastructure

including defense agencies and and all

sorts of transportation agencies as well

that have have critical infrastructure

running tracking data about about

infrastructure and people and citizens

moving around the world

so and and I think you know one of our

most high profile banking customers is

Capital One they do a ton of stuff on us

I wish I had better examples off the top

of my head in terms of those kinds of

customers but but many many government

organizations that work in defense and

in in transportation transportation

infrastructure use use AWS one good

example this is the US Navy they use

this for for many mission-critical

applications I have one question for

domain Oats their machine saves to me no

excuse me

no it just as you show us a lot of

information that your handle

if it came from sensors and how can you

protect sensors and avoid to be to have

attacks on them or the defacement on

data and if you have any project on

citizen of us as a sensor of your

question what was the last hour series

yeah of course yeah yeah they

collaborate and we have sources we have

channels with citizens to report for

instance the maps that I showed with the

incidences in the city many of them come

directly from citizens reporting to my

telephone email or even we have an a

mobile app close the sensor so the sense

is transparency is very important here

this again overlaps I thought I said

before about keep maintaining

credibility sensors will fail sensors

might become corrupted in some way or

you know a good example this is there's

a satellite called Landsat that

something there was a failure the sensor

started producing weird data the

providers of that data were very

transparent the community said the

sensor failed here's what we know about

the failure and here's the data that's

being produced and the community figured

out how to work around that and and deal

you know extract value from the data

that they could get even though the

sensor was not perfectly calibrated

anymore so it all has to do with

communication to retain that the trust

in usefulness of the data from a sensor

will close fast answer people as a

sensor sure with the mobile when you

make a transportation in a city the

telephone companies see what is the

movement of the people and in this way

they can optimize the road of the of the

the boost the the the most doctors in

the cities the matrix origin destination

you can you can make that the best

solution for the public transportation

using only the

the localization of the people that move

in a city that is many other

uncertainties about the the sensors if

the the the the the probably a challenge

today for the sensor in the Internet of

Things is what what what is the

information as a sensor provide and and

what is this information for this is the

there is a lot of information but you

want to use it what this means in which

situation this is the correct measure of

this of this data and internal things

can manage a lot of data but when you

want to use the data

what is this data you understand me this

is the challenge today for specific

things you can take in three ways

different ways the same data but

Internet the philosophy Internet is not

to do three times the same data is to

have many data okay

at the annual have to correlate data in

different origins to have information

not data to have direct interaction now

I close before when I made the the my

last question about the the civil

engineers and the richer the idea was to

close saying that the probably the

Internet of Things the the the sensors

can provide that information about our

infrastructure you said something like

this and and well only we are right here

there is one minute to finish say thank

you nobody slipped I was seeing you now

what is this lipid thank you very much

for your attention

thank you very much for the speakers

thank you

[Applause]