

Data Availability and Use - Submission

The Data Availability and Report from the Productivity Commission is an important document because better access to data will lead to substantial productivity improvements. This submission addresses two critical questions asked by the Productivity Commission.

The Commission seeks more information on the benefits and costs of a legislative presumption in favour of providing data in an application programming interface (API) format, specifically:

1. In which sectors would consumers benefit from being able to access data in an API format?
2. What are the main costs and barriers to implementing APIs?

The answers are:

1. All sectors of the economy will benefit from the provision of API access. Benefits accrue to business, governments and consumers.
2. APIs can be deployed to give access for close to zero cost. Systems can be built to make it easy for organisations to implement existing or new APIs to access data. Ease of access goes a long way to removing barriers.

The use of APIs to access data is low-cost because the rules of access to data can provide a smart contract in response to a request. It means organisations can give permission to applications to access data in a standard way and in a way that the requestor can fulfil programmatically. The hard part of accessing data is specifying and enforcing the rules under which an organisation grants access. Many initiatives use the approach of attaching smart contracts to data, and it results in lower cost solutions to many problems.

A further development of the idea is the builder of the application to put the reasons or rules for access in the application accessing data so saving the organisation the effort and expense of rules enforcement.

Without APIs both the organisation and the recipient must store the rules with the data. It costs more to put rules in two places and to coordinate the rules than it does to put the rules in the application that accesses both organisation and recipient data stores with APIs. Further, if the same application accesses other parties, there is still only one copy of the rules. It means a common set of rules for access to all databases using the application.

The only thing stopping the introduction of APIs are existing rules and regulations around data access. These rules and regulations have meant that organisations have created gateways to access. The gateways permit the owners of the gateways to extract tolls. Certified applications that access the APIs can embed existing standards and regulations and remove the need for

gateways and the accompanying charges. If justifiable, charges to the owner of the data source rules are included in the application.

Bureaucratic inertia and existing players in the marketplace of information, including government agencies, combine to preserve their regulated access advantages by impeding the introduction of APIs.

Once API access is available, it is possible to deploy distributed applications to coordinate the activities of independent agents like people. Without APIs, we centralise applications because of the cost of enforcing distributed rules held with all agents. Using distributed applications removes the advantages of scale in centralisation. Distributed applications that achieve the same outcomes will always be lower cost than centralised applications. The main reason being the replacement of intermediaries with help when needed.

To illustrate the benefits and productivity improvements of distributed applications the submission outlines the deployment of a possible nationwide device location service that operates indoors and outside. The service uses existing infrastructure and does not require an expensive satellite GPS service. It does not use Apple or Google Location services. It is 100% distributed, and its cost is the cost of distributing the app on devices plus the calls to APIs to data held on actual or virtual devices. The productivity comparison is between the deployment of apps on devices and Australia putting up a GPS satellite service. That is billions of dollars versus a few million. This submission outlines how to deploy the app on fixed devices like mobile phone towers and wifi routers and on mobile devices like mobile phones.

The submission also outlines ACT Water Rewards - a distributed app for investment loans in water infrastructure. This app will save the ACT government \$70M in interest payments and double the profit of the local ICON Water Authority for no cost to the Authority or the ACT government. Presumably, we could call this a 100% productivity improvement. Opponents to Water Rewards use access to data as the gatekeeper. There is strong opposition from the finance sector who lose the rent on money. Treasury and Price Regulators oppose the system. They measure economic efficiency as the most money received for a given amount of water rather than getting the same value from using less water. The Water Rewards app gives access to money data including the rules associated with the money and water usage. Without API access such systems are impractical at scale.

Like all complex systems emergent properties of the system will appear. The emergent property of the commercialisation of the internet was the loss of privacy. An emergent property of the marketing of the distributed internet will be privacy.

A Distributed App to find the location of a mobile device

Distributed algorithms are the same app executed on many devices. The separate instances of the app collaborate to achieve a common goal. Using the same app means the same rules apply to all devices.

A distributed app to find the location of a device is one that works with its near physical neighbours to find its location. Each instance of the app executes the same code. It calculates where it is by first guessing its location. It measures the distance to any other device by estimating how far away the device is from the strength of Wifi, Bluetooth, ultrasound, light or another signal broadcast by the other device.

Having made a calculation, it asks, via API calls to the other devices, where they think they are and the strength of the signal. Devices only provide these two measures. They do not ask who or what the other parties are. Having received back the guessed locations of the other devices and the signal strength the requesting device recalculates its position.

A device keeps asking until it is confident of its position. The devices are connected because they use the same app, and the physical connection happens when the app is activated. The app can, on request, show the identity or other information stored on the device to trusted parties. The device is the place containing the authoritative data on position.

Even if a device does not join the network and puts itself into the network, the network of connected apps can still include it by setting up a virtual device in the cloud and attaching an app to it. The virtual device can guess where it is and ask the other apps where they are and operate the same algorithm. The best protection for a device owner is to join the network and take control of the virtual device.

The system is low cost as it uses wifi signals, standard https protocols, existing transmission paths, little storage or computational resources. It is several orders of magnitude cheaper than the centralised location services created by GPS.

This distributed algorithm works because devices connect with APIs via a trusted app and because each device is autonomous. There is no need for permissions on the location and signal data because the data never goes outside the trusted device's control without permission.

For a device owner to use the network it needs to download the app. If it wants to use the network to tell others who or what is at the location or any other information, then it registers that information by filling out a form on the app and fills out any restrictions it wishes to make on the release of the data. Other applications can integrate with the network by registering through the location network. Those apps can access data accessible by an API to a user's data if the device owner approves these other apps.

Water Rewards a distributed application

Water Rewards is a distributed app for crowdfunding water infrastructure. ACT Water Rewards Co-op has members who use water from the ACT water infrastructure. The Co-op purpose is to replace bank lending to fund ACT water infrastructure. The Co-op decides who can invest, the returns on investment, what to invest in, and who receives the investment returns. Each person who receives the right to invest becomes a member of the Co-op by agreeing to receive and own a Water Rewards app.

The ACT government as the owner of ICONWater decides on how much to invest in ICONWater, and what price to charge for water. The ACT government works with the Co-op to take decisions on the returns on investment, what to invest in, and who receives the investment returns. The Co-op members get a return on investment by using their investment to pay for water.

The app contains the rules of the Co-op. These rules include:

- The criteria for membership.
- The returns on Loans.
- The size of Loan, each member, is permitted.

A set of rules, made in consultation with the ACT Government, might include anyone who pays for ICONWater is entitled to be a member. The return on the Loan could be 10% fixed per year of the inflation adjusted amount still on Loan.

ICONWater has \$1.4 Billion in debt and pays \$70M in interest on the debt. The Co-op will first raise \$1.4B by selling ACTWaterRewards to repay the loans. Anyone who uses water measured by an ICON water meter receives the Right to Purchase Rewards inversely proportional to their previous year's consumption. The app records each person's Rights and the Rights converted into Rewards. The app records the value of Rewards. The person can sell their Rights and sell their Rewards to another via the app. The buyer must also have an app. All the apps link via APIs and all the data defining the Rewards and Rights are kept with each app for each Co-op member.

For this system to operate efficiently and securely, ICONWater should provide API access to water meter billing records to each Co-op member. The app contains the rules on what meter each Co-op member is entitled to access. A 0.2% fee on the transfer of funds will cover the Co-op operating and build costs.

ACTWaterRewards will result in an immediate increase in ICONWater profits of \$70M. Because there is no interest costs the profits from the investment go to some water users as they get some of the water they purchase at a lower cost. On average each Co-op member will receive

the free Rights to Purchase \$4,000 worth of Rewards to pay off the \$1.4B. The market in Rights determines their value. The return on the Loan, set by the Co-op in consultation with the ACT government, influences the market.

Privacy an Emergent Property

The productive economy will move to distributed apps because of lower financial and operational overheads. Every application has to register what data it accesses hence sources of data are aware of the data they provide. As access to data is valuable data sources will only release the data they wish to and will actively work against the operation of the "adnet". The adnet continually collects information as the result of our online activities. If the data sources want to, they can stop it gathering information.

Those organisations that move to distributed applications will have a new marketing tool of privacy they can offer their customers.

Privacy concerns will cripple the adnet. It will still exist, but it will be easier to avoid. We will want it to stay around so that distributed systems develop strategies (antibodies) to attack the virus of surveillance.

Kevin Cox
White Label Personal Cloud
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