

# Introduction to IBM's BlueMix Platform-as-a-Service Environment

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## I. ABSTRACT

NIST defines Platform as a Service (PaaS) as “*the capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using program languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment*” [1]. IBM BlueMix is one such PaaS offering, available as a web-accessible hosted service<sup>1</sup>. PaaS allows developers to focus on the code they are developing—instead of the infrastructure required to run that code—by providing the underlying virtual hardware, pre-packaged web servers, frameworks, and runtimes needed to run and share their apps with the push of a button.

Today, developers spend many of their productive hours standing up, configuring, and maintaining servers that provide the runtimes and frameworks that applications require to execute. PaaS allows developers to produce a running application as quickly and painlessly as possible by providing a pre-built environment into which the developer’s app is installed. Developers bring their application code, send it to the PaaS, and the PaaS takes care of the deployment process. The PaaS provides services, too: if a developer’s app needs to use a database management system, then the developer can click a button in the PaaS and the service is exposed to the application through environment variables.

IBM’s BlueMix takes the PaaS concept one step further by making the PaaS a standards-based, enterprise-grade solution with a plethora of built-in services that are available in BlueMix’s marketplace. BlueMix is based on Cloud Foundry<sup>2</sup>, an open source PaaS that has a large associated developer community and that attracts a large number of customers who are interested in this new and progressive technology. Currently, IBM’s BlueMix supports Java web apps built to run in WebSphere Liberty, Node.js apps, and Ruby apps, through a set of pre-provided *buildpacks*—sets of scripts that contain the instructions for deploying and running an app within the PaaS’s isolated execution environments. Developers can also use custom buildpacks, provided by third-parties, that enable them to deploy a multitude of application types, such as PHP

and Python. BlueMix provides services such as Data Caching, Session Caching, Message Queuing, Decision Services, Single Sign-on, Log Analysis, Databases, BLU Acceleration, MapReduce, Mobile Push Services, and Mobile Data<sup>3</sup>. Developers can push their applications to BlueMix using command-line utilities and plugins for the Eclipse integrated development environment. They can also make use of git hosting and a web-based IDE (JazzHub). Once their apps are running, developers can perform monitoring and analytics on their apps using the service marketplace.

In this talk, we will discuss the features and advantages of BlueMix. We will also provide a step-by-step demo of using BlueMix to push a simple hello world application and bind that application to cloud-provided services to demonstrate IBM’s value add to this rapidly expanding ecosystem and developer community. BlueMix represents an ideal opportunity for universities, faculty, and students to quickly get applications and solutions running on a PaaS environment. We will also discuss IBM’s efforts to involve various colleges and universities to take advantage of the BlueMix platform. In particular, we will discuss the BlueMix hackathon<sup>4</sup> we held at NC State University, our current effort to install BlueMix on NC State’s campus, and instructions to access the BlueMix environment for education and research purposes.

We will also describe some of the innovative applications that students developed over a 24-hour period at the hackathon. The students provided IBM with some useful feedback that we have used to improve the BlueMix offering. By installing an instance of BlueMix into NC State’s Virtual Computing Laboratory (VCL)<sup>5</sup> infrastructure, IBM and NC State are actively identifying applications and services that are better-suited to run behind NC State’s firewall. IBM’s collaboration with NC State will allow academic institutions the ability to explore the benefits of PaaS within the context of teaching and research.

## REFERENCES

- [1] Mell, Peter and Grance, Timothy. National Institute of Standards and Technology. *The NIST Definition of Cloud Computing*, September 2011, <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>.

<sup>3</sup>For a list of services in the IBM Marketplace, see <https://www.ng.ibm.com/docs/Services/Services.jsp>

<sup>4</sup>For more information about the hackathon at NC State, see <http://www-01.ibm.com/software/ebusiness/jstart/news/ncsuHackathon.html>

<sup>5</sup>For information on VCL, see <http://vcl.ncsu.edu>

<sup>1</sup>Sign up for BlueMix at <http://bluemix.net>

<sup>2</sup><http://cloudfoundry.com>