● Smart Hackathon 2017 Problem Solving Kit

SMART INDIA HACKATHON '17
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Hello Friends,

Greetings from Openfuel!! First of all congratulations to all of you for getting selected to the live Hackathon program of "Smart India Hackathon 2017". Openfuel is the official learning partner of Smart India Hackathon 2017. We are specializes in providing learning tools and problem solving as a skill to start-ups, innovators and collaborators.

With this kit we're attaching a problem solving tool for you- "Problem Space Canvas". Till now you might have worked on developing Technology for a specific problem. But looking at a problem in silos don't make sense in modern day world. Nor do they make great solutions or business proposals. Dealing with one problem helps you build a great technological idea (Great man named Steve Wozniak) but looking at an entire problem space and building business around it helps you sell better (Great Man named Steve Jobs). The tool would just help you improve the ability to sell your product to the ministry.

The tool would help you do 2 main things

a. Zoom out of the problem. The solution you are building could actually be solving a bigger problem. The Solution might actually be looking at a completely different form of problem too. The solution might be replicable in any other industry. Let's explore the possibilities. Relate the Technological problem with real world troubles that people are facing and how would your solution play an important role.
b. Zoom in to the problem. A problem might have been composed of multiple smaller problems. Looking at each such smaller problem helps you set a context on what form of solution would be the best and are we eventually achieving what we set out to achieve in the first place?

Along with this kit we have sent you a few examples of the kind of thought process you can put up, a set of tool usage examples and examples of depth of questions we asked ourselves while we were building a solution for the same.

Just as nobody is perfect, nor are these problem space canvases. There can be add-ons. There can be removals. Play with your problem and build a problem space canvas that you believe your team would be solving.

Let's get the ball rolling!!

Regards,
 Openfuel Team

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Redefining Problems & Problem Spaces

"Real Time Based Automatic Street Light Control system - A system that switches itself off during the day and even alternate lights in late nights"

Openfuel Knowledge Foundation

The problems looks simple. Streetlights are sometimes not switched off during the day and they waste electricity. How to automate the switching on & off to prevent this and also how to make them more energy efficient at late night hours?

The problem is well solved in public domain- A supplier provides switching equipment for doing this- http://www.navagoelectronics.com/twilight-switch.html#twilight-switch is available and at many other places. The only problem that this equipment doesn't solve is extra measures to save electricity during late night. So if this problem is already solved - then do we give up on the problem?

No. This is where we use the concept of **Problem Spaces** to explore more problems around this core problem that are unsolved and maybe worth solving. In problem spaces we don't look at problems as stand-alone problems but as a space of many connected problems.
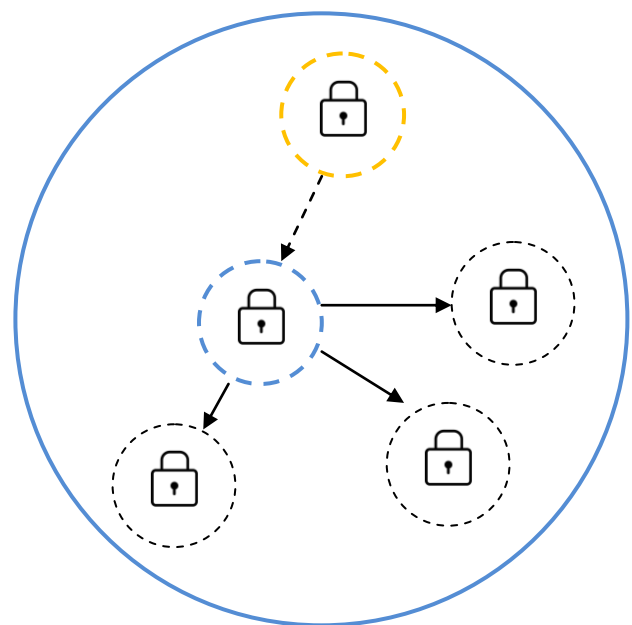
Problems vs. Problem Spaces

To start with we need we can explore the existing solutions and see what they do well and what they don't yet. If you examine the solution available at http://www.navagoelectronics.com/twilight-switch.html#twilight-switch you'll come across many problems they might already be solving which you may or may not have even thought about. A daylight sensing street light will include sensors.

How will these sensors in the field work in spite of dust covering them and reducing light sensitivity?

How will these sensors differentiate between bird sittings, cloud covers vs. actual low light conditions?

How to stop the sensors from triggering due to vehicular traffic or artificial lighting from nearby buildings?

How to isolate the sensor from the light coming from the streetlight it is installed on?

The solution in the link already addresses these problems by having a large field of vision, infra-red sensors and so on. Thus the existing solutions gives us some ideas on what solving this problem entails. We explore this problem space further.

Problem Zoom-Out
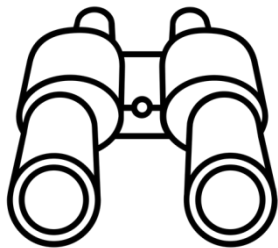
We will do a zoom-out on the problem - Zooming out is like looking at the problem in broad perspective. This helps us in building our problem space and then we can choose any problem in the space related to the original problem that interests us.

So when we're automating the switching of streetlights. What else can we automate about streetlights?

What other activities are done in regards to streetlights? Their repairs and maintenance. **So can repairs & maintenance of streetlight can also be automated?**

What else do street lights do other than providing light? Streetlights also give a sense of security. **Can streetlights also enhance the function of providing safety?** Perhaps.

Streetlights mostly function in multiples - like in a cluster of street lights. **So do we want the automation have to work at the single street-light level or at the network level? Can networks of streetlights be automated?**

If the switching automation works at the cluster level - **Can one lead streetlight control the switching on & off of other streetlights?** This would save costs of sensors but it will be less reliable. If the lead streetlight fails the system will fail as well. Unlike the system where each streetlight has its own control unit and therefore one failing will still keep all other units in order.

One solution that takes a middle path will be making a small group of streetlights function as a unit. So a group of 5 streetlights functioning as one unit will be moderately reliable but maybe only one-fifth or one-fourth as costly as system that operates at each street-light level. **Is this small group based system better?**

When comparing between 'one vs. many' streetlight system what should we look at - Costs, reliability, power saving potential or initial capital costs? Every street light system will operate in a different environment and depending upon the operating conditions - various solutions may be optimal in different conditions.

A small stretch of road in remote areas lit by streetlights will have a significant power consumption and may have less access to repairs - so power consumption and reduced maintenance is important here which means a distributed system with more reliability is more important here.

But what if the above system was not a small but a long stretch of road? Then the number of streetlights will be many and keeping a sensor on each light will be very costly. In this case perhaps clustering five streetlights as a single unit will be more economical without giving away reliability entirely.

Thus therefore the system chosen needs to be estimated based on environment, surroundings and configuration of the streetlight system. **A system that estimates the optimal streetlight system to be deployed based on system's environment, surroundings and configuration needs to be built. Is there already a tool like this or tool for estimating the type of switching automation required based on location?**

Given the problem has come from steel ministry we can imagine that systems may power both remote factories and attached residential localities, industries in more established areas & offices in cities. Thus the use case will benefit from any dynamic estimation tool.

Also if the type of system required may differ based on the location - there is also a need for a system that is smart and reconfigurable so that it serves all the different types of location configurations. **So how to build a smart reconfigurable streetlight switching system?**

What kind of smart software can power a smart configurable streetlight automation system?

What kind of network based streetlight automation systems will also be able to stimulate functionality that allows intelligent turning off of lights to save more electricity such as alternate lights switching during late midnight hours (specified in the problems statements) But will alternate light switching system be sufficient or there can be more configurations to save more light - say each third light off when having a single lane road but every second off when having a divided roads -with streetlights on both the end. **So what kind of dynamicity to be built in the streetlight control system for energy conservation?**

A number of software and hardware solutions in the market are system agnostic. These are generic Internet of Things (IoT) module which are designed to connect devices to internet and control them through cloud software. The generic modules allow lower cost of development and very robust IoT systems.

Is there already one or a generic automation (with or without IoT) module for streetlight systems needs to be built? This dynamic system for streetlights should be built in a way that it can automate many other systems also in the environment they are installed. For example providing ability to automate indoor lights also to be smartly managed - such as common motion sensing capability that can automate lights based on traffic in outside areas and on presence of occupants in indoor areas.

Such an automation system can then use the same ability to control switching of cooling systems also based on its occupancy understanding. Thus in the discussion we see that we have figured out a number of related problems to the original problem statement.

Problem Zoom-Out Summary

We started with *"Real Time Based Automatic Street Light Control system" - A system that switches itself off during the day and even alternate lights in late nights.*

We wanted to automate switching of street lights. From here we looked at the broader problem perspective on how to move one step higher on automation. Looking at the bigger picture. This is zooming up!

Can we automate more than just switching of lights? **Can repairs and maintenance of streetlight can also be automated?**

Going one step further can we go beyond automation to functional enhancement? **Can streetlights also enhance the function of providing safety?**

Then we zoom up to look beyond one streetlight and look at a whole bunch of streetlights. **Can networks of streetlights be automated?**

We looked the bigger picture and tried looking at all kinds of location a system may be deployed. **A system that estimates the optimal streetlight system to be deployed based on system's environment, surroundings and configuration needs to be built. Is there already a tool like this or tool for estimating the type of switching automation required based on location?**

Moving beyond just a single type of streetlight control system - we zoomed up to look at a configurable system. It's going one step higher than just a smart system. **Since location requirements for many parts will be different, so how to build a smart configurable streetlight switching system?**

Once we have a smart system, how smart can it be - can it figure out energy saving lighting maneuvers or even go beyond it. **So what kind of dynamicity to be built in the streetlight control system for energy conservation?**
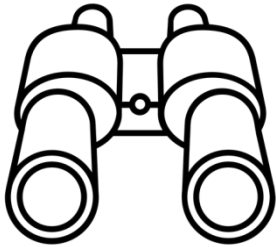
Finally we looked at the bigger picture, if we are building a configurable automation system for streetlights, why not build one for indoor lights also. And if we build it for indoor lights, why not

build it for other indoor equipment? **How to build a dynamic system for streetlights that it can automate many other systems also in the environment they are installed?**

So our problem space looks like this. Any of these could be a good problem to solve, if they are not already solved.

A generic automation system reconfigurable for many equipments including streetlights	Software that can power smart configurable streetlight automation systems
A smart configurable streetlight switching automation system	Tool for estimating the type of switching automation required based on location.
A tool for estimating the type of switching automation required based on location?	Streetlight network switching automation system
Streetlight with enhanced automation - safety	Streetlight with full automation - repairs, status, and switching

Problem Zoom-in

We will do a zoom-in on the problem - Zooming in is like looking at the specific sub problems to solve in order to solve the broader problems.

One of the problems of sensor based automation is the health and the efficacy of the sensors themselves. When a complete automation system is brought in - the normal manual oversight & staff handling the street lights will be retired. This is where it is important to look at how the human & automated system may function. **Will there be a backup system if a sensor fails and can't be repaired immediately?** This is important because if one or two sensors fail or perform inadequately, calling for sensor Maintenance Company may not be possible or feasible. In fact the more sophisticated a sensor, less likely to find local maintenance. In such situations what will be the backup arrangement.

What will be the notification system if a sensor is not working well, working intermittently or is in need of maintenance (cleaning or battery) - how will the human intervention be brought into and what will be the remedy? Current systems may be lacking the ability to notify the owners of their breakdown or need of maintenance due to which the system may suffer. This maybe more important for systems deployed in remote locations. Will this notification be SMS based, internet based -emails or app based or a simple systems that will give visual indication on physically on streetlight poles (such as a red light on top blinking)?

How much the system will be dependent upon software intelligence? Depending upon the location of poles, height of the poles, systems maybe in sun, under permanent shades (wooded roads), under shade during certain times during the day and so on. The problem is of detecting the light levels in a certain area not on a certain point - this may necessitate software intelligence in the systems beyond just sensor based inputs.

Should the systems be completely automated? Cost of these systems will be very important consideration. Normally a light may work from evening 6 to morning 6 for 12 hours. If the lights are not shutdown on time they may work for say 18 hours. Having a system that saves consumption during these 6 hours, will end up saving 33% electricity. But on the other hand

usage of LED lights can provide the same light in only 1/6th electricity. In this case even if the system run for up to 18 hours due to improper switching off, the savings would still be 75% that is more than the one achieved from use of sensors. So sensors may not be the final word unless they increase electricity in ways more than just switching automation.

How important are the human systems administrating the systems? A number of institutional users of such a system have people in their ranks - electrical staff who are capable of repairing or administrating the systems occasionally in their premises. Therefore rather than complete automation, understanding how the systems are administrated, only certain functions need to be automated and rest could be left to humans to administrate. For example - different electrical poles will require face different lighting conditions, including some permanent shade. These values may even change seasonally and due to any new structures coming around the sensor systems. Rather than using hardware that may adjust based on computations, this could be left to be calibrated seasonally or occasionally to administrative staff - if that saves cost.

How will the system be maintained? What will be the design for optimum maintenance ease? Maintenance or occasional repair of system is important such as including the cleaning up of sensor or seasonal maintenance. The choice of design of system will dictate how easy it will be to clean-up the systems or skill level required to do simple repairs. Since most poles are at a height and to secure against sabotage, the sensor modules may be installed at height. This may make cleanups difficult - therefore there needs to be design innovation in the way that eases maintenance. For e.g. Even a long rod designed to clean the sensors high up that comes with sensor suite may be useful!

Problem list after Zoom-Out & Zoom-In

So our expanded problem space may look like this now

What will be the notification system if a sensor is not working well, working intermittently or is in need of maintenance (cleaning or battery)- how will the human intervention be brought into and what will be the remedy ?

Will there be a backup system if a sensor fails and can't be repaired immediately ?

How much the system will be dependent upon software intelligence?

Should the systems be completely automated ?

How important are the human systems administrating the systems ?

How will the system be maintained ? What will be the design for optimum maintenance ease?

A generic automation system reconfigurable for many equipments including streetlights

Software that can power smart configurable streetlight automation systems

A smart configurable streetlight switching automation system

Tool for estimating the type of switching automation required based on location.

A tool for estimating the type of switching automation required based on location?

Streetlight network switching automation system

Streetlight with enhanced automation - safety

Streetlight with full automation - repairs, status, and switching

Problem Space: Automatic Streetlights

Think where else the problem that you're solving can be faced? Can this be a new problem statement?

✏️ *A generic automation system configurable for other equipment including streetlights*

Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

✏️ *An switching automation system for an entire streetlight network?*
_____

Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ *Safety features to automation for streetlights?*
_____
_____

Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✏️ *How about taking switching automation to a higher level? Streetlight with full automation - repairs, status, switching.*

Zoom-Out

Think of the problem on a broader level

✏️ . _____

✏️ . _____

✏️ . _____

Dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ *How much the system will be dependent upon software intelligence?*
_____

By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ *What will be the notification system if a sensor isn't working well, working intermittently or is in need of maintenance (cleaning or battery). How will the human intervention be made & what will be the solution?*

✏️ *Will there be a backup system if a sensor fails and can't be repaired immediately?*
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✏️ *how will the systems be maintained? What will be the design for optimum maintenance ease?*
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✏️ *how important are the human systems administrating the systems?*
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✏️ *Will systems be completely automated?*
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Zoom-in

think of the problem on micro-level

Redefining Problems & Problem Spaces

"Design a solution to restrict usage of public mailing service from government infrastructure"

Openfuel Knowledge Foundation

Design a solution to restrict usage of public mailing service from government infrastructure

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Usage of public mailing service like Gmail, Yahoo, etc. from government infrastructure is prohibited especially when organization provide own email service. It is easy for anyone to setup his own mail server and start mail service easily using various tools..... Work out a solution which can detect such an attempt to connect such web mail server using HTTP/HTTPS and block it.

Q. Does this solution already exist?
Q. If it exists - is it the problem that it is not available from a trusted Indian vendor?
Q. Is it that it has to be built by the organization itself due to high security requirements wherein any third party vendor cannot be trusted?

Evidence that something similar may be in existence:

#1

Hilary Clinton who was accused of using a private email server at work was initially blocked by the US State department. The systems were blocking Hillary Clinton's private email server - State Department had to disable a few security measures to allow Hillary's private server to operate well. This happened way back in 2010. Likelihood that something similar exists at least since 6-7 years.

Perhaps another problem associated was that Clinton was aware of the problem but not about its severity. *"Clinton and her team ignored clear internal guidance that her email setup broke federal standards and could leave sensitive material vulnerable to hackers"* - State Department's inspector general.

#2

Symantec's Network Prevent does indeed talk about same functionality: *"Network Prevent blocks email, Web (HTTP/HTTPS), and FTP communications that contain confidential data."* At https://www.symantec.com/connect/articles/network-prevent

#3

Boeing is a security vendor to US Department of State. At http://boeing.mediaroom.com/2006-08-30-Boeing-to-Enhance-Security-at-U.S.-State-Department-Facilities-Worldwide
it is not clear if the state department is also providing the network security but if it did, is it that these services will be not available to Indian agencies?

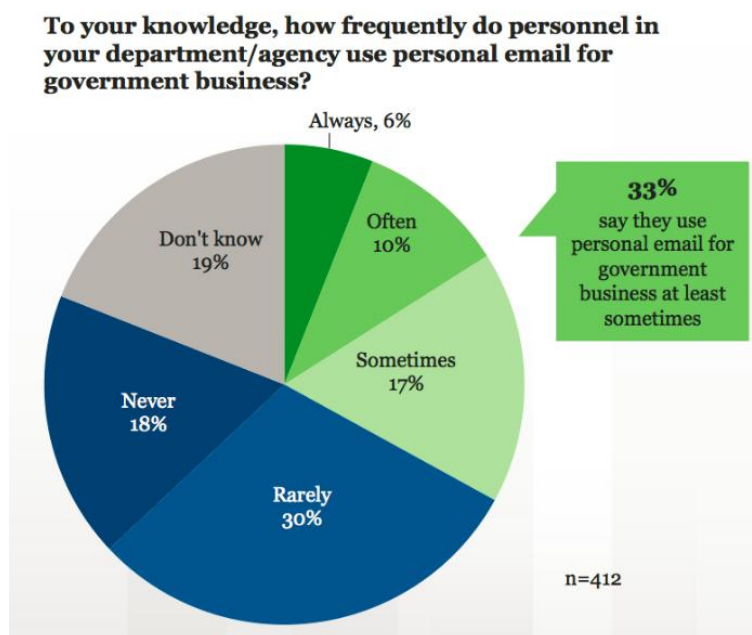## Q. Is a fully software solution even required? Can special devices take over the role of highly secure emails?

The $600K Blackphone from silent circle @ https://www.silentcircle.com/products-and-solutions/devices/silent-os/ brings in the functionality of virtual separate phones- this allows you to put your work and personal email communications in separate virtual phones. No data is shared between the two devices. One device could allow only limited connectivity and the other one unlimited.

At $10,000 Solarin phones provide an even greater level of security (http://www.telegraph.co.uk/luxury/technology/sirins-10k-solarin-phone-with-military-grade-security-a-first-gl/) Of course the cost is very high and therefore it could be only used by the top decision makers and leadership team.

Q So what kind of an organizational people should this solution cover?

Q Who needs this solution and to what extent: All organizational employees? Top leadership teams?

Q. Do other government offices in India also face this problem?

To your knowledge, how frequently do personnel in your department/agency use personal email for government business?

Always, 6%
Don't know 19%
Often 10%
33% say they use personal email for government business at least sometimes
Sometimes 17%
Never 18%
Rarely 30%
n=412

#using personal emails for government business is very common. 33% of the federal employees in US do this- that is like one person in every three. (http://dailysignal.com/2015/03/08/high-ranking-federal-officials-history-using-personal-email-government-business/)

The practice of using public email systems interchangeably with an organizational system and on the same system is quite convenient and therefore common too. Using the same system may leave the other email client and its content vulnerable too.

Q. If you do use a dual use device - allowing separate virtual or actual devices for personal and work email - will people agree and follow?

Q. When asking for blocking private email use - who is this requirement for?

(a) Non complying organizational employees who end up using private email for convenience or as lack of caution?

(b) Elements who have more sinister motives and deliberately are looking to pilfer information.

If the target of the solution are users in case (a) - very tough, restrictive measures will lead to pushback as highly restrictive measures will also make a lot of normal conversation difficult. Especially if these are government departments.

If the target are users in case (b) - only very tough measure will work but these elements are also likely to deploy measures that may be able to circumvent most types of securities.

If target users are group (a) then off the shelf measures could also work given the users may be motivated enough to implement security measures. For example researchers at National University of Singapore found that simple safe behavior for organizational systems & data safety can be implemented through making changes at behavioral level itself.

They found that just like behavioral steps can lead to an avoidance of illnesses & diseases, the same model can also predict how individual behavior could be moderated to keep organization's information systems safe. The in their research found that doing three steps can be very effective:

(a) Perceived Susceptibility: How likely is a certain individual to be attacked and compromised? Most individuals when they know their susceptibility take precautions.

(b) Perceived Benefits: How much can taking a step help in avoiding attacks or hacking can also lead to action on behalf of individual. The individuals need to know to what extent does each thing that they do matters.

(c) Self efficacy: How much does the individual has the confidence that he can do what needs to be done. Does he/she feel they are capable of doing it?

Thus beyond the direct technology solutions - other approaches to solve this problem may also help. So in other words - to solve this problem, besides the original problem statement (Design a solution to restrict usage of public mailing service from government infrastructure), the problems statement could also look these -

How to build a system to provide susceptibility to attack/information hacking to individuals based on their behavior?

How to build a system that informs an individual how much each of the precautions against attach/hacking they are taking will make? At broader level and at personalized level?

How to build systems/programs that may be able to train individuals to increase their confidence in implementing steps/actions for preventing attacks/hacks?

How to design a system that implements a different email protection system based on the criticality of information that each individual handles or has access to. The level of security for someone in a the travel arrangement department of an organization has vastly different level of information then one in the procurement department which in turn differs from someone in senior leadership.

 So what can be the design for graded security?

How to build secure - limited purposes devices for safe emailing that provides both convenience and security?

Can systems be built over or customization over the publically available systems such as blackphones be implemented?

What open-source security systems could be used to help this - such as Tor browsers for accessing emails?

PROBLEM SPACE: SECURE PUBLIC EMAIL

Think where else the problem that you're solving can be faced? Can this be a new problem statement?

✏️ Do other government offices in India also face this problem? Can the system be built in a way that it could be used by other public organizations also?

Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

✏️ How to build systems/programs that may be able to even train individuals to implementing actions for preventing attacks/hacks?

Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ How to design a graded security system based on the criticality of information that each individual handles or has access to?

Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✏️ Zooming out the problem of restricting usage of public mailing service from govt. infrastructure, it can be expanded to use of specialized hardware as a solution?

Zoom-Out
Think of the problem on a broader level

✏️ National University of Singapore found that simple safe behavior for organizational systems & data safety can be implemented through making changes at behavioral level itself.

How to build a system to provide susceptibility to attack/information hacking to individuals based on their behavior?

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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ this sensor and software based solution should provide full automation or partial automation?_____
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✏️ What open-source security systems could be used to help this – such as Tor browsers for accessing emails?

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Dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ Can systems be built over or customization over the publically available systems such as blackphones be implemented?

✏️ Does this solution already exist? If yes, is it the problem that it is not available from a trusted Indian vendor or it has to be built by the organization itself due to high security requirements wherein any third party vendor cannot be trusted?

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✏️_____
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✏️ How to build secure – limited purposes devices for safe emailing that provides both convenience and security ?_____
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✏️ If you do use a dual use device – allowing separate virtual or actual devices for personal and work email – will people agree and follow?
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✏️ Who needs this solution and to what extent: All organizational employees? Top leadership teams?
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Starting point
Initial problem statement

Zoom-in
think of the problem on micro-level

Redefining Problems & Problem Spaces

"App to connect Farmers directly with Retailers and Food Processing Industries"

Openfuel Knowledge Foundation

Design an App to connect Farmers directly with Retailers and Food Processing Industries

- Farmers are paid low prices by Mandis.

- Inadequate cold storage to store excess produce.

- Mandis charge higher prices from retailers and FPI.

- Households pay higher prices.

- The app would distribute trader's margin between farmers and retailers/FPIs.

- Households would pay lower prices

Problem Redefinition Phase 1

There are many apps that are trying to help farmers sell their produce directly to its customers but it is also facing a lot of issues

Let's start by understanding the Eco-System. Currently The Agriculture produce by all the farmers are given to mandis, and these mandis in turn supply it to the market in geographical region. Let's take even a step back and check the process. The Farmer does not really sell the produce directly to a trader at mandi, but he initially sells it to a local arhitya in his local village (sort of a local aggregator of fruits and vegetables in the village). Here is some Research on how much of the Agri produce is being sold to which channel as the first sale

% DISTRIBUTION OF FARMERS SELLING TO VARIOUS AGENCIES

CROP	Local private trader@	Mandis	Government agency/Coop	Processor
PADDY*	65.94	19.46	9.49	1.70
WHEAT**	58.42	34.78	6.79	0.27
MAIZE*	69.21	29.66	0.56	0.28
MUSTARD**	54.61	45.83	0.44	0.22
BAJRA*	51.85	46.91	0.41	0.00
COTTON*	68.02	25.08	6.10	2.03
CHANA**	52.82	46.80	0.38	0.00
SOYABEAN*	52.15	46.72	1.36	0.11
JOWAR*	69.46	23.49	1.01	0.00
POTATO**	77.72	23.60	0.19	0.19
SUGARCANE*	23.41	6.70	42.73	23.75
URAD*	73.96	25.45	0.80	0.00
ARHAR*	50.78	47.88	0.22	0.00
GROUNDNUT*	65.75	27.83	3.82	0.00
COCONUT**	84.73	10.39	3.05	0.00

*Sold in Jul 2012-Dec 2012; **Sold in Jan 2013-Jun 2013; @Includes input dealers.

Now let's understand what exactly the problem here is. These local arhityas or the so called baniyas are responsible for providing farm credit to these farmers. It is then compensated in the form of stock received. Hence for most farmers it is a little difficult to go and sell to Govt. agencies even after government agencies promising the best rates.

Q. Can the app Provide Farm Loans?

Q. Would the app you build help farmer get farm credit? Would they be able to connect with people who would provide farm credit and not take barter? Have we really identified all the stakeholders of the agricultural eco-system?

The Farm-to-fork model
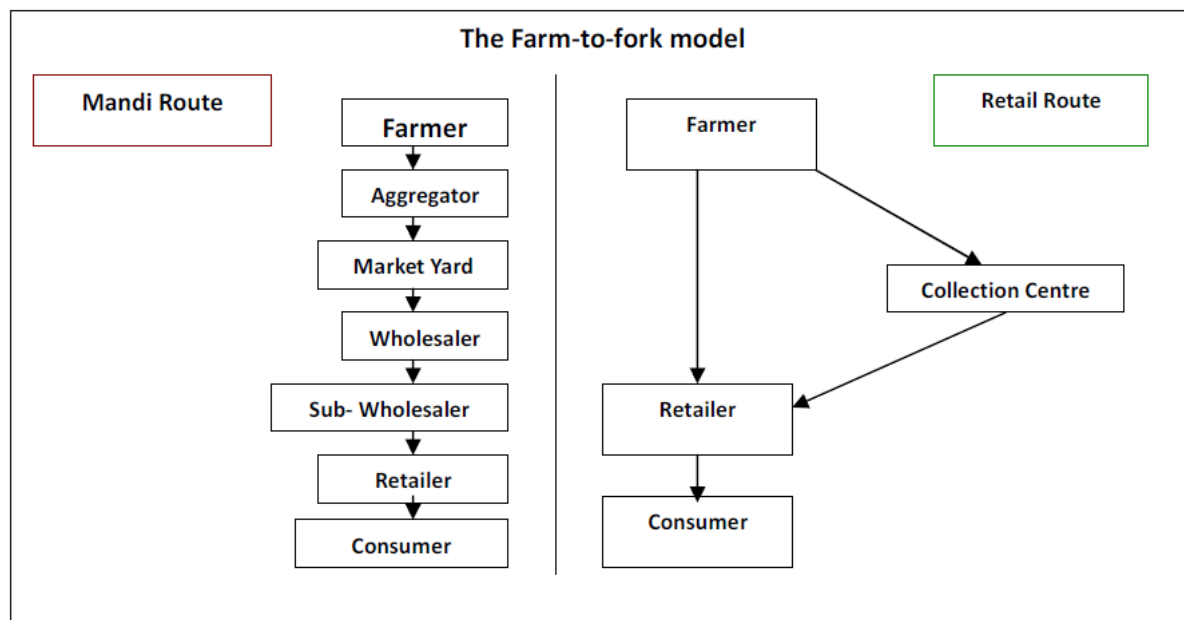
Phase 2: These local aggregators then sell their accumulated stock to the traders at a mandi. Mandis are basically an association which is responsible for selling in a specific geographic location. It is governed by the rules of Agricultural produce Marketing Committee (APMC). Taxation and payment policies are defined by the government and APMC is responsible for getting them implemented. A trader cannot be registered at multiple mandis. Government is now working towards making this system also a little more transparent. By launching National Agricultural Market (The app that you build would be a part of NAM) and e-NAM. This would basically be an online marketplace for farmers, traders, retailers, producers to buy and sell agricultural commodities online. Agriculture to mandi is usually the first registered transaction. Some farmers do sell straight to mandi, but sometimes mandi players improvise on taxes and reduce the amount to be paid to the farmer. Sometimes these mandi players do not even give the bill to the farmer, which reduces their capability to get loans (an income

without a bill is not considered as an income and lack of income stops them from getting loans from banks or government associations)

The main objectives of NAM are to create an integrated platform where with utmost easiness transactions can happen and can also be monitored.

But the major problem here is to convince the farmers to increasingly sell on an online portal

Most obvious question

1. How do we make the look and feel of the app friendly for the farmer?

2. Can we actually improve price parity systems? Is there a necessity of bringing in price parity?

3. Can the app be integrated with Taxation Systems of different states so that these farmers can sell outside their own mandi's geographical region?

4. Can there be price parity at certain transactions(like farmer to mandi, or aggregator to mandi)

5. Can there be a passbook system, which actually shows what was sold by the farmer and how much did he earn... to improve credibility when the farmer applies for a loan?

6. Would your app connect farmers to different mandis too?

7. How would the logistics be managed?

A little Deeper Set of Questions

1. Can government actually control the way such transactions are conducted outside the app system? Should the app be made a compulsion for all forms of buying and selling? The Government has reduced the restriction for registering as a trader on the NAM portal

2. Can the app help farmers select which is the best mandi/retailers to sell their farm produce to?

3. Is the approach correct and acceptable to connect farmers directly with the retailers or is the necessity really to control the operations of mandis by reporting all the transactions using technology?

4. When the scheme was launched to sell farm produce directly to the retailer there was a huge opposition from the mandis. It was marked with a protest and strike. How would the app really create a level playing field even for mandis so that the opposition can be removed from the check list?

Phase 3 – Now while this agricultural produce moves from different hands and eventually reaches the retailer or a food processor, some of it gets wasted owing to short life and lack of enough cold storage units. Neither at aggregators end nor at the end of the Mandi. Some farmers do not send their farm produce throw their produce away because of lack of cold storage space in nearby area and logistic cost to reaching out to better storage units is more than what the farmer was going to earn out of his farm produce. US throws away 50% of its agri produce. India's Post Harvest Losses accumulate to 92651 cr (INR)
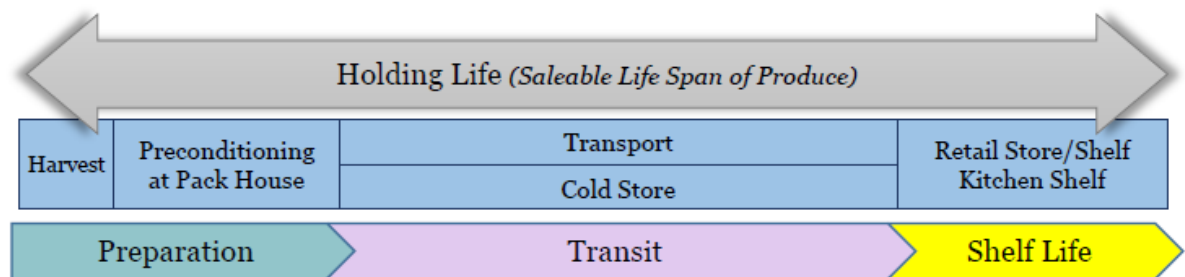
According to NCCD(National Centre for Cold Chain Development) specifies that there are 7 stages by which a farm produce passes before it is sold or consumed by the consumer, which can further be generalised to 3 stages (preparation, transit, shelf life). Most of farm produce specially fruits go through a time span where they ripen. Currently monitoring of this is being done manually by the collection centre unit guys or by the mandis.

8. Now that your app is transforming that eco system, how would it control and manage the phase movement of different fruits and vegetables? How would it manage the tagging of products in the system at the time of Sorting and Grading? Would you be integrating it with the ERP systems of the collection center?

9. If the stock is moved from one collection to another in times of urgent need (famine or drought) how would they be segregated?

10. How would the movement sorting and grading help maintaining price parity?

11. If it is being sold directly to the retailer how would we assure that the farm produce reaching the retailer is fresh or it is ripe and in shelf life stage?

12. How would the app help reducing post-harvest losses?

13. Would the app show logistical information to the correct kinds of stakeholders?

14. In case of floods the agri produce might have to be moved. Would the app be able to predict and suggest what stock to be moved when?

15. Would the app take Weather as an input and suggest movement of stock from one location to another?

16. Would the app eventually help distributing the mismanagement cost to reduce the cost that house olds are paying?

Think where else the problem that you're solving can be faced? Can this be a new problem statement?

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Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

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Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ Can it solve the overpricing of products and underachieving by   farmer?

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Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✏️ Can it solve the problem of agricultural selling in India?

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Zoom-Out

Think of the problem on a broader level

Starting point

Initial problem statement

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Would the app completely remove mandis from Action?

Can the system keep a check on the attempts to make transactions outside the system?

Can the system help farmers get farm loans?

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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?

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Can the app be built which can talk to farmers in local languages?

Can the System integrate multiple payment systems and taxation systems?

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Zoom-in

think of the problem on micro-level

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Dig into the problem. If this problem was to be solved, what sub-problems would you face?

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Would the app work on Providing Logistical Support?

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Would the app be able to build technology around storage and transportation of agricultural goods?

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Redefining Problems & Problem Spaces

"Automatic Ticket Checking System"

Openfuel Knowledge Foundation

Design a solution should be such that passenger need not have to wait for getting his ticket checked.

At present, ticket checking is done on trains, at station exit and also at platforms. Ticket checking is manual process and due to shortage of ticket checking staff, only a small number of passengers are checked. There is need for solution which can ensure 100% ticket checking. The solution should be such that passenger need not have to wait for getting his ticket checked.

Problem Redefined:

Relooking at the problem

Can the system work with the way current ticket issuing mechanism is working? Can Ticket Checking of current unreserved tickets be done by an automated system? Making small changes in the Design of the current Railway tickets help in the way ticket checking can be automated?

Or is it really a problem of redesigning the way tickets are issues, or the kind of content present on the tickets? Ticket redesign could probably be a part of the solution.

Recently the Suburban Division of Central Railway has published a report that they are working on tickets with "QR code" or barcodes for easy checking of tickets.

Can the solution work on redesigned form of ticket design, and can it also accommodate any future upcoming

If we look at the entire process

1. ## Where the tickets should be checked?

    a. Should there be multiple checks? Entering the platform, boarding a train, leaving a train and leaving the platform. There might be different people with different requirements. At which point should ticket checking commence and at what point should ticket be deleted.

2. ## How to track the distance travelled by the bearer of the ticket is appropriate?

    a. It is a punishable offence to take a ticket of shorter distance and travel for a longer distance. How does your solution detect such cases? Could the system detect GPS and find out the amount of travel done by the bearer of the ticket. If ticket issuing is system is automated could there be a way by which it can be detected how much has the bearer travelled on the ticket?

3. How to find people not buying ticket at all?

a. It is evident that the most important aspect of this solution would be finding people who haven't bought a ticket. Point 1 would play an important role in finding the people travelling without tickets. What mode of communication would your solution use with the traveler? Not all travelers of India Railways carry mobile phones. And most of them do not even carry a physical form of a ticket. Can the Solution differ for reserved and unreserved category of tickets? If the solution is at a location, how can we identify who are the passengers who trying to enter as multiple people in one ticket?

4. Notification system

a. Who should be notified when a ticket offender is found? Should the next station in charge be reported? What details should be sent to prevent offences in the form of no ticket boarding or boarding a train for more than specified ticket journey

b. What form of Details should be sent when a ticket offender is found? Could there be a mechanism to notify the bearer of the ticket of his/her upcoming station and that he/she would be requested to deboard the train at that specific station.

c. For offenders without tickets what form of data should be identified and how should the data be transferred to the respected personals. If the person has not bought a ticket, there is no way of identifying him/her. How does your solution sell correct data about such offenders to the respective personnel such that action could be taken on them

5. Should there be a loop for exceptions are created?

a. Railways could be used in special cases for free. Should the system give away such loopholes?

b. What are the suggestions your ticket checking system give to the system redesigning the ticket designing system.

c. Would it be necessary for ticket design system to provide a card or a hardware device with RFID on it to be able to identify the journey of each ticket bearer?

Think where else the problem that you're solving can be faced? Can this be a new problem statement

✏️ Redefining how ticketing is done at Railways
Redefining how Ticketing is done at other transport systems
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Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server
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Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ Redefining how tickets are issued at Railway Stations
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Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem
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Zoom-Out
Think of the problem on a broader level

Starting point
Initial problem statement

Zoom-in
think of the problem on micro-level

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Checking end-to-end Travel journey

Checking that an individual buys ticket which is not for a station lesser than his travel
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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?
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Where to check the ticket? At platform, on the train, while boarding or deboarding
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Dig into the problem. If this problem was to be solved, what sub-problems would you face?
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How to identify People who have boarded the train illegally
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Who to notify about people boarding trains illegally?

What should the notification be?
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Redefining Problems & Problem Spaces

"INTER-CONNECTING HEALTHCARE"

Openfuel Knowledge Foundation

Design a solution to interconnect heath care/hospitals

Currently, Hospitals/Healthcare center work in isolation. The means for co-ordinate/inter-connection among them is still a long way to go in India. Patient records (medical life history as well as case to case) are not digitalized / transcribed and the data/record of medical history of a patient is not readily available/accessible online or on-demand across various Hospitals/HealthCare. Networked devices will let hospitals monitor patients when they are away, and recommend interventions when a serious problem is imminent. Policy, guidelines, norms, digital appliances and various software applications are required to Network all the Hospital and Healthcare centers in India.

Problem Redefined:

Relooking at the problem

35% of Deaths in the country are owing to the lack of specialized medical health reaching at the right time of the requirement. If we take a relook at the problem the major problem is about gathering and giving out information about each and every patient at every smallest stage (i.e. change in any parameters above specific threshold)

1. Reaching out to audience within hospitals

Would the solution you build connect patients with their concerned doctors? Would it also help patients and hospital staff to connect with doctors specializing in their field at other hospitals? Would it also recommend the nearest doctor with specialization in the problem that they are facing?

2. Data Aggregation

The most important part of the solution is the data gathering, data crunching and data mining at the right moment. Internet of Things has made it easier for such medical devices to connect with each other and communicate with each other. But the base of this app should be the capability of aggregating all the data into a larger data warehouse, and reducing the speed of mining data out of the data warehouse. Criticality of data mining at the most correct instances would improve the usability of the solution. What are the different forms of Data warehousing platforms? What data mining and data warehousing algorithms would be used in order to reduce the data mining speeds? Which data is considered raw and which one is synthesized out of it? Which data is fresh, till what time should it be considered fresh and how long should it be kept in the warehouse and at what point should it be removed to improve data mining efficiency

3. Reaching out to patients not yet admitted to the hospitals

Point 1 looked at problems faced by patients admitted at hospitals and keeping a track of their parameters. How would your solution go b2c? Would it give them a list of basic parameters that need to be monitored on day-to-day or week-to-week basis to be able to understand the direction of going? Could the app suggest or recommend nearest specialist whom the patients should meet on the basis of the data that is being aggregated about the patient. Would the app also send the data to their family

doctors? Would it also recommend the same data with the name of the family doctor to a specialist on regular basis?

4. Reaching out to audience not under any internet connectivity

Still a large portion of our country are not connected by internet. Their frequency of visiting a hospital would be really low to be able to monitor their parameter. How can this problem be solved. Would your solution be transportable in such a manner that the doctors or clinics themselves reach out to these patients on regular intervals and regulate or monitor their parameters?

5. Connecting with laboratories

Laboratories would be the one's conducting tests on patients. How would the data and parameters of the tests conducted at laboratories be aggregated on the app? These are the data of a patient not yet admitted to the hospital but might need medical assistance soon

6. Notification system

At what parameters who needs to be notified? What form of information should be given to the doctor working on a specific case? At what point should a recommendation be made to a specialist in the nearest vicinity. What form of notifications should be shown to families or patients? What notifications should be sent to family doctor?

Think where else the problem that you're solving can be faced? Can this be a new problem statement

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Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

✏️ Building a Software that takes care of everybody's health care parameters online

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Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ Building a system that notifies right doctors at the right time

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Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✏️ Internet of Things system with communication amongst different things connected over internet
Quickest Data Mining Problem

Zoom-Out

Think of the problem on a broader level

Starting point
Initial problem statement

Zoom-in
think of the problem on micro-level

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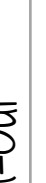
Reaching to the audience in hospital
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Reaching to the audience at their homes
Reaching out to audience not under internet connectivity

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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ Deciding notifications and what to send and whom to send_____
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Data Warehousing and Data mining
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Dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ Connecting Laboratories
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Redefining Problems & Problem Spaces

"Mobile Mechanic"

Openfuel Knowledge Foundation

Design a solution to get a solution that helps highway drivers to get mechanics on-demand

In case of tyre burst/puncture, the nearest mechanic with contact details can be found through the app. The mechanics can be registered on the app and they will receive a notification for a nominal charge.

Problem Redefined:

Relooking at the problem

35% a lot of Companies are including funded start-ups such as bumper.com are attempting to provide mobile mechanic to door step of a lot of consumers. But the problem that they are not solving is the fact that a lot of type burst, punctures and engine crashes also happen for heavy vehicles commuting over highways.

What are the points to think about?

Detection of Mechanic Pan India

When the app gets affiliated to the central government mechanism, it is clearly evident that the solution that is being built goes beyond the barriers of regions or languages. How would the solution move ahead of these barriers built by the society? For Vehicles moving from one state to another would it be auto-detecting the problems by which the conversation between the mechanic and the driver of vehicle.

Identification of the exact location of the mishap

When a driver is on the highway it is very difficult to identify the exact location where the problem has happened in the vehicle. It would be difficult for the driver to explain the location of the mishap to the mechanic if he/she is on the road. For private Drivers travelling using Google Maps might not be able to send GPS location owing to lack of data services. How do we find the exact location of the vehicle? Can some form of Black Box technology used in planes be used to provide hardware which emits signals containing exact location are sent?

Sending SOS signals when out of coverage zones (especially if the solution uses Data services)

Sometimes location of such mishaps are too remote for any kind of data capability to reach. 90% of country is covered over voice capability, but rest is not even covered by voice capability. Voice capability enables sending of SMSs but not data. How would the solution you build cope up with the fact that most of the users of Heavy vehicles come from villages and might not have phones which are data capable. Would the technology require data capability to be enabled for it to communicate with the back end system?

Would it be a hardware+Software platform or pure hardware platform with back end integration?

One of the major view here is to identify how selecting a hardware + software solution or a pure hardware solution would build a better idea than all previous ideas. One of the major issues that are providing a completely hardware solution is the fact that these hardware are usually attached to number plates and people change the number plates on their vehicles which in turn reduces the amount of tax they are liable to pay. If it is a hardware + software solution, how would you identify the same software identifying multiple vehicles? What role would a software play in terms of reducing the hassles of the commuter?

Safety SOS signals that could be used by women/men on lonely roads

Would your solution provide security to women/men who are travelling alone on lonely roads and have faced such a problem? Who would be the stakeholders who would be informed? How would the solution react when such a problem is detected, would it explain safety measure to be taken for men/women to protect themselves from any form of aggravation of the incident?

24*7 availability

Would the solution be able to provide 24*7 service? Would it communicate with other mechanics if a certain mechanic is not available during a specific time slot?

Incentive for Mechanics

Some Mechanics in such local regions might be a little reluctant on using the app, how would your solution reach out to this audience. What incentive would the solution provide for such mechanics to be on the app. would the app have standard cost structure across the nation? How would the cost structure change with change in the time span during which the mishap occurs?

Standardisation of Processes

Not all problems are solvable at the spot, for some problems the vehicle might have to be moved from its place of mishap to the location where the mechanic is stationed. Can the solution also communicate with a 24*7 towing service which can help movement of vehicle from the place of the mishap to a more comfortable location where the problem could be solved? Also availability of Tools could be an issue. Would the solution provide a list of basic problems/ tools that should always be carried by the mechanic to any place of mishap? Availability of new parts can also be treated in the exact same manner.

Building acceptance amongst audience

If the Solution requires formation of an app, how would the app work with people who are not connected to any form of data at specific locations? Driving of Heavy vehicles in India are done by a lot of uneducated drivers. What form of interface would work the best with such an audience? How would the app be more understandable for the audience? What Meta facilities will the solution be providing which will be helpful in terms of the business.

PROBLEM SPACE

Think where else the problem that you're solving can be faced? Can this be a new problem statement

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Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

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Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ Building a system that helps highway drivers during any form of bad phase when on highway

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Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✏️ Building a system that provides support to all highway mishaps
Building a system that provides support at every point/any place

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SOS signals to help people to be rescued on a lonely highway
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Best ways to aggregate payments
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_____Signaling when out of coverage zones
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Dig into the problem. If this problem was to be solved, what sub-problems would you face?

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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?
✏️ Identification the most appropriate location of mishap

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✏️ 24*7 Availability
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Awareness about basic issues, tools, and parts required for most common problems

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Zoom-Out
Think of the problem on a broader level

Starting point
Initial problem statement

Zoom-in
think of the problem on micro-level

Redefining Problems & Problem Spaces

"Online Toll payment system"

Openfuel Knowledge Foundation

Design a solution to get toll paid using online methods

1-2 km before the toll plaza, a notification should be received on the mobile phone of the approaching user with Toll Name and amount of applicable Toll Fee. Payment can be facilitated through mobile wallets and credit cards payment integration. An electronic receipt be generated, with bar code/QR code which can be shown at the Toll Booth. A list for all the toll plaza and respective services to be made available in the app.

Problem Redefined:

Toll automation is being tried by a lot of companies. This can even be implemented as a b2c project in the future. Companies like Metro infrasys are also attempting to digitize the way payments are made at toll booths. There was an attempt made previously by 2 banks ICICI bank and Axis Bank for digitize toll booths across the country. ICICI set up around 160 toll booths to have an automated system where the person does not have to carry cash but has to carry an ICICI card. The bank also issues 3,00,000 cards to supply to people regularly visiting the toll booths. But the attempt dint work out owing to many problems, some of them were solved later on while some are listed below.

FastTag was then implemented by National Payments commission of India. Fast Tag to an extent reduced the amount of time spent by commuters with a fastTag on such toll booths. There were special lanes that detected FastTag commuters with RFID tagging and they were given RuPay Cards from which the payments were deducted.

What are the points to think about?

Detection of vehicle

As you all must have figured out till now the most important section is detection of vehicle based on the number plate and differentiating it based on the category in which it falls. Except number plate items such as chassis number engine number etc. could also be used to uniquely identify each and every vehicle and define its toll tax. The backend system should be capable of identifying each number separately and the way it should be charged. The back end system should also be capable at identifying VIP and VVIP vehicles which should be exempted from toll tax payments. The System should also be capable of detecting ambulances, police and fire ambulances which are again exempted. Government vehicles should also be exempted from Toll Tax. The system should work differently for all forms of vehicles

Would it be a hardware+Software platform or pure hardware platform with back end integration?

One of the major view here is to identify how selecting a hardware + software solution or a pure hardware solution would build a better idea than all previous ideas. One of the major issues that are providing a completely hardware solution is the fact that these hardware are usually attached to number plates and people change the number plates on their vehicles which in turn reduces the amount of tax they are liable to pay. If it is a hardware +

software solution, how would you identify the same software identifying multiple vehicles? What role would a software play in terms of reducing the hassles of the commuter?

Building a common platform for money transfer from multiple banks.

Would the technology you produce integrate multiple banks or multiple payment gateways, managing of charges for all the transactions happening across the payment gateways? There is a possibility of certain banks not being integrated with any of the payment gateways of online payment transfer software. How would your technology deal with such situations?

Coping up with internet issues across the country

Sometimes location of toll booths are too remote for any kind of data capability to reach. 90% of country is covered over voice capability, but rest is not even covered by voice capability. Voice capability enables sending of SMSs but not data. How would the solution you build cope up with the fact that most of the users of Heavy vehicles come from villages and might not have phones which are data capable. Would the technology require data capability to be enabled for it to communicate with the back end system?

Detection of end-to-end journey

One of the major loophole of Tollbooths with human monitored barricades is the fact that people run away from the toll booth without paying the toll. A lot of people even run away from the fast tag route even without possessing the fast tag card. Can this be avoided by taking measures of end-to-end journey of the consumer? And the toll could be charged according to the need.\

Building acceptance amongst audience

If the Solution requires formation of an app, how would the app work with people who are not connected to any form of data at specific locations? Drivers of Heavy vehicles in India are done by a lot of uneducated drivers. What form of interface would work the best with such an audience? How would the app be more understandable for the audience? What Meta facilities will the solution be providing which will be helpful in terms of the business.

PROBLEM SPACE

Think where else the problem that you're solving can be faced? Can this be a new problem statement

✎ Can be used to build a parking system too
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Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

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Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✎ Building a Toll booth payment system agnostic of where the toll is

Building a Real Time Toll Payment System_____

Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✎ An automated toll payment system
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Zoom-Out

Think of the problem on a broader level

Starting point

Initial problem statement

Zoom-in

think of the problem on micro-level

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Detection of End-to-End Journey
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Dealing with Network issues
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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?

✎ Detection of Vehicle, making sure no number plates are exchanged to cheat the toll booths_____

Hardware or hardware+software
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✎ _____
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Dig into the problem. If this problem was to be solved, what sub-problems would you face?

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Aggregating multiple payment methods_____

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Redefining Problems & Problem Spaces

"Secure Copier (Secure Pen drive Copier)"

Openfuel Knowledge Foundation

Design a secure software/ tool which will only should Read/ Write from/ into the Pen Drives

When some files or data is reading/ writing from/ into the Pen Drive it should give a pop up saying the following files are copying/ writing from/ into the Pen Drive, you want to continue or skip/ cancel without user intervention no data should be copied.

If the Pen Drive is being used on any other unauthorized system, then the Pen Drive should get formatted automatically.

Only authorized Pen Drives should be enabled on the machines.

Problem Redefined:

Need to build a hardware/Software that runs on its own and is present on the pen drive, executes as a road block on multiple occasions (on detecting an unauthorized system, reading from pen drive, writing to pen drive)

Does such a solution already exist – BitLocker is one of the best examples of the fact that locking of hard drives by encryption methods is possible. But as we all know bit locker is an executable code that runs only when it is

Major points to look at (except the core problem that you have thought of)

1. Would it need a hard ware solution? Where will your software code really run?

Is it necessary to change the way pen drive is designed? Pen Drive is always a slave Device. It by itself cannot execute any code. The OS generate control transfer commands to either read data or write data from/onto the pen drive. Would you need to build a small processor on the pen drive that executes only a specific code on the pen drive whenever it starts getting power from the system? You must have definitely created a code to check the authorization of each and every PC, but where will the code run. On the Machine that the pen drive is attached to or on the pen drive itself. Can there be a pure native system solution? (A Solution in native language that runs itself on the processor on the hard drive)

2. Can the code become a roadblock every time OS sends a signal to read/write from/into the pen drive?

The code is supposed to create a human intervention every time the data is being read from or fed into the pen drive. How would you make the process more secure? What form of authentication would be provided at this place?

For e.g. an authorized PC is sitting unattended. Some person tries to steal data from this authorized PC, and copy it into another authorized PC Could there be a form of encryption provided at this juncture which better than just a push button of "Yes/No"

3. Can the code be copied onto different PCs/ or is the code non-forgeable?

Is it possible to create a copy of the entire code on an unauthorized device? Are there methods by which such copies could be created in multiples? Can someone read the contents of the code file? What reaction would an authorized PC generate which will have an unauthorized pen drive attached to it? Of course there are tracking systems that track data transfers taken from an authorized PC. The Detection of the same would happen and may be the responsible people might be punished, but what if during the course of time the data is already misused. Can that be stopped in any form?

4. What would be the Authentication algorithm?

What form of encryption algorithm would you be using? How does it perform in front of simple brute force attack? What data would be encrypted and is it possible for anyone else to detect the key using specific patterns? What encryption algorithm would be used to protect the code and formatting the pen drive? What kind of reactions should the system expect when attempts to break through the authentication are found?

PROBLEM SPACE

Think where else the problem that you're solving can be faced? Can this be a new problem statement

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Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

✏️ Providing security to all forms of connections/communications between sources and destinations

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Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ Providing Security to all data transfers from correct sources to correct destinations

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Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✏️ Providing Security to all Data on PC

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Which Authentication algorithm would be used?

What are the possibilities of breaking through the authentication algorithm?

How to build the code non-forgeable?

How to protect the authentication code?

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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ Hardware or Hardware + Software or Pure Software

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Signaling with OS or a lower level system

Handling Different PCs and lower level hardware systems

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Dig into the problem. If this problem was to be solved, what sub-problems would you face?

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Zoom-Out

Think of the problem on a broader level

Starting point
Initial problem statement

Zoom-in
think of the problem on micro-level

Redefining Problems & Problem Spaces

"Solid Waste Management System"

Openfuel Knowledge Foundation

Design a solution to integrate technology into solid waste management processes

Solid waste management is a major problem of all urban areas in India. Based on available information regarding solid waste management in major cities in the country, the most potential extent of waste generation and its removal policies shall be made through digital technology and an intelligent and efficient plan of action can be visualized and developed as a model.

Problem Redefined:

India on a Whole generates a total 1,00,000 MT of Solid Waste Every day. Large Urban Metros Such as Mumbai Generate 7000 MT a day while other Metros such as Pune or Ahmedabad generate a total waste of around 4500-6000 MT a day. Waste Management System comprises of 5 fundamental processes

1. Waste Generation, Gathering, Segregation

2. Waste Collection

3. Waste Transportation

4. Waste Processing

5. Waste Disposal

Technology can play a role at many places amidst this process of 6 stages

Waste Generation, gathering, segregation: - Could technology Create methods to keep a check of coverage of households from which solid waste is to be gathered. Could technology became a role player in providing proper input points where dumping of waste should be done when waste is being generated in a specific geography? Could it help government identify the efficiency of solid waste management system they have placed in action? Extent of Coverage by which waste gathering has been done. Can Technology play a role in identifying the main sources of segregation of waste and once segregation is done can take care of assigning labels to the waste and probably provide specific addresses where it should be transported, or identify landfills where they should be collected. Can Technology at least help imparting knowledge on the way waste should be segregated into wet and solid waste, and within solid waste into rubbish or not usable and reusable and hazardous substances?

Waste Collection: -Could Technology help identifying and growing on analyzing how much waste was collected at a collection center and how much was recovered. How much waste was dumped at a land fill and what would be the best method of avoiding waste being dumped at landfills. What portion of Landfill based waste could be reused for better purposes? Can Technology help in finding better methods (which are more scientific methods) of managing solid waste by municipal bodies in specific regions.

Waste Transportation:-

Could Technology keep a track of the way Waste is being transported?

Waste Processing and Waste Disposal: - Could Technology Keep a track of the way waste is being disposed of and could technology be built for efficient processing and Disposal of Waste?

Building PPP and promoting PPP: - Solid Waste Management could never be a success if worked on only by the government it needs active private, public and people participation. Could Technology be used to promote the correct methods and bring in better committed processes from people to make solid waste management a better process? Can Technology play a role in improving the reception of public messages on solid waste management services? Can Technology build Education and Information around Solid Waste management processes built by the local governing bodies? Can Technology build a platform to create better reception for community led solid waste management work? Can Technology become a tool for training and capacity building amongst audience and officials on the way solid waste management should be done!!

PROBLEM SPACE

Think where else the problem that you're solving can be faced? Can this be a new problem statement

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Think about the problem by multiplying your subject. If car was your problem subject, think of a car fleet, home vs. a colony, email vs. email server

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Keep broadening the scope of problem you're facing. From solving traffic problem, look at solving the travelling problem itself

✏️ Building Cleaner Urban India

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Zooming-out on a problem: We look at how the problem statement can be made more generic, broader Say if traffic lights is your problem, how about looking at traffic as a problem

✏️ Building technology that helps any processes under solid waste management

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Zoom-Out

Think of the problem on a broader level

Starting point

Initial problem statement

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How to Build Technology that builds information and education around waste management?

How to build technology that improves community interactions on waste management?

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By Zooming-in on a problem, we dig into the problem. If this problem was to be solved, what sub-problems would you face?

✏️ How to track locations where maximum waste is being generated?
How to build technology which tracks transport of waste?
How to build technology which provides best methods of waste disposal?
How to build technology which suggests best segregations

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Dig into the problem. If this problem was to be solved, what sub-problems would you face?

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Zoom-in

think of the problem on micro-level

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