CONDUCTING HACKATHONS
A City Guide

Contents

About this document

This guidance document highlights the importance of Hackathons as a process for crowdsourcing ideas to help overcome the ever-growing urban challenges. It enables cities to conduct hackathons in order to tackle the existing and upcoming hurdles related to urban transformation.

This document is useful for City Administrators, in particular City Data Officers (CDOs) and other officials working in the field of data who are inclined towards the development of their respective cities using data and technology for problem solving. It is also a helpful read for all those people related to academia, industry and other stakeholders of a city who are contributing towards improvement in various sectors and would like to use 'hackathons' for problem-solving and co-creating solutions in their field of work.

The document will guide cities on how hackathons can be used to help identify and/or solve the complex challenges facing our growing cities. Hackathons are inclusive, agile, promote multidisciplinary collaboration, and have shorter innovation cycles that are better suited to addressing fast-changing citizen demands and city needs. This document will give us insights on:

• How the vast publicly available data on Open Data Portals, closed data available with Government departments, or any other data pertaining to cities can be used to generate new ideas, solve problems and lead to the overall benefit of the citizens
• The various types of hackathons that can be conducted and some case studies that will help understand their usage
• How to organise a hackathon from planning to execution

I. An introduction to Hackathons

1. What is a hackathon?

The word 'Hackathon' can be broken up into two words- 'hack' and 'marathon.' Here, 'hack' is used for exploratory analysis which could include programming, deep diving into available data etc. and 'marathon' for a long event or race. Usually lasting about 24-48 hours, a hackathon is an event that includes participants from various backgrounds – software programmers, developers, data analysts, designers, students and industrialists depending on the problem statement, to come together, code, analyse the issue at hand, construct a solution and help towards solving problems. It is a process through which ideas can be crowdsourced to uncover solutions for current or upcoming problems being faced by the cities. Depending on the theme and business case presented in the hackathon, participants can work individually or in groups.

A hackathon aims at improving a city's economy by enhancing its services and businesses. This is achieved when new products and services are launched to solve urban challenges. Hackathons also help in addressing solutions to obstacles such as change management, process bottlenecks and weak policy partnerships. The intention is to craft tools that could accelerate dialogue, shift attitudes and change behaviour for socio-economic development. In addition, cities hope to encourage developers, programmers, universities, think tanks, industries and start-ups to come up with innovative solutions. These solutions could help conceptualize an idea into a solution, that may be further transformed into applications and services for the greater good of the citizens. These ideas could even be about identifying the problem itself.

2. Why should cities host hackathons?

There are several benefits that cities can garner by hosting hackathons. Some of these are listed below:

- **Improving collaboration:** By connecting government and the stakeholders in various sectors, the government encourages collaborative problem solving and promotes a sense of inclusion amongst all involved stakeholders. It is also an excellent way of moving towards user-centric innovation by showing the city's support for local data innovation and can lead to a change in city's data culture. It can help in mobilizing data innovators and specialists to develop new viable solutions to undergoing problems. Hackathons also encourage start-ups by giving them avenues to develop proof of concepts which is crucial in the early stages of any solution.

- **Prioritizing urban issues:** All cities are currently facing challenges spanning more than one sector/domain. Conducting data hackathons can help identify and prioritize the current challenges so as to focus the efforts of city governance as well as the city finances towards those problems. It may also facilitate collection of data as well as improve citizen engagement.

- **Promoting change:** Like the domino effect, cities that host hackathons can serve as a light house model for other aspiring cities. It is also common for more than one city to come together and host a hackathon so as to collaborate on ideas, funding and manpower to conduct this activity.

- **Increasing process and resource efficiency:** The creation and co-creation of innovative solutions through hackathons enhances process and resource efficiency of service delivery in cities. It

also enhances the competitiveness of the urban ecosystem through efficiency improvements, newer goods and services, creation of new job sectors and categories.

- **Propagating trust and accountability in government:** Open information flow improves trust and accountability among stakeholders, right from problem framing to implementation of solutions on ground. Citizens participate in decision-making and benefit from transparency and accountability in problem definition and solution building.

- **Advancing learning and capacity building:** Breakout or mentoring sessions can be organised for stakeholders, both online and offline, when the hackathon is open to the public. This can help the academic and industry community to talk about innovative processes and institutional aspects that can be taken up by cities.

- **Encouraging volunteering and pro bono efforts:** Hackathons may offer a good platform to create engagement opportunities for communities and other stakeholders to volunteer for solving urban problems and create 'social innovation' pathways. This can help communities progress on a challenge and create mechanisms to change behaviours.

- **Sparking innovation among the young community:** For students and the academic community, hackathons globally have proven to be a space for kindling innovative ideas or developing creative techniques to help spark their productivity. This can help build an ecosystem with a more informed and innovative younger community.

3. Who can attend the data hackathon?

Depending on the problem at hand, the event can be attended by universities, start-ups, industrialists, third-party agencies or individual contributors. If there is a specific theme to the hackathon, then the target participants should be reached out to, in accordance with the theme. For example, if it is a data hackathon, data analysts and scientists may be targeted.

II. Types of Hackathons

There are several types of hackathons that can be organised. These include:

1. Internal hackathon

Also known as corporate hackathons, these can be organised by an entity/organization for its employees only. These are organised with the aim of promoting engagement, boosting innovation and intrapreneurship.

2. External hackathon

These hackathons are much larger events conducted by governments and organisations and are open to the public. These allow for crowdsourcing ideas from multiple stakeholders so as to gain various perspectives that may have been overlooked.

3. Online or virtual hackathon

These hackathons work well when organizations want to engage participants simultaneously across different geographies and time zones to solve a problem or drive innovation. As the name suggests, all end-to-end activities from registration to announcement of results takes place on an online platform. These could include application-based hackathons as well, which are conducted on specific platforms for development like mobile device operating systems, desktop operating systems, solution development, data visualizations and analysis etc.

4. Offline hackathon

Offline hackathons are primarily used for driving external developer engagement, beta testing of existing products and identification of flaws, and innovation of new apps or solutions. An offline hackathon is conducted at a physical location.

The type of hackathon that needs to be conducted depends on the core objective. These objectives may include social awareness, recruitment, branding, product feedback, new technology etc. Some of the objectives specific to city level hackathons are:
- Brainstorming solutions to solve urban problems

- Identifying urban challenges/problems by analysing available public data

- Presenting innovative product(s)/service(s) that can help solve sector level issues

Based on the problem focus for the hackathon, it may also take on the following themes:
- **Policy focused:** Developing ideas for new policies that would further the outlined goals for city government

- **Business model focused:** Developing a business model for a targeted city initiative to make it self-sustaining

- **Data jams:** Analysing city datasets and produce insights around the outlined problems/initiatives

- **Software focused:** Building digital platforms/tools/apps that support governments in identifying the latest and most efficient solutions

III. Conducting a Hackathon

1. Organisational committee/team

An organization committee/team will be required to support the CDO (or the official in-charge of conducting the hackathon) to help organize the hackathon event. This official should act as a conduit among universities, NGOs, governments, investors and industry to come up with innovative and scalable solutions to city problems. Thus, there should be a group of people, divided into teams and committees with each being responsible for a different task that the person-in-charge overlooks and delegates. There can be an outreach team, a communications team, a sponsor's team, and so on. A core team should be the one responsible for the proper and overall execution of the event. Following are the aspects which should be taken care of while planning the hackathon:

- **Identifying the problem:** Identifying the main problem is the first step in planning a hackathon. Defining the problem will help in deciding on the kind of participants, type of hackathon, duration, venue, etc.

- **Reason for conducting the hackathon:** Once the problem has been identified, listing and discussing the 'why' among the team is important in order to determine the basis for conducting the hackathon. It will help in visualising how the hackathon can be used to solve those particular problems.

- **Expected outcome:** The expected outcomes should be discussed beforehand in order to formulate an organised roadmap. It should be decided if the result can be at an idea stage, does it have to be a working prototype/ pilot implementation, or a fully developed commercial deployable solution.

- **Alliance with implementation partners:** The success of the event would be dependent on effective implementation of the winning solution, be it a process change, pilot study or prototype development and implementation. It is important to form alliances with potential partners for whom the solution is designed. This will improve the likelihood of the winning solution reaching the stated outcomes of the hackathon.

- **Judges:** Teams usually present their final ideas and products to a panel of judges. These judges must have the required knowledge to be able to select the winners. They may consist of sponsors, organisers, subject matter experts, university/ college heads, leaders from local business, senior government officials as well as developer evangelists.

- **Prizes:** Although the main idea is to foster innovation, prizes are great incentives as they encourage better participation and motivate the participants. Deciding the winning prize with the sponsors would be a good start. Angel investment to take the idea further, or a permission to test product on a live pilot with the cities may be considered as prizes. For example, at HoloHack (a Smart Cities mixed reality hackathon), the best prize was a Hololens (mixed reality smart glasses).

2. Outreach and Promotion

As mentioned earlier, hackathons would help in creating alliances between the government and

other sectors of the society. An outreach team should be in place to carry out this task. This team should consist of young recruits and interns, and other enthusiastic people who are willing to go onsite when needed and reach out to the right people. Promoting the event is extremely important. The following channels can be used for undertaking outreach and promotion activities:

- **Social Media:** Social media channels can be leveraged for an effective social media campaign, with creative videos and posters. Facebook, Instagram and Twitter pages can be used to post regular updates about the event. Social media influencers and bloggers can be invited to the event and requested to post about it. Professional networks such as LinkedIn, Meetup, Xing, Stack Overflow may also be explored. Creating threads on Reddit or Quora can also keep alive the culture of hackathon over a longer time. Technical communities like GitHub can also be utilised, this can attract data analysts and scientists directly.

- **Online Portal:** A separate portal or microsite can be created for registrations, advertising and marketing. This will help in reaching the target participants in a more effective and efficient way. Links to this site can be posted on the hackathon's social media platforms. A blog post or articles can be written, working with local media as well as online tech magazines for publishing.

- **Stalls:** Targeted interaction with universities/colleges can be helpful. Stalls and talks could be set up at universities/events to spread the word. Start-ups can also be incentivised through marketing opportunities at career fair stalls.

- **Cold Calling:** Cold calling, by making regular phone calls or SMS can be a method used to reach out to both potential sponsors as well as participants.

- **Co-working spaces, accelerators and incubators:** These organisations are filled with new innovators and start-ups who can add much value to the hackathon and in other data related events that the city intends to host. Such organisations host hackathons on a regular basis and can be a good source of conducting/designing one for the city.

- **Investor community:** Reaching out to specific investor network can help identify collaborators for a solution or enhance the value chain for the stakeholders.

- **Group communication:** A week or so prior to the event, set up a group page of participants on social media platforms like Facebook and Instagram. This will help them communicate digitally. It should be ensured that there is someone to take pictures during the event and share the event online, in order to spread the word for the next event. Recording of testimonials and other videos should be explored as well. This would help spread the word as well as help in the event's success.

3. Design and Execution

To maximise the return on investment and the potential benefits of these data hackathons, design and execution frameworks should be setup. For proper execution, it is important that hackathons are organized well in advance. The broad stages of a hackathon are problem definition, ideation, prototyping or user testing, business model design and pitches, inspired by the approach of problem solving in human-centred design. Below are the key steps required to organize a successful hackathon:

- **Set the theme/Finalize a problem statement:** Choosing a specific theme helps in defining the purpose of the hackathon. Through the problem statement, the kind of hackathon and its participants can be identified. Accordingly, the ideation and prototyping conditions for a hackathon can be set.

- **Sponsorship and Budgeting:** Estimating the likely cost of organising the hackathon on time is extremely important. Once this is done, the organisers may start looking at sponsors. Large events especially would require sponsors to help cover the cost. Using tiered sponsorships can help make the price points feasible. Other than the advertising at the event, merchandise tables or a podium for them to speak would be good incentives to attract sponsors.

- **Date and Venue:** The date and time of the hackathon needs to be finalized keeping in mind the goal of maximum participation and checking for any clashes with niche conferences or other similar hackathons. The venue needs to be selected to suit the type of hackathon being conducted. Location should be accessible by public transportation and information on shuttles to and from the parking areas or nearest public transport should be informed ahead for better planning by participants.

- **Logistics:** Depending on the budget, the place needs to conform with the required seating style, power and IT hardware requirements, internet connection, etc. Name tags and other event material requirements can reduce hassle and coordination issues. Branding can be improved for the city and the event by providing memorabilia to key participants.

- **Idea or solutions registry:** A registry can be created, preferably in an online format, to collate all ideas into an idea management system. It is not only for winning ideas but also ones that were exceptional but not able to make the list. With additional support from incubators these ideas can be perfected later or shared with other cities for whom the particular solution may be more viable.

4. Post Hackathon

Once the hackathon is over, there is still work left to do in order to boost its success as well as that of future events.

- **Feedback:** Surveys should be sent to the participants, judges and sponsors after the event has culminated. This will help in improving the event in the future. Surveys can be digitally pushed to the participants to their mobiles or emails immediately after a session for identifying what worked and failed and can be improved. Alternatively, if budgets permit, digital kiosks can be set up with provisions for feedback, contacts registry, smart city information and progress, and other features to improve user engagement.

- **Social media presence:** After the hackathon is over, it is important to showcase the results to the public at large. Post videos and photos of the event, on the website and get the story out in the media.

- **Showcasing results:** Sharing a video or presentation of the final results as well as the innovative apps and other solutions created serves to highlight the event's success.

- **Implementation of winning solution:** Organisers should plan for implementation of the winning solution well in advance, by entering into alliances with the potential implementation partners. The winners of the hackathon should be connected with these implementation partners. There should be a handholding support to the winners and meetings with the partners should be facilitated.

IV. Case Studies

1. Open Government Data Hackathon

- **Problem statement/mission:** Data.gov.in is an open data portal launched by the Government of India, which promotes its open data initiative. The Hackathon was aimed at fostering innovation by creating unique and innovative service delivery Applications and Infographics.

- **Participants:** Students, Entrepreneurs, Innovators, Start-ups, Developers and Community.

- **Details:** Open Government Data (OGD) Platform India is at the forefront of promoting innovation in Open Data ecosystem. NIC, in association with IAMAI and StartUp India organized a Hackathon – "#OpenGovDataHack in 2017. It took place across seven cities namely Delhi NCR, Patna, Jaipur, Chennai, Bhubaneswar, Hyderabad and Surat. This program aimed to promote and showcase potentially great talent and innovation by start-ups. The objective was to translate ideas into applications that would be used by OGD for issues across five themes/sectors including, Drinking Water & Sanitation, Health, Education, Transport and Crime, with a focus on inclusive growth.

- **Outcome:** A mobile/web app which could be published on mobile stores as well.

2. Smart India Hackathon (SIH)

- **Problem statement/mission:** To solve pressing problems in the city, inculcate a culture of product innovation and develop a mindset of problem solving.

- **Participants:** 5 lakh+ students in over 65+ locations across India, 9 Union Ministries.

- **Details:** SIH 2019 was an initiative by Ministry of HRD, AICTE, Persistent Systems, i4c and Rambhau Mhalgi Prabodhini. There were separate events for Hardware and Software and the challenge was conducted across various themes such as Agriculture, Smart Communication, Waste Management, Renewable Energy etc.

- **Outcome:** A range of solutions were showcased and developed on a variety of challenges from clean water, waste management to robotics and drones.

3. NITI Aayog and Pune Smart City Hackathon

- **Problem statement/mission:** To encourage participants to come up with smart and innovative ideas and technology solutions to solve pertinent issues faced by citizens.

- **Participants:** The organisers at Pune Smart City invited participants from across sectors and from all over the country.

- **Details:** Pune Smart City in collaboration with NITI Aayog organised this two-day event at Pune's SavitribaiPhule University. There were five main themes - Water Management, Solid Waste Management, Safety and Security, Public Health, and Digital Connectivity. The teams were evaluated on two tracks: Solutionthon and Ideathon. Under Solutionthon, the teams had to present a readymade solution and develop a working model to act as a solution. Under Ideathon, the teams had to propose and present a not yet developed or deployed idea, along with a prototype.
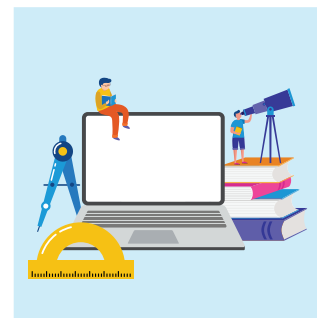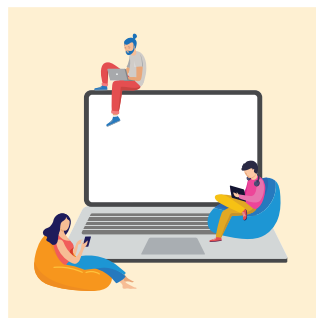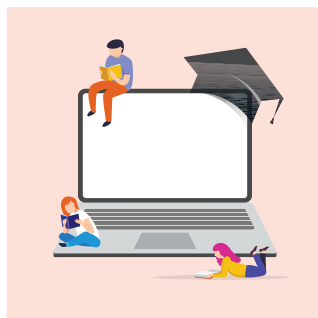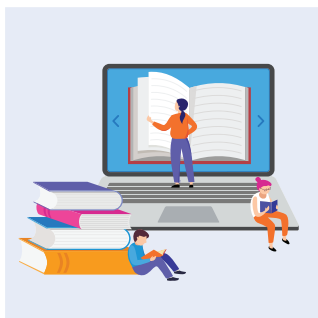
- **Outcome:** The teams came up with several innovative solutions such as 'Project Dhakkan: Water disinfecting cover plate' and 'Vidyaroha: Smart Presence Management.'

4. Pune Open Data Hackathon

- **Problem statement/mission:** To make people aware of the Open Data Portal and create solutions that would be able to put this data to use.

- **Participants:** Students from acclaimed educational institutes in Pune.

- **Details:** Pune was the first city to launch its own Open Data portal, in accordance with the National Open Data Policy. The portal has more than 450 datasets, covering a whole variety of topics ranging from fires to finance. The aim was to use this data in a way that would help solve problems and issues being faced by the community. The event was organised by Pune's city government. Mentors were available during the sessions, to assist the participants to come up with innovative ideas and solutions. Facilitators guided the teams when needed. The objective was to design a tool that would have information about neighbourhood schools around infrastructure, amenities and also information on where to open a new school.

- **Outcome:** One of the teams created a dashboard application with information and analysis on the schools to assist parents. Geospatial mapping of all the schools in the area was done as well.

5. NYC- Annual Hack League

- **Problem statement/mission:** To develop solutions to several problems being faced by the communities relating to transport, crime, climate, sanitation and more.

- **Participants:** 28 teams, 1,700 students from different schools in the city.

- **Details:** This hackathon was organised by New York City's Department of Education, NYC Council speaker and BetaNYC.

- **Outcome:** The winning teams created the following apps:

- **Busted:** a bus app that measures and provides real time data of transportation issues faced by students with MTA buses, so that alternate solutions can be found, and MTA can be informed of the problems being faced.

- **Heat Track:** a heat app that measures the inside temperatures that tenants of the city are exposed to in order to make the lives of the tenants easier. If faced with extreme temperatures, the landlords will be notified.

- **Trash! Go! NYC:** an app that aims to reduce the trash related complaints in the city by 14% in the initial 3 months. This would be achieved by using GPS to locate the closest trash can and reduce litter.

6. Data Analytics Global Hackathon

- **Problem statement/mission:** To improve performance of Ambulance Victoria in several important areas, such as responding to emergency calls, providing healthcare and taking patients to the correct hospital.

- **Participants:** Data and Analytics (D&A) experts from a private firm

- **Details:** This hackathon was organized by a private firm, along with Ambulance Victoria. The two greatest issues were: being able to predict short-term demand for ambulances based on location and choosing the most appropriate hospital. Each team, out of 17 teams from 5 different continents, had around 5 D&A experts to find the right solution. A huge dataset was given to each team with specific details of consumer preferences and responses.

- **Outcome:** The Hackathon resulted in 17 new ideas, many of which were ready-made solutions that recognized patterns from the dataset. One idea suggested an app to make the data collection and delivery process easier.

7. Cyprus Open Data Hackathon

- **Problem statement/mission:** To encourage users to develop innovative applications with the re-use of Open Data made available through the National Open Data Portal data.gov.cy and other public sector portals.

- **Participants:** This data hackathon specifically targeted analysts, students, programmers, communication and marketing experts to develop applications using Public Open Data.

- **Details:** This hackathon was organized by the Public Administration and Personnel Department (PAPD) (within the Ministry of Finance in Cyprus), Hack Cyprus and a private firm. The PAPD collaborated with the Open University of Cyprus.

During the two days, attendees presented ideas with different open datasets with the government's national portal (data.gov.cy). The data covers most public services, departments and ministries. There were cash prizes, products and services given to the winners, from the event's sponsors. At the event, there were mentoring sessions as well where participants received feedback and assistance.

- **Outcome:** Innovative tools (for reporting wildfires) and apps (augmented reality app called City View) were created.

Learnings from these case studies

Hackathons such as these can be used as models for conducting data hackathons in Indian cities. Key learnings include:

- By partnering with tech start-ups (especially those in D&A) and others (academia, individuals and data specialists), the government can get feedback on their Open Data Portal.

- Using this feedback, they can make improvements, generate new ideas and work with these individuals to develop future strategies.

- Hackathons may result in creation of apps/portals which can help cities improve data literacy as well as citizen engagement.

- Such events also help raise awareness about open data, and its uses and benefits.

- Data hackathons are highly beneficial for ideating and developing ideas and solutions that will help shape long-term policies of the government.

- A roadmap for future development can also be developed basis the ideas and solutions generated in these events.

V. Sample Hackathon website content

- **Overview -** General description about the background information of the hackathon, its context and a basic introduction.

- **Registration -** Details about any requirements for participation, who can register, where and how to register and the important deadlines.

- **Team Guidelines -** Depending on the type of hackathon, the teams would consist of a diverse group of people. This should ideally be a mix of creative thinkers as well as tech experts or specialists from academia, start-ups or industries.

- **Judging Criteria -** This criterion should be decided beforehand and the judges should be well versed with these. This could include cost effectiveness, ease of implementation, impact created, replicability, etc.

- **Sponsors -** The kind of sponsors should be decided, and a list of all potential sponsors should be made. They can then be reached out via emails, cold calls etc.

- **Prizes -** The types of prizes/rewards should be decided beforehand. These should be discussed with the sponsors as well.

- **Venue -** The venue and related logistics should be decided and communicated to all participants by posting on all required platforms.

- **Process Flow -** This can include the schedule as well as a timeline for the hackathon overall as well as day wise distribution of events (e.g. how and where different events will take place).

- **Teams -** A list of all participating teams and their details can be given here post their successful registration.

- **Datasets -** Links to datasets can be given in downloadable formats on the online portal, prior to the event in order to allow participants to prepare themselves.

- **Announcements -** All announcements related to the event can be posted on the website to inform participants about any updates and changes.

- **FAQs -** A list of frequently asked questions and their answers can be given to clarify any doubts that participants may have.

- **Discussion Board/Blogs/Communities -** For those participants that aren't active on their social media as well as for all participating teams/individuals, a discussion board/corner on the website will be useful.

- **Gallery -** A section of photos and videos of promotional events as well as the event itself can be useful. Testimonials can be included under this or a separate section.