Platform on Platform (PoP) Model for Meta-Networking: A New Paradigm for Networks of the Future

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ABSTRACT

In this research essay, the authors envision a Platform-on-Platform (PoP) model to understand the (r)evolutionary nature of future networks, with examples and constructs from the two most pervasive networks, namely the Internet and the mobile cellular networks. First, they articulate how PoP model is conceptualized on the economic principles of n-sided markets and discuss associated network effects for the platforms to attain critical mass for sustainability. Then, the authors attempted to analyze the enablers of the PoP including open systems and standards and their effect on the success of PoP. Next, they apply the principles of PoP to two use cases – Internet of Things and Enterprise Mobility, and indicate the relevant research issues that need to be addressed. The authors concluded with remarks on the importance of security as a platform, which in their opinion has not been given due importance thus far, and the related avenues of research for the reliability and sustainability of future networks.

Keywords: Critical Mass for Sustainability, Enterprise Mobility, N-Sided Markets, Networks, Platform-on-Platform (PoP) Model

1. INTRODUCTION

We begin with a question that is bothering all of us for quite some time now. What will be the nature of the future networks to work with and do business with? Looking for a concrete answer to this poser is important not only for the researchers but also for the business leaders as well. If the business can get it right, it can reap a lot of benefit out of this correct guess. It will surely provide any business with the desired competitive edge it is forever craving for. But this million dollar question is still left as unanswered or answered only vaguely in the literature that is rife with speculations. Since a unique framework to capture the recent developments in the field of networking is yet to evolve, we take the opportunity to propose one, which, to the best of our knowledge, is novel and generic enough to explain the macro behavior in this arena. It is largely motivated by the market-driven economic analyses of network science in recent articles.

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First, we describe the model, called Platform on Platform (PoP) in this paper, with examples and constructs from the two most pervasive networks, namely the Internet and the mobile cellular networks. Second, we consider the mobile wireless network as the case in hand to establish our model with a detailed analysis of its dynamics. Third, we digress a bit to take up the “open system” movement to show how it is helping our cause – the more open the platform is, the more mature it is and the more amenable it is to (r)evolution. We analyze this development in order to bolster our argument for PoP model of meta-networking. Fourth, we apply our model to the most happening in-thing in enterprise networking viz. mobile cloud platform for business-scale IT. Finally, we wind up with a few cautions about the impending security challenges in our proposed model.

2. PLATFORM ON PLATFORM (POP) MODEL

Let us first try to understand that every network – be it wired or wireless – be it high speed or low speed – be it multicast or broadcast – be it voice or video or multimedia - is basically a “platform” (Evans & Schmalensee, 2010). We are now-a-days familiar with the term ‘platform’ due to rise in the popularity of cloud computing where Platform-as-a-Service (PaaS) is one of the offerings along with Software-as-a-Service (SaaS) and Infrastructure-as-a-Service (IaaS) (McAfee, 2011). The concept of platform is also age old in economics and that concept has been used by researchers to explain the behavior of the Internet – arguably the best network ever designed on this universe. According to Wikipedia, “two-sided markets, also called two-sided networks, are economic platforms having two distinct user groups that provide each other with network benefits”. Common examples of platforms having two sided markets are eBay, Facebook, Skype, and Google. Extending this simple definition to n-sides, we can write ‘multi-sided markets or multi-sided networks are platforms having multiple distinct user groups that provide each other with network benefits’. Examples of n-sided platforms are galore today; an operating system, like Android, is a 3-sided platform – users, app developers, and handset manufacturers forming the 3 sides. Definitely, the main driver behind the development of any intermediary (aka platform) is economies of scale offered by the market that links two or more distinct but interdependent groups of customers. The earliest telephone exchange or a modern day router or a simple N×N switch is also a platform in its very basic mode – connecting just two sides. In this framework, the Internet is a worldwide available platform; every intranet is a company-wide platform; every LAN is a campus-wide platform; every WAN is a global-scale platform; so on and so forth. For instance, TV network is another good example of a mass-scale platform, though its ‘platform utility’ has not been explored to the fullest extent till today. So we are ready to accept a network as a platform.

Now let us consider this quote: “Two-sided platform businesses with low costs of reversing participation status have become more important with the rise of the Internet. Platform businesses add value by facilitating interaction of various sorts between customers who are attracted to the platform at least in part by network externalities. This constraint, which is two-dimensional for two-sided platforms, does not involve production scale economies or fixed costs” (Evans & Schmalensee, 2010). An interesting observation indeed! The authors have equated the Internet with a 2-sided market sans “production scale economies or fixed costs”. Multisided markets have been around for decades, but they’re proliferating rapidly today as modern information and communications technology (ICT) creates more opportunities for organizing complex markets via ICT-based exchanges. Similarly, one can also consider the world-wide mobile network as another global “platform”, which is however not that mature as the Internet is as a 2-sided (or may be n-sided) market. But, per se, every network – small or big – has the potential to mature into an n-sided market or platform although it all depends on...
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