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ZTE 5GC Network Deployment Best Practice

Industry overview

Communications Service Providers (CSPs) are leveraging 5G network deployment as a pivotal step in driving the digital transformation of their operations. As a network built on Network Functions Virtualization (NFV) principles, 5G enables CSPs to share standardized hardware resources, reducing capital investments while decoupling software from hardware. This approach enhances scalability and responsiveness. However, the shift to NFV also introduces challenges, such as the complexity of large-scale network deployment, multi-vendor integration, and the proliferation of interface standards. To address these issues, the industry increasingly relies on automation tools to enhance integration efficiency and quality, mitigating the pain points associated with virtual network integration.

ZTE's Practice in 5GC Network Deployment

ZTE has maintained a strategic partnership with Red Hat for over eight years, collaborating to develop end-to-end (E2E) virtualized 5G network solutions built on the Red Hat platform. Through in-depth study of Red Hat's E2E integration processes, ZTE has developed automated integration tools tailored to the platform's specific features. These tools significantly enhance the efficiency of integration and deployment, while improving the quality of Operations and Maintenance (O&M) throughout the entire lifecycle - ranging from integration planning, design, and verification, to deployment, inspection, and ongoing platform support. ZTE is dedicated to delivering efficient, reliable E2E integration solutions to its customers.

- **iDevise (Network Planning & Design):** In the integration planning and design phase, iDevise enables data center (DC) planning and design on the Red Hat platform. It supports data design across multiple layers, including hardware, bearer, NFVI (Network Functions Virtualization Infrastructure), and VNF (Virtual Network Function). iDevise can automatically generate the Low-Level Design (LLD) necessary for deployment. Offering template-based, hierarchical design, it follows a minimum input principle and includes built-in parameter verification to ensure accuracy. The design files can then be seamlessly imported into the iDeploy tool for automated deployment.
- **iCheck (Hardware Connectivity Check):** During the hardware integration phase, connection errors can significantly impact subsequent tasks, often requiring costly solutions. After the hardware installation of a new resource pool, ZTE's iCheck tool verifies hardware connectivity based on the Low-Level Design (LLD), utilizing hardware discovery protocols and detection

packets. The tool automatically generates check results, ensuring accuracy and preventing potential issues early in the process. iCheck boasts an execution efficiency of 5 sets per minute, streamlining hardware validation and minimizing delays.

- **iDeploy (Deployment):** In the deployment and implementation phase, iDeploy enables end-to-end automated 5GC network deployment on the Red Hat platform by simply importing the necessary LLD files, software packages, and VNF plug-ins. It supports multi-level, end-to-end "one-click" automated deployment, along with pre-deployment automated checks, one-click rollback, and single-step retry capabilities. These features ensure a seamless and efficient deployment process, minimizing manual intervention and reducing the risk of errors.
- **Inspector (Enhanced Inspection):** Before and after major operations, Inspector provides one-click preventive inspections to ensure the Red Hat platform's status remains consistent. During the operations and maintenance (O&M) period, Inspector tasks are automatically triggered at regular intervals within designated security windows, helping maintain platform health. ZTE's Inspector covers all key components, including Red Hat virtual machines (VMs), containers, and storage systems. Currently, it features over 100 health inspection items, encompassing 44 Red Hat OpenShift Container Platform (OCP) items, 29 Red Hat OpenStack Platform (OSP) items, and 22 Red Hat Ceph items, ensuring comprehensive platform oversight.

Solution benefits

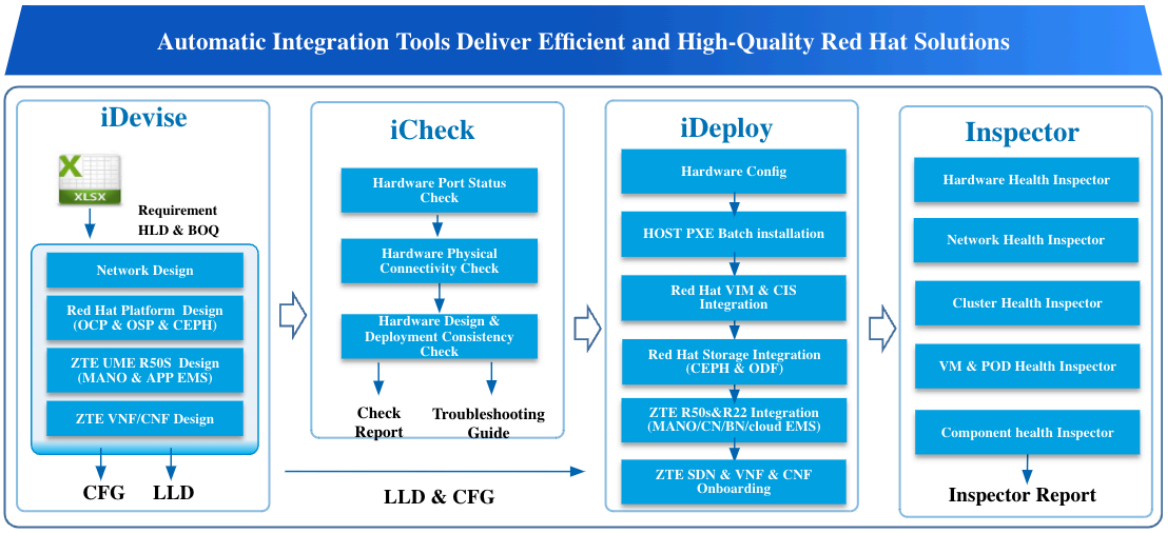
ZTE's automated integration toolsets have been successfully deployed across multiple overseas 5GC network projects built on the Red Hat platform, delivering strong support for rapid deployment and seamless integration. Key highlights and benefits include:

- **Agile Design:** Automatically generates all LLD and configuration files, reducing the design phase duration by 50%. This process lowers the skill requirements for design personnel and enhances design quality through built-in self-inspection mechanisms.
- **Accurate Inspection:** Addresses the challenge of poor hardware integration quality by proactively identifying construction issues like misconnections and open circuits. It accurately detects discrepancies between the design and implementation, including wrong, missing, or interchanged connections, thereby reducing hardware connection error rates in the data center by over 5%.
- **Efficient Deployment:** Enhances the Red Hat platform deployment tool to facilitate E2E one-click deployment and integration of all Red Hat and ZTE components within data centers. This tool supports the automatic installation of Red Hat OSP, OCP, and Ceph. As a result, the

commissioning time for a single site is reduced by 75%, significantly lowering the quantity and skill requirements for on-site engineers.

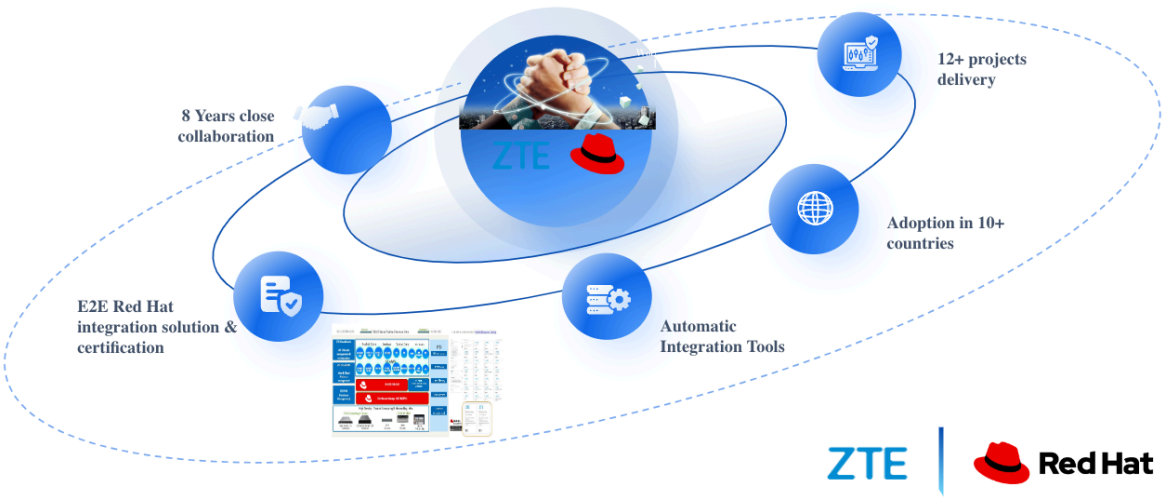
- **Comprehensive Inspection:** Facilitates minute-level inspections of the Red Hat platform, providing real-time results for major operations and ensuring that services are functioning correctly post-operation. This capability reduces the complexity of O&M, decreases daily workloads, and enhances O&M intelligence.

High level solution architecture overview



ZTE | Red Hat

Why Red Hat



ZTE | Red Hat

With the evolution of telecommunications networks towards virtualization and cloudification, CSPs are increasingly opting for open cloud platforms as the foundational layer for their 5GC networks. The Red Hat platform, known for its stability, integration capabilities, security, and support for open-source technologies, has emerged as the preferred choice for many CSPs looking to build and deploy 5G network cloud infrastructures. ZTE, a world-leading provider of integrated information and communications technology solutions, has successfully delivered over 12 projects globally through its partnership with Red Hat, earning widespread acclaim from customers. Moving forward, ZTE and Red Hat will continue to collaborate on innovation and exploration, striving for further market breakthroughs and delivering efficient, reliable 5GC networks for CSPs.

Learn more

Discover how Red Hat and ZTE provide integrated communication information solutions to telecommunications operators, government and enterprise customers, and consumers worldwide. For more information, visit Red Hat Partner Catalog and ZTE OpenLab.