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Tinkerbell, an Equinix Open Source Project, Empowers Developers to Deploy and Manage Foundational Infrastructure at Global Scale

All-in-One Bare Metal Provisioning Platform & CNCF Sandbox Project Simplifies Heterogenous Digital Infrastructure

REDWOOD CITY, Calif., April 7, 2021 /PRNewswire/ -- Equinix, Inc. (Nasdaq: EQIX), the world's digital infrastructure company™, today announced that Tinkerbell, an all-in-one open source bare metal provisioning platform, has added significant new features since joining the Cloud Native Computing Foundation (CNCF) Sandbox program. As a CNCF project sponsored by Equinix, Tinkerbell has also gained ecosystem adoption among cloud native digital leaders for its ability to empower developers to deploy and manage infrastructure across private, hybrid and edge environments. Tinkerbell's growing community of enterprises, hardware manufacturers and open source developers are contributing code to the project alongside updates from Equinix, helping to add new components, expand documentation and release a technical preview of a new Cluster API provider for Kubernetes.

Tinkerbell is a collection of microservices that together help organizations transform static physical hardware into programmable digital infrastructure regardless of manufacturer, processor architecture, internal components, or networking environment. Its cloud native and workflow-driven approach has been tested in production at Equinix Metal™ with millions of successful provisions of diverse hardware across dozens of global locations.

With Tinkerbell, infrastructure operators and developers can normalize any heterogenous hardware (including x86 and Arm); create powerful workflows to configure and secure private, hybrid or edge infrastructure; deploy their choice of operating system or virtualization software; and manage the life cycle of hardware programmatically.

To get started with Tinkerbell today, visit https://tinkerbell.org/. To watch a livestream demo of Tinkerbell on Wednesday, April 7, 2021, at noon PST, visit: https://www.twitch.tv/equinixmetal

Highlights/Key Facts:

- The latest release of Tinkerbell includes a number of new or improved capabilities:
  - **New Component**: Hook is a next-generation in-memory operating system installation environment that builds on extensive experience. Hook was developed with community participation and is based on popular projects including Docker's LinuxKit. Hook allows end users to quickly rebuild action images, significantly reducing build times from approximately 45 minutes to 90 seconds. Hook also reduces memory footprint while making rebuilding action

images for different processor architectures significantly easier. Deployment metrics are available via Prometheus endpoints, allowing operators to monitor their provisioning workflows with their preferred metrics tooling.
    - **Composable Workflows via Shared Actions**: Using the CNCF Artifact Hub, Tinkerbell users can now share and reuse common workflow actions just as they would with container images on Docker Hub. Common Tinkerbell actions are now written in Go and delivered as binaries to make it easier to author new workflows while reducing memory footprint. These actions can also make use of new functionality from Hook to decrease provisioning times through technologies like kexec.
    - **Cluster API for Tinkerbell**: By supporting Cluster API, Tinkerbell is adopting the leading community provider for provisioning Kubernetes clusters, increasing interoperability and decreasing the learning curve for those already familiar with Cluster API. After successful community testing, Cluster API for Tinkerbell (CAP-T) will now be extended to implement the full API.
    - **Out-of-the-Box Support for Major Operating Systems** – Tinkerbell's support for major operating systems such as VMware ESXi, RedHat Enterprise Linux, Windows Server, Flatcar Linux, Ubuntu, CentOS 8, Debian and NixOS has been tested by the community. New configurable actions provide the ability to deploy any operating system on Tinkerbell as covered in the updated Operating System documentation.
- The latest Tinkerbell release also includes an updated sandbox that allows users to get up and running with a validated version of the Tinkerbell stack, binaries for both x86 and Arm processors, and introduces a new capability allowing users to swap in and out components. The Tinkerbell sandbox is available through a local development environment on HashiCorp Vagrant Cloud.
- Tinkerbell has four major components: a DHCP/TFTP server (Boots), a metadata service (Hegel), an in-memory operating system installation environment (Hook) and a workflow engine (Tink). There is also an optional fifth component: a power and boot service (PBnJ) that communicates with the Baseboard Management Controllers (BMCs). The workflow engine is comprised of a server and a command line input (CLI), which communicates via remote procedure calls (gRPC).
- Tinkerbell was open sourced by Equinix in May 2020 and accepted as a CNCF Sandbox project in November 2020 to empower organizations to deploy and manage diverse physical infrastructure at scale and accelerate their move to hybrid multicloud architectures.
- Tinkerbell currently powers thousands of daily provisions at Equinix Metal, an interconnected and secure bare metal service. Equinix Metal applies a developer and API-first mindset to foundational infrastructure and provides a fully automated way for digital businesses to access the value of Platform Equinix® via its leading collection of DevOps, open-source and native Equinix Fabric™ integrations.

Quotes:

- **Ross Kukulinski, Product Management Lead for Tanzu Kubernetes Grid, VMware**
  "As we push VMware Tanzu into more places, bare metal lifecycling is becoming increasingly important, so we're excited to see Tinkerbell gain momentum as part of the CNCF and the addition of a Cluster API provider for Tinkerbell. From a Kubernetes perspective, it's fabulous to see leaders like VMware, Equinix, Microsoft and others rally around Cluster API to pool our development efforts and accelerate the cluster life cycle ecosystem."

- **Sebastian Scheele, CEO, Kubermatic**
  "With Kubermatic Kubernetes Platform, we empower teams worldwide to automate the deployment and operations of multiple Kubernetes clusters in hybrid and multicloud setups. While Kubeadm has solved the problem of running clusters on bare metal, provisioning them remained a challenge. While various tools solve the problem of running Kubernetes on bare metal, Tinkerbell fills a critical gap by facilitating the life cycle of the underlying physical infrastructure in a cloud native and API-driven way."
- **Mark Coleman, Director of Developer Relations**, **Equinix Metal**
  "Equinix Metal is passionate about bare metal provisioning and leveraging the power of software to change the world. Community and openness are important to everything we do, from our involvement in the Open19 hardware project to our next-generation provisioning platform, Tinkerbell. We are excited to bring our experience of millions of provisions over half a decade to provide a robust provisioning platform on which our partners and community can create and share workflows to meet any need."

Additional Resources

- Visit Tinkerbell.org [website]
- Visit the Tinkerbell GitHub repository [website]
- Visit Twitch to watch the Tinkerbell Livestream Demo [Twitch]
- ESG – Interconnection Amplifies the Value of Bare Metal Deployments [analyst report]
- Equinix Metal: Bare Metal and More! [blog]
- Equinix Metal [website]
- Equinix Metal Expansion Equips Digital Leaders to Harness Physical Infrastructure at Software Speed [press release]

About Tinkerbell
Tinkerbell is an open source, all-in-one bare metal provisioning platform for managing data centers at scale worldwide. Developed and maintained by Equinix, and with an active and growing community of open source contributors from across the cloud native ecosystem, Tinkerbell standardizes application management and infrastructure for any architecture. With Tinkerbell, organizations can deploy and manage digital infrastructure from the ground up, from bare metal to Kubernetes, with the components needed to build locally and scale globally. Tinkerbell is licensed under the Apache license, version 2.0. To get started, visit tinkerbell.org.

About Equinix
Equinix (Nasdaq: EQIX) is the world's digital infrastructure company, enabling digital leaders to harness a trusted platform to bring together and interconnect the foundational infrastructure that powers their success. Equinix enables today's businesses to access all the right places, partners and possibilities they need to accelerate advantage. With Equinix, they can scale with agility, speed the launch of digital services, deliver world-class experiences and multiply their value.

Forward-Looking Statements
This press release contains forward-looking statements that involve risks and uncertainties. Actual results may differ materially from expectations discussed in such forward-looking statements. Factors that might cause such differences include, but are not limited to, the challenges of acquiring, operating and constructing IBX data centers and developing, deploying and delivering Equinix products and solutions, unanticipated costs or difficulties relating to the integration of companies we have acquired or will acquire into Equinix; a failure to receive significant revenues from customers in recently built out or acquired data

centers; a failure to complete any financing arrangements contemplated from time to time; competition from existing and new competitors; the ability to generate sufficient cash flow or otherwise obtain funds to repay new or outstanding indebtedness; the loss or decline in business from our key customers; risks related to our taxation as a REIT; and other risks described from time to time in Equinix filings with the Securities and Exchange Commission. In particular, see recent Equinix quarterly and annual reports filed with the Securities and Exchange Commission, copies of which are available upon request from Equinix. Equinix does not assume any obligation to update the forward-looking information contained in this press release.

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