HIGH PERFORMANCE OF IOT(INTERNET OF THINGS)

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Abstract - *SAT-IoT platform is an Architectural Model for a more robust performance Fog/Edge/Cloud IoT Platform. Modern new IoT standards don't detail enough some important and affective aspects because the Fog/Edge computing support, the IoT computation topology management or the IoT presentation systems. This work defines three new concepts: a) the prototype of edge/cloud computing transparency that lets the computation nodes change dynamically without administrative intervention; b) the IoT computing topological management that provides an IoT system global aspect, from the hardware and communication infrastructures to the software distribute on them, and c) the automation and integration of IoT presentation systems for real time data visualization, current IoT topology and current paths of knowledge flows. it's also defined a replacement architectural model that has these model and covers other IoT demands, like security safeguard services supported Blockchain. This architectural model definition is taken because the basis for developing a replacement advanced IoT platform.*

1. INTRODUCTION

The International Telecommunication Union (ITU) defines the net of Things (IoT) it's mainly defined because the internet of things and it's the worldwide infrastructure for the knowledge society and enabling advanced services by interconnecting (physical and virtual) things supported, existing and evolving, interoperable information and communication technologies. It requires the definition of an IoT formal framework that integrating the involved technologies, systems and devices, the prevailing models define the structure of an IoT platform as a group of logical entities such as: Business & External Application, Services & IoT Application, IoT Network & Gateways, Devices and Physical Layer It also describe functionalities such as: Connectivity, Device management, Data Access and Databases, processing and Management of Actions, Data Analytics, External interfaces including Human Machine Interface (HMI), etc. the most purpose is to process of knowledge near its sources so as to scale back latencies and save bandwidth.

Current new IoT standards don't detail enough some important and emergent aspects because the Fog/Edge computing support, the IoT computation topology management or the IoT visualization systems. SAT -IoT defines three new concepts: a) the paradigm of edge/cloud computing transparency that we will change computation nodes dynamically without presence of administrator b) IoT computing topology management it gives the whole architecture view from the hardware and communication infrastructures to the software deployed on them, and c) the automation and integration of IoT visualization systems for real time data visualization, current IoT topology and current paths of knowledge flows. SAT-IoT is an architectural model for a high performance Fog/Edge/cloud IoT platform.

2. How IoT works?

An IoT ecosystem consists of web-enabled smart devices that use embedded processors, sensors and communication hardware to gather, send and act on data they acquire from their environments. IoT devices share the sensor data they collect by connecting to an IoT gateway or other edge device where data is either sent to the cloud to be analyzed or locally. The devices do most of the work without human intervention, although people can interact with the devices as an example, to line them up, give them instructions or access the info.

3. Why IoT is important?

The internet of things helps people live and work smarter likewise as gain complete control over their lives. IoT provides businesses with a real-time cross-check how their companies' systems really work, delivering insights into everything from the performance of machines to supply chain and logistics operations. It enables companies to automate processes and reduce labor costs. It also cuts down on waste and improves service delivery, making it more cost-effective to manufacture and deliver goods. Smart cities help citizens reduce waste and energy consumption and connected sensors are even employed in farming to assist monitor crop and cattle yields and predict growth patterns such, IoT is one in every of the foremost important technologies of way of life and it'll still devour steam as more businesses realize the potential of connected devices to stay them competitive.

4. FOG COMPUTING

Fog computing may be a decentralized computing infrastructure and to enhance efficiency, through it's going to even be used for security and compliance reason. within which data, compute, storage and applications are located somewhere between the info source and also the *cloud. Fog computing brings the benefits and power of the cloud closer to where data is made. many folks use the terms fog computing and interchangeably, because both involve bringing intelligence and processing closer to where the info is made. this can be often done to enhance efficiency, though it's going to even be used for security and compliance reasons.*

4.1 How fog computing works

Cloud computing isn't available for several IoT applications, fog computing is usually used. His distributed approach addresses the requirements of IoT and industrial-IoT additionally because the amount of knowledge, smart sensors and IoT device generate, which might be costly and time consuming to send to the cloud for processing and analysis, though cloud servers have the ability to try to these, they're often too far-off to process the information and respond in a very timely manner. additionally, having all endpoints connecting to and sending information to the cloud over the net can have privacy, security and legal implications, especially when addressing sensitive data subject to regulations in several countries.

5. EDGE COMPUTING

Edge computing might be a distributed computing paradigm which brings computation and data storage closer to the position where it's needed, to reinforce response times and save bandwidth. In edge computing, intelligence and power are going to be located in either the endpoint or a gateway. Supporter of edge computing commend its reduction of points of failure, because each device independently operates and determines which data to store locally and which data to send to a gateway or the cloud for further analysis. Proponents of fog computing over edge computing say it's more scalable and offers a stronger big-picture view of the network as multiple data points feed data into it.

6. CLOUD COMPUTING

Cloud computing is that the on-demand availability of ADPS resources, especially data storage and computing power, without direct active management by the user. The term is usually accustomed describe data centers available to several users over the online. If the connection to the user is comparatively close, it should be designated a grip server. Clouds is additionally limited to 1 organization (enterprise clouds), or be available to several organizations (public cloud).Cloud computing relies on sharing of resources to grasp coherence and economies of scale. Proponents also claim that cloud computing allows enterprises to induce their applications up and running faster, with improved manageability and fewer maintenance, which it enables IT teams to earlier adjust resources to satisfy fluctuating and unpredictable demand. Cloud providers typically use a "pay-as-you-go" model, which may end in unexpected operating expenses if administrators aren't familiarized with cloud-pricing models. the supply of high-capacity networks, low-cost computers and storage devices additionally because the widespread adoption of hardware virtualization has led to growth in cloud computing. By 2019, Linux was the foremost widely used software, including in Microsoft's offerings and is thus described as dominant. The Cloud Service Provider (CSP) will screen, continue and gather data about the firewalls, Intrusion identification or/and counteractive action frameworks and knowledge stream inside the network.

6.1 Cloud computing exhibits the subsequent key characteristics:

•Agility for organizations is additionally improved, as cloud computing may increase users' flexibility with re-provisioning, adding, or expanding technological infrastructure resources.

•Cost reductions are claimed by cloud providers. This purportedly lowers barriers to entry, as infrastructure is sometimes provided by a 3rd party and wish not be purchased for one-time or infrequent intensive computing tasks. The e-FISCAL project's state-of-the-art repository contains several articles looking into cost aspects in additional detail, most of them concluding that costs savings rely on the type of activities supported and also the sort of infrastructure available in-house.

•Device and placement independence enable users to access systems employing a application no matter their location or what device they use (e.g., PC, mobile phone). As infrastructure is off-site (typically provided by a third-party) and accessed via the online, users can connect with it from anywhere.

•peak-load capacity increases (users needn't engineer and get the resources and equipment to fulfill their highest possible load-levels)

7. SAT-IoT MODEL

Physical Layer
Smart device Entity
IoT Data Flow Collector Entity
IoT Data Flow Dynamic Routing Entity
IoT Topology Management Entity
IoT Visualization Entity
IoT Cloud Entity
Platform Access Entity
Security and Privacy
Embedded IoT Application

Fig: SAT-IoT MODEL

The architecture comprises of the subsequent elements and entities.

A. Physical Layer

It defines the set of basic physical devices, common sensors and actuators within the real IoT scenarios (real world things). They can only get data or act in a very basic way, and that they are connected/communicated through a knowledge network. It don't consider the physical layer as part of the platform, but the layer over which the SAT-IoT platform manages, actuates and receives data.

B. Smart Device Entity

It is the mix of device entity and gateway entity.

C. IoT Data Flow Collector Entity

It is in change of interconnecting device to the SAT-IOT platfor, this interconnection behaves as an IoT platform gateway and independent of the physical devices and their field protocols, providing the common entry point to receive IoT data from devices installed within the IoT system.

The main designed to be implemented, deployed and run in any network place. But it'll be especially useful when deployed in edge nodes, because it works along with the IoT Flows Dynamic Router Entity so as to support Edge Computing and Edge/Cloud location transparency.

D. IoT Data Flow Dynamic Routing Entity

Handle dynamic data flows between processing nodes (cloud nodes, edge nodes and even smart devices). Additionally, this entity includes a distributed temporary data storage system to support data streaming services and native processing services.

E. IoT Topology Management Entity

The definition of the configuration of each IoT system deployed by the platform. This entity describes each IoT topology as a graph of computing nodes and links between them, and it includes a range of attributes like node features (CPU, Memory, etc.), electric circuit features (bandwidth), node geolocation (if available), use of resources (hardware and communication metrics), etc. This entity manages dynamically the IoT hardware topologies.

F. IoT Visualization Entity

The IoT Visualization is an innovative entity that supports the automated visualization of IoT systems deployed within the SAT-IoT platform. This entity manages two complementary views of the IoT system: the IoT system view and also the IoT data view . The System view is concentrated on the IoT topology and also the IoT data flow paths; the IoT data view is concentrated on the groups of information the system receives from devices.

G. IoT Cloud Entity

Represents the highest-level applications and services that the IoT platform provides to external systems, users and applications, it's executed within the cloud to provide an honest service.

H. Platform Access Entity

The Platform Access Entity may well be considered more a design element than an entity, because it's defined as a Platform API Gateway on top of the architecture. This API Gateway is that the single entry-point to the SAT-IoT *platform which publishes and exposes all the platform services to be utilized by external users, systems and applications. The Platform Access Entity also manages and controls the access to services through an authorization and login system supported roles and user profiles.*

I. Security and Privacy

Support the premise functionality associated with secure access to the platform therefore, Security and Privacy isn't considered as an entity during this design but as a core module that supports the fundamental functionalities associated with secure access to the platform (applications, services, data, etc.).

J. Embedded IoT

Represent the embedded IoT applications which will be designed developed and deployed integrated with the platform. These embedded applications can access to any or all internal services of the platform in order that the platform, the architecture and also the embedded applications are going to be strongly integrated, and internal applications will make the most of the platform in terms of access to its internal services, application setup functions and/or automated deployment process.

8. CONCLUSION

To boost the performance of an IoT system, the sting Computing model aims to process the big data generated from different IoT devices at their zone edge nodes. Only the processing results are transmitted to the cloud infrastructure or to the IoT devices, reducing the bandwidth consumption, the response latency and/or the storage needed. Including the "Edge/Cloud Computing Location Transparency" and so the "Topology Management" entities in IoT system models requires a novel visualization service, not only for data visualization, but also to point this IoT topology and so the paths of the data flows. Here a novel concept defined and it defines the concept of Automation and Integration of IoT Visualization System as a kind of system embedded within the IoT platform that's able to show automatically two basic dashboards: a) a system dashboard with the deployed IoT topology (nodes, links, their features and so the consumption of their internal resources like memory, bandwidth, storage, etc.) and so the info flow paths of the topology (data flows and their volume, for instance); and b) an IoT data dashboard to continuously show the data received within the platform from the configured and connected devices. the foremost advantage of this integrated visualization system is that any IoT deployment is verified even before the event of IoT applications. this happens because, once the topology is deployed and so the devices are connected, the platform would be able to show the topology (as defined within the topology management system) and so the results of the inside monitoring of the IoT system. The concept "Edge-Cloud Computing Location transparency" lets computation nodes, in an IoT constellation change dynamically (without administrator intervention).The "IoT Computing Topology Management" concept integrates the hybrid networks (cloud, edge, devices and their wireless or wired links) as an element of the IoT Platforms. this provides an IoT deployed on them. The Embedded IoT Visualization System concept offers a mechanism to check the deployment of the new IoT system within the platform. In summary, the specification of an architectural model that integrates these concepts has been of great help to understand new technical demands in IoT, providing feasible solutions for complex systems because the SAT-IoT Platform.