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THE POWER OF HACKATHONS: A ROADMAP FOR SUSTAINABLE OPEN INNOVATION

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Hackathons offer an opportunity to achieve innovation-oriented goals with limited resources, but require careful planning and organizational commitment to sustain engagement over the long term. This brief provides an overview of hackathons and offers strategies from previous successful events.

Recent Executive Branch policies like the Open Data Policy,¹ Digital Government Strategy,² Open Government Directive³ and Open Government Partnership⁴ envision a 21st century framework for the relationship between government and the American public. This framework sees significant opportunities for improvement in policy outcomes by automating key government functions and sharing government data. However, with ever tightening federal budgets, program managers are being asked to achieve more with less.

Agencies might find a way to fulfill their obligations to open data through the use of “Hackathons.” The term “Hackathon” denotes

a technology development event, often held over a single weekend, where technologists work in sprints to develop an application prototype, sometimes including a prize for the team creating the best concept.⁵ The definition of a hackathon is not strict: It can involve testing a new platform or revising an existing application, not just creating new ones. These events go by many names: “codeathons,” “developer days,” “apps challenges” and so on.

For these events to succeed, organizations must provide direct access to government data people can use. While hackathons have generated excitement, there are natural barriers between government and informal

technologist culture. To overcome these obstacles, agencies should build infrastructural support to allow success. As data is unlocked in a machine-readable format, opportunities for new applications will multiply. The event must be deliberately planned, learning from previous agency efforts. Above all, expectations must be managed: A hackathon is not a one-off event or a catch-all solution. It is a tool to move federal culture down a road of sustainable innovation.

Hackathons offer an opportunity to achieve innovation-oriented goals with limited resources. This can be accomplished by engaging a dynamic population of volunteer technologists to develop software applications that approach

persistent problems in innovative ways. [See *Fig. 1*] For example, the Pineapple Project⁶ confronted the issue of food scarcity in developing countries by offering an SMS tool and smartphone app to assist farmers. These tools aim to integrate information on crop markets, growing conditions and local resources “to make their yields as profitable and efficient as possible.”⁷ This ongoing project was the winner of “Most Disruptive” at the 2012 International Space Apps Challenge, a premiere hackathon event organized by NASA. In the 2013 event, the winner for “Galactic Impact” was The Greener City Project.⁸ This application seeks to enrich “NASA satellite climate data with crowd-sourced micro-climate data; in effect, providing higher resolution



Fig. 1 Participants at the Kennedy Space Center branch of the 2013 Space Apps Challenge. Photo courtesy of NASA. Learn more at: <http://spaceapps.tumblr.com>.

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information for monitoring the environment.”⁹ These two projects could prove to be dynamic resources: One could educate emerging populations in developing their own food sources, and the other could develop a high-quality repository of urban environmental data.

To better understand how hackathons’ value can be best leveraged, we explored innovation-oriented federal government policies and public reports on previous hackathons and performed interviews with agency staff at the FCC, NASA, the EPA and USAID to better understand their unique concerns. We also spoke with private sector programmers and technologists to learn what guidance they can offer curious agencies. Ensuring hackathons have a lasting positive impact requires more than enthusiasm. It necessitates careful planning and organizational commitment to sustain engagement over the long term. This policy memo provides a brief overview of government policies that foster open government and open data, making hackathons possible. It explores the policies in place that encourage hackathons and the best practices for holding a successful event with sustainable outcomes.

Open Data Policy and Goals

For agencies curious about incorporating hackathons into their programming work, there are standing policies geared towards automating key government functions and sharing useful government data. The **Digital Government Strategy**, issued by the White House in 2012, mandates that government agencies “unlock the power of government data to spur innovation across our Nation and improve the quality of services for the American People.”¹⁰ One of the backbone principles of this directive is providing government data via application programming interfaces¹¹ (APIs), allowing easy access across digital devices. This is significant because applications developed during federally sponsored hackathons rely on accessible government data.

The Digital Government Strategy acknowledges this, referencing the “App Economy” that has been supported by the City of San Francisco, among others. For example, by making public transit data freely available through web APIs, San Francisco enabled civic-minded programmers to develop web applications to help commuters navigate

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buses and trains.¹² To support the transition to freely distributing publicly useful data, the Digital Government Strategy requires that federal agencies “identify at least two major customer-facing systems that contain high-value data and content,” deploy them to the right customers via web APIs with the proper metadata tags¹³ and plan to transition additional systems as practicable.¹⁴

The **Open Government Directive**¹⁵ and **Open Data Policy**¹⁶ also encourage agencies to make their data more available to the public, which could further support the use of this data in hackathons. The Directive, issued by the White House in 2009, is a move towards more accessibility and transparency. First, it mandates agencies publish their information online, and the “presumption shall be in favor of openness.” Second, it instructs the government to “improve the quality of government information.”¹⁷ Both these adjustments are critical to successful hackathons. The Open Data Policy,¹⁸ released in May 2013, emphasizes that information is an asset both inside and outside of government. The corresponding

executive order notes that making data open and machine readable can fuel entrepreneurship and innovation.¹⁹

The U.S. Department of State has mirrored these priorities, launching the **Open Government Partnership** in 2011, a multilateral initiative encouraging foreign governments to embrace transparency, citizen empowerment, anti-corruption policies and incorporation of new technology.²⁰ These policies encouraging high-quality, visible and accessible data demonstrate that government leadership is aware of the value in making information available to the public.

Steps for Success

Although broad policy support exists, these general directives do not will a labor-intensive event like a hackathon in existence. This section outlines the critical elements to a successful hackathon: organizational support, open data, careful planning and managed expectations.

Organizational Support

Planning a hackathon is impossible without hardworking staff and support from agency leadership. Some staff interviewed began a campaign to host a hackathon, seeing it as a tangible measure in support of the Digital Government Strategy.²¹ Normal agency operations require taking this type of activity up the chain of command, making sure everyone is comfortable with the event.²² One structural issue is that, unlike other challenges and prizes, hackathons have no specific statutory authorization.²³ However, the absence of a specific White House statement mentioning

hackathons should not discourage agencies from organizing these events. One of the most powerful arguments can be to point to previous successful hackathon events as a model, and structuring the event in a similar fashion.²⁴

Open Data

Consumable, web-ready data is the lifeblood of any hackathon, making it important to consider what types of information would be most useful and interesting to the public. [See Fig. 2] It is important to communicate that the utility of the information might not be immediately apparent. Novel uses for data can present



Fig. 2 Screenshots of ABQ Ride, an iOS application using real-time data from the City of Albuquerque data to track bus location, calculate fares and learn about New Mexico public transportation. Photo courtesy of the City of Albuquerque. Learn more at: <http://www.cabq.gov/abq-apps/city-apps-listing/abq-ride>

themselves. For example, global positioning systems handsets have grown into a billion dollar industry based on open data released by the government.²⁵ Agencies should also target data that has actual utility: Everyday information, like bus routes and other infrastructural data, can oftentimes make life easier.²⁶ These will ideally be data presented via perfect visualization tools and data representing real-life concepts.²⁷

Some agency staff admit resistance to the idea of opening up data for public use, but, beyond the directives previously noted, others believe that proactively releasing information is an opportunity for public engagement.²⁸ One way to identify the data needed for a hackathon can be to ask potential participants to examine data portals like Data.gov and report back on what looks useful and why.²⁹ As open data becomes the norm, agency officials may start the process by focusing on a particular problem, then select the data that addresses the issue.

However, security and privacy issues may make unlocking some useful data impractical or inappropriate. Personally identifiable information can be highly interesting, but can implicate concerns involving the Health Insurance Portability and Accountability Act (HIPAA) and the Privacy Act.³⁰ HIPAA protects the privacy of personally identifiable health information, sets security standards for electronic health records and allows identifiable information to be used to improve patient safety.³¹ The Privacy Act restricts the federal government's collection, use and distribution of personally identifiable information.³² The implication is that

there is information with strong humanitarian purposes that may nonetheless be inappropriate for a hackathon. It is also important to consider whether the applications have location privacy concerns: For example, if they require users to share personally identifiable information, then a privacy analysis should be performed.

Careful Planning

Event organizers must decide how to structure the challenges, the specific problems that participants will work on during a hackathon. [See Fig. 3] Planners of previous events advise that limiting the number of challenges can encourage more focused results. This benefit can be amplified with more specific parameters and unambiguous direction. Knowing exactly the types of issues to be addressed increases the likelihood of useful products.³³ In some instances, social media staff attended events that only had tasks available for programmers, leaving them feeling underutilized.³⁴ Respecting different skill sets and creating diverse task lists can allow for enhanced participation. Finally, a great launching point can be ongoing work. Existing projects will already have a core group of participants and a set of more defined tasks, making them ripe for improvement via a hackathon event. This also aids with focusing results.³⁵

Looking to other hackathons on structuring **intellectual property arrangements** is a necessary step in planning. Some recent commentary has expressed concern on the ownership of applications produced at hackathons. Some see potential conflicts between

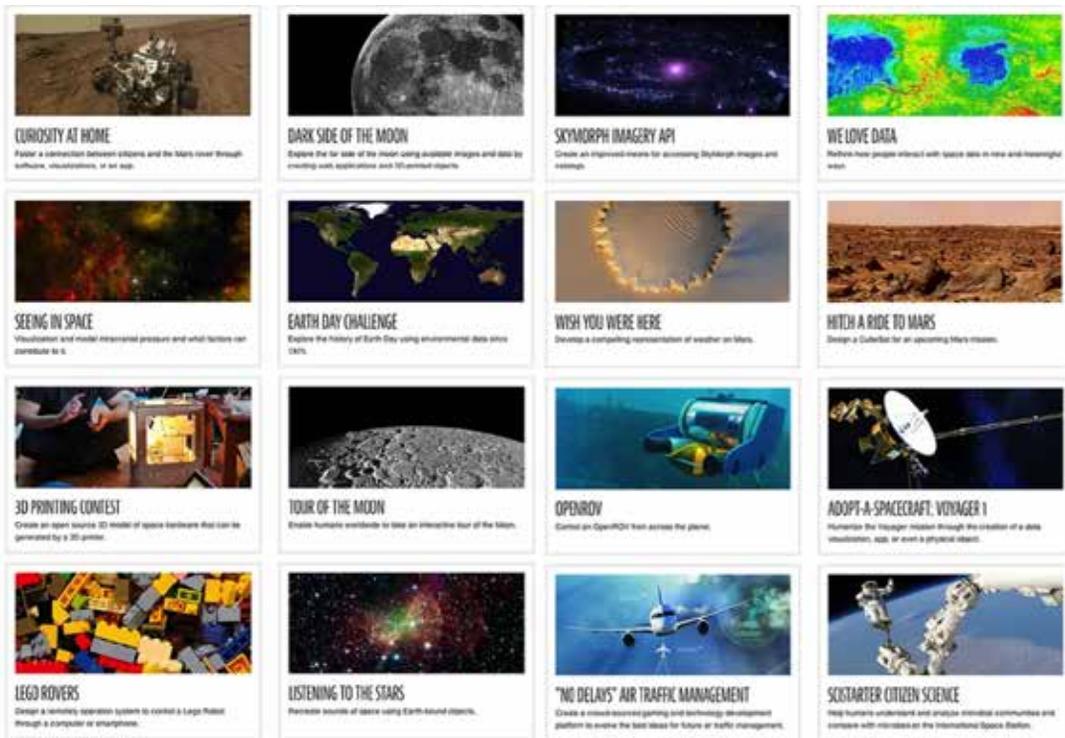


Fig. 3 A sampling of the challenges provided for the 2013 Space Apps Challenge coordinated by NASA. Photo courtesy of NASA. Learn more at: <http://spaceappschallenge.org>.

the interests of private companies and staff that want to contribute their expertise to these events. Employers, it is argued, should caution employees to not publicly disclose products because doing so can “preclude entitlement to patent protection.” Alternatively, some suggest that employee participation should be restricted to those “likely to be unrelated” to a company’s business interests.³⁶ Regardless of how employers might choose to approach these issues, agencies should make clear that any hackathon work product cannot be the sole property of an application’s creator(s). For example, in literature provided to participants of the International Space Apps Challenge, they are informed that all products are “avail-

able for others to download or use.”³⁷ In this way, the agency pre-empts any attempt to turn a profit from agency hackathon results.

A successful hackathon also requires **structural support** from within the hosting agency. Some have found the approach of Random Hacks of Kindness,³⁸ a joint initiative between Microsoft, Google, Yahoo!, NASA and the World Bank, to be very helpful. Their collaborative model, built on sustained engagement and work beyond the hackathon, is a powerful teaching tool on best practices.³⁹ It is essential to ensure that the event will provide a stable, reliable work environment.⁴⁰ This includes a secure network able to handle

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everyone working on site and procedures for people to be allowed in the facility.⁴¹ All equipment should be tested extensively to minimize the risk of an outage, and plans should be in place in case an outage does occur.⁴² Finally, several staffers emphasized the importance of making **subject matter experts** accessible to participants.⁴³ This can serve many purposes. Subject matter experts can point participants to the data needed to address certain issues, explain terminology and interpret what data means. Otherwise, technologists can get stuck or make incorrect inferences.⁴⁴

One of the final steps to a successful event is **strong promotion**. Professional presentation is extremely important: You cannot expect programmers to promote a hackathon for you.⁴⁵ Arranging endorsements from well-known figures in the technology sphere can be valuable, creating credibility with the target audience.⁴⁶ Some events have received extensive media attention, but planners caution that this can become a distraction—teams must be able to work on challenges without significant interruption.⁴⁷ While building event awareness is critical, there is no substitute for old-fashioned networking. Keeping the size of working groups down can be critical. A frequent hack-

athon participant cautioned that technologists prefer working in teams of five to thirty highly qualified people rather than mass collaborations.⁴⁸ Teams may work virtually, but existing relationships are vital.⁴⁹ One interviewee noted the reputation government has for not being respectful of peoples' time: Planners should work to overcome that barrier by staying up to date and efficient when communicating with participants.⁵⁰

Managing Expectations

Beyond properly planning and supporting the event, organizers must manage expectations. When advocating holding a hackathon, overstating the benefits can lead to disappointment. Critiques of hackathons have included whether there is enough standardized open data for them to scale outwards, making them more sustainable.⁵¹ Because data is frequently in different formats, cities with similar issues cannot simply plug their data into existing applications. They are forced to duplicate effort and make a separate program for each data set. But these hurdles do not nullify the utility of encouraging technologists to think creatively about problems within a community. Beyond the broad issue of the need for more open data, other challenges remain. For exam-

ple, it is unlikely that a working application can be developed in a weekend. Rather, a strong outcome could be a prototype that is available for testing and further work.⁵²

An extra layer of care must be taken if the app is to be used for internal agency operations, because Federal Information Security Management Act (FISMA) compliance could be required.⁵³ FISMA “requires each federal agency to develop, document, and implement an agency-wide program to provide information security,” which should provide “security commensurate with the risk” involved with the agency’s unique mission.⁵⁴ This issue can be mitigated if the proper security infrastructure is provided to participants, and thus “baked in” from the start.⁵⁵

If the hackathon is seen as one step in an ongoing commitment to public engagement and open data, the event is more likely to be successful. For example, the Pineapple Project is an ongoing application under development: The concept and basic framework was developed at the 2012 International Space Apps Challenge, but the team continues to collaborate and hone their product.⁵⁶ The low probability of creating a working application in a weekend means most successful events are one piece of a larger puzzle. As agencies open up more data and offer opportunities to work on standing applications, credibility is enhanced among volunteer programmers. Conversely, that goodwill can be wasted if the hackathon is a one-off with little or no follow-up. Skepticism towards government can run high, but mean-

ingful connections have grown out of previous events. Offering people a chance to work with open data to create applications for the public good goes a long way to building a foundation for future collaboration.

Conclusion

The federal government aspires towards 21st century infrastructure where critical functions are automated and open government data facilitates a reflexive relationship with citizens. These ambitious goals are hampered by the reality of overstretched budgets and limited resources. Hackathons offer an opportunity for agencies to work towards the White House’s directives by tapping an engaged populace cooperatively.

To gain meaningful benefits, agencies should realize how hackathons fit within their open data policies and build the organizational support to make them successful. As agencies unlock their data, making it accessible in a machine readable format, the opportunities for innovative new applications will grow exponentially. The event must be carefully planned, taking cues from the lessons learned by previous agency efforts. Above all, agencies should manage expectations: A hackathon is not a one-off event or a catch-all solution. It is a tool to move federal culture down a road of sustainable innovation.

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