

The Internet of Things Role in the Architecture of Digital Enterprises

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Abstract

Companies are changing their approach, culture, activities, and data frameworks to expand digitization endeavors or move closer to advanced initiatives. Advanced change deeply disturbs existing organizations and economies. In this day and age, many new business openings have arisen that improve the capacity of the Internet and related computing innovations: Internet of Things (IoT), Service Computing, Cloud Computing, Artificial Intelligence, Big Data with Analytics, Mobile Systems, Collaboration Networks, and Cyber. Realistic systems. Digitization favors the advancement of IT conditions with many small and somewhat circulating structures, such as the IoT, microservices, or other fine granular components. The design of fine granular structures greatly affects the engineering of advanced departments and elements. The shift from a closed world articulating viewpoint to an open world more adaptable of live programming and framework structures sets the context for adaptive programming and development, which is fundamental to advanced change. In this paper, we present some perspectives on computerized pledge engineering and choices to support respect for object-based programming frameworks and administrations and intelligent advanced managements. This paper describes a new data-shaping-based approach to integrating partial IoT objects, which are unified as a semi-automated cluster in an end-to-end Enterprise Architecture Management (EAM) environment.

Keywords: Digital Enterprise, Modern Technology, Connectivity, Internet of Things (IoT), Enterprise Architecture and Management.

Introduction

IoT Changed the thinking and environment of people work, live, travel ... etc. Rather, a precursor to another mechanical change, known as Industry 4.0, and a key in computerized change for associations, urban areas, and society in general. Reason enough to understand the essence of the IoT. What is the IoT? You can discover several definitions below. Whatever the case, we should start with the basics. Look at it along these lines: People can connect to computer networks and the Internet with tools, for example, mobile phones and computers, to share data, visit, make purchases, etc. [1].

Information, data, then knowledge, and wisdom are central ideas essential to our regular exercises. These days' digital transformation is driven by data, information, and knowledge. On this basis, most institutions transform their work system from the traditional form to a digital activity based on the use of the latest technologies and computers. New departments and neatly organized advanced elements expand physical parts by adding online data, applications, and network departments.

Digitization characterizes the path of digital transformation underpinned by major innovative trends: IoT, cloud and fog computing, service computing, artificial intelligence, big data, analytics, deep learning, mobile systems, and social networking. Digital administrations and elements condense essential qualities and capabilities, which provide exponentially increased freedoms.

Digitization enables people and autonomous objects to work hand in hand with the recent past by leveraging advanced innovations. Data trading allows people to make better choices, just like choices programmed through strict frameworks. The integration of multiple granular frameworks and miniature departments greatly affects the design of advanced departments and elements [2].

It is shocking that the current state of examination and practice of large business design coordinates a large number of frameworks and micro-managements in relation to digital transformation and development of architectures does not contain a basic understanding of the diverse perspectives that appear in the engineering of computerized endeavours.

We are likely to extend to earlier, very static ways of approaching the design of a large business to accommodate the scalable and versatile digitization of new items and departments. While designing advanced elements and departments, with their starting point in open micro-granular structures, we provide sensible components to innovative building design by integrating a valuable viewpoint with an auxiliary one. Our Flow research paper is important for the ongoing exploration of basic computerized design strategies and paradigms. We study the accompanying essential exploration question:

How can endeavour design and selection management for computerized objects support open-world reconciliation across a myriad of fine-grained advanced frameworks and administrations with a holistic view and comprehensive management?

We will continue as follows. Primarily, we'll map the synthetic setting of our digital transformation approach, giving an inescapable perspective to reality-worthy relationship planning from computational technology to advanced design. This advanced endeavour design features a centralized management model that is contained within the computational elements with the help of the prevailing rationale [3]. Then, at this point, we introduce a uniquely advanced engineering reference model as a building system, which characterizes ten structural elements necessary for a comprehensive assembly model.

In view of the goal of computerized design, we focus on engineering micro-granular frameworks and departments using the IoT and micro services and provide an engineering enterprise model for a basic set of micro-granular advanced elements and departments in the pursuit of advanced engineering. Then, at this point, we give the insides of our techniques and tools to build selection management for advanced multi-faceted designs.

Background Of Study

In a world that is changing more quickly than we envision, it has gotten uncommon to discover an office or organization that doesn't specify the IoT. It is astonishing to feel that something theoretical, like an

organization association, can hold such a lot of expectation, and before we completely comprehend why the IoT is a particularly significant piece of the innovation, we first need to characterize what it is [4].

The term IoT alludes to the organization of gadgets equipped for gathering and imparting information to different gadgets on a similar organization, as this permits things to be detected and controlled distantly through the current organization foundation, and this sets out many open doors for the consistent combination of PC based frameworks on the planet materialistic [5]. Gadgets that can work with IoT can come in any shape and work, and any heart screen, auto, biometric handset, and so forth can gather and send data with some other gadget on a similar organization.

The IoT will undoubtedly disturb the manner in which we convey, and this interruption will influence changes in the economy, liable to make new business sectors similarly as the Internet has done as a web-based business, online media, and numerous different ventures. It's the manner in which IoT can possibly change the manner in which we utilize current innovation that makes it so significant [6].

A shrewd structure is perhaps the best illustration of how the IoT can be effectively utilized, where each piece of office hardware, regardless of whether it's keen locks introduced on each entryway, a keen espresso creator, or a cooling unit, can be checked and controlled distantly. At the point when gadgets can speak with one another, this makes a stage on which computerization can be customized, simply envision having the option to turn on your terminal the second you pass your worker ID at the front work area, or in the capacity to characterize and apportion a vacant space for your stopping the second you enter the workplace parking garage [7]. It is such potential outcomes that make organizations that focus on building shrewd social orders in various ventures a significant part of the IoT.

It is as yet not known whether it will be costly to make the IoT, yet what is known is the advantages that this innovation will give any organization that can utilize it. Regardless of whether it is in diminishing expense, further developing security and computerization, and further developing laborer productivity, the advantages of IoT will undoubtedly help business development [8].

IoT will be one of the greatest mechanical headways we've seen since the creation of the Internet. It's significant innovation, because it can change the manner in which we associate with our gadgets, and how we can make a consistent joining of shrewd gadgets into the actual world. Albeit the idea seemed twenty years' prior, advances that condition and backing IoT are continually developing; being connected with a blend of existing and creating innovations applied in another unique situation, in any event, tracking down a suitable meaning of the term is certifiably not a simple undertaking [10].

Digital Transformation

The development of the digital field is the ebb and flows predominant kind of business change having IT both as an innovation empowering influence and as an essential driver. Digitized benefits and related items are programming concentrated and in this way flexible and for the most part, the administration arranged [11]. Advanced items can build their abilities by getting to Cloud Services and change their present conduct.

Digitization encourages the improvement of IT frameworks with many, internationally accessible, and various, rather little and conveyed structures, similar to the IoT or Micro services [12]. A ton of programming creating ventures have changed to coordinate Micro service models to deal with the expanded speed. Thus, the applications manufactured in this way have nothing but to limit the traditional work of the administration, and the administration can adapt to this system over time and spread the benefit of it, and work on its development.

Initially, digitization was seen as an essentially specialized term. Thus, many developments are a

prerequisite for digitization: distributed computing and big data are frequently associated with the latest analytics, social software, and the Internet of Things. New developments such as artificial intelligence with deep learning support our endeavours for digital transformation. It allows for precisely computerized exercises to be performed that are generally selective for individuals.

Digitized items and administrations support the co-formation of significant worth along with the client and different partners in an unexpected way. To start with, there is extremely durable criticism to the supplier of the item. The web association of the digitized item permits gathering information forever on the use of the item by the client [13]. Then, the information given by countless computerized items can offer new experiences, which are impractical with information from a solitary gadget. Flow Research asserts that computerized items and sections offer problematic freedoms to new business arrangements, with new functionality associated with this development.

But the administrative and mechanical effects of digital development have different perspectives, which straightforwardly influence the advanced models of administration predominant computerized items. Sadly, the current demonstrating approach for planning legitimate computerized administration and item models experiences utilizing uncorrelated and various displaying approaches and constructions, with issues in the essential worth direction of fundamental forming administrations and frameworks [14].

Excellent advanced models ought to follow a distinct worth and administration viewpoint. Notwithstanding, today, we as of now have no strong worth relationship from computerized procedures to the subsequent advanced business displaying, and in this way to a worth arranged venture engineering, which today regularly has rarely appropriately adjusted help and item model portrayals.

The current commitment shows a recently presented vital worth situated model arrangement approach by connecting computerized systems with advanced plans of action for advanced administrations and close adjusted items through a drawn-out multilateral computerized venture engineering model [15]. Worth is normally connected with the value of a computerized administration or item and totals conceivably required properties for an effective client experience, like significance, allure, and convenience. The idea of significant worth is fundamental in planning satisfactory advanced administrations with their related computerized items and adjusting their advanced plans of action with esteem arranged venture designs.

According to the monetary point of view, asset value and coordinated cost characterize the major parts of financial value. The current concept of critical value as a help-based view is presented by the prevalent management (S-D) theoretical system and its management environment view. Qualifying among ideas of great value in use and respect in return traces all the way to influence and continues to influence the current outlook. Since it was coined by Adam Smith and developer of Finance Optimization, value comes in return as a measure of the cost an individual pay for assistance or an item brought to the bleeding edge [16]. The value is used as the real value and the corresponding value as the nominal value. These days, advanced advertising system has moved to the primary use of the value viewpoint considering customer experience and consumer loyalty as primary value insights. Attributes of great value to demonstrate the existence of a biological assistance system has been explained. The heirs have important traits: discretion is phenomenological, multidimensional, and sophisticated. Phenomenology of value means that value is seen primarily and explicitly by different partners in the changing environment within the auxiliary environment.

Worth outcomes as the new worth from explicit signs of connections among assets and asset blends. Accordingly, the subsequent genuine worth is still up in the air ex-risk. Incentives are esteem guarantees for a commonplace, however not exactly known client at configuration time and ought to be acknowledged some other time when utilizing these computerized benefits and related items. Our present paper draws our perspective on an incorporated worth viewpoint joined with a help point of view, See figure 1, [17].

Today, we are encountering a beginning arrangement of first computerized technique structures, as in free relationship with conventional methodology systems. Our initiation phase is a model of computerized methodology, which provides guidance and lays the foundation and value that defines advanced business definition models, with action plans, and motivational materials. Since we have the basic models for a well-ordered computerized work, we draw these basic help models and these object models into an advanced working model.

The business model deliberately characterizes the basic degree of coordination and normalization of business procedures for the transfer of departments and elements to customers. According to the worth point of view of the plan of action material outcomes in appropriate mappings to big business engineering esteem models with ArchiMate. At last, we are setting the casing for the exact meaning of advanced administrations and related items by demonstrating computerized administrations and item organizations, following semantically related composite examples.

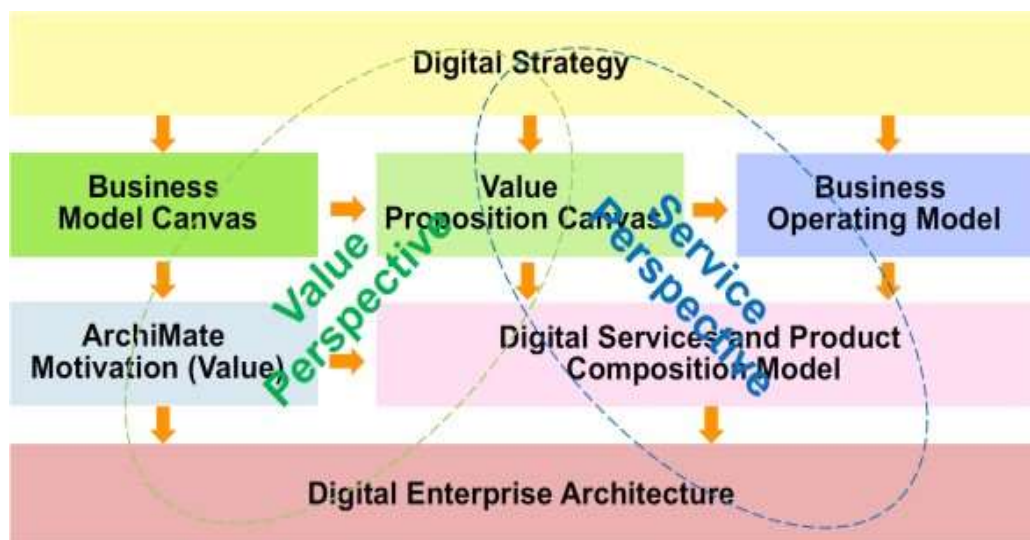


Figure 1: Digital Enterprise Architecture Framework

It has been assumed that digitization accepts the viewpoint of construction and the modern element itself and that the traditional modern elements are fixed. It can only be changed very limited by any means. Although the digital elements are dynamic, they contain all of the hardware, programming, and administrations that are implemented on the cloud. Assuming also that the advanced elements can be upgraded by the company.

Additionally, their usefulness can be broadened or adjusted utilizing outside administrations. In this way, the component of advanced items is dynamic and flexible to changing necessities and up until recently obscure client needs.

Specifically, it is feasible to make digitized items and administrations bit by bit or give briefly unlockable functionalities. Thus, clients whose prerequisites are changing can add and adjust administration usefulness without equipment alteration.

Architecture Digitalization

Digitalization advances hugely dispersed frameworks, which are IT frameworks with numerous somewhat little and conveyed structures, similar to the IoT or Microservices. Furthermore, we need to help Digitalization by a thick and various measure of various assistance types, similar to Microservices, REST administrations and put them in a cosy relationship with disseminated frameworks and the IoT. The change from a Closed-World demonstrating point of view to a more adaptable Open World piece and development

of framework designs characterizes the changing setting for versatile frameworks, which are vital for empowering Digital Transformation [18].

Digitalization considerably affects architecting advanced administrations and items. The ramifications of architecting miniature granular frameworks and administrations considering an Open World methodology in a general sense changes displaying settings, which are traditional and distinct by very static shut world and all-times steady and less modern models. Computerized Transformation, Digitization, and advanced interruption make numerous occasions that might affect undertakings and associations. Versatile venture engineering the board assumes a fundamental part in cultivating procedures and capacities for strength by giving strategies and devices to planning endeavours designs that are adaptable for change. It might address endeavours yet additionally select pieces of big business engineering like administrations and cycles. Strong Services will be administrations that give extra meta-administrations notwithstanding their centre usefulness to adapt to problematic occasions.

For example, aircraft reschedule travellers of deferred flights. Tough Processes furnish occasion overseers to manage outer occasions and are in this manner equipped for driving back the control stream on the ideal track even on account of unfriendly occasions. Their choice focuses use information from a huge number of inside and outer sources permitting them to distinguish and respond to changes in the climate.

Versatility is the ability of ventures and their data frameworks to adapt to quick and ongoing evolving occasions. Versatility is the capacity of an Information Technology (IT) framework to give, keep up with and further develop upset administrations in any event, when changes happen. Strength is a difficult ability that consolidates a large number of alternate points of view on various deliberation levels like authoritative versatility, data framework flexibility, digital versatility, organization, and innovation versatility, just as hierarchical strength. Versatility alludes to an element's capacity to convey the expected result regardless of unfavourable digital occasions constantly [19]. This capacity incorporates reaction and recuperation and creating strong by-plan frameworks. Versatility requires helpful and hierarchical methodologies with a solid spotlight on an oversight climate for big business models of data frameworks and administrations.

Enterprise Architecture (EA) is since years a very much inspired discipline of big business and IT administration. For over one-decade EA is a discipline with a logical foundation and valuable choice supporting capacities and models for ground-breaking ventures and associations. Endeavour Architecture means to demonstrate, adjust and comprehend critical associations among business and IT to set an essential for a balanced and deliberately situated dynamic structure for both computerized business and advanced advances [20].

Enterprise Architecture Management (EAM), as today characterized by a few norms like uses a very enormous arrangement of various perspectives and points of view for overseeing current IT. An impact of the EAM approach for advanced ventures ought to furthermore uphold the Digitization of items and benefits and be both comprehensive and effectively versatile.

Besides, computerized engineering sets the base for Digital Transformation driving new advanced plans of action and innovations with an enormous number of miniature organized Digitization frameworks having their neighbourhood miniature granular models like IoT, cell phones, or Microservices.

A Digital Enterprise Architecture (DEA) broadens the examination base and gives today in our momentum research ten essential compositional areas for a comprehensive characterization model, as delineated in figure 2, [21].

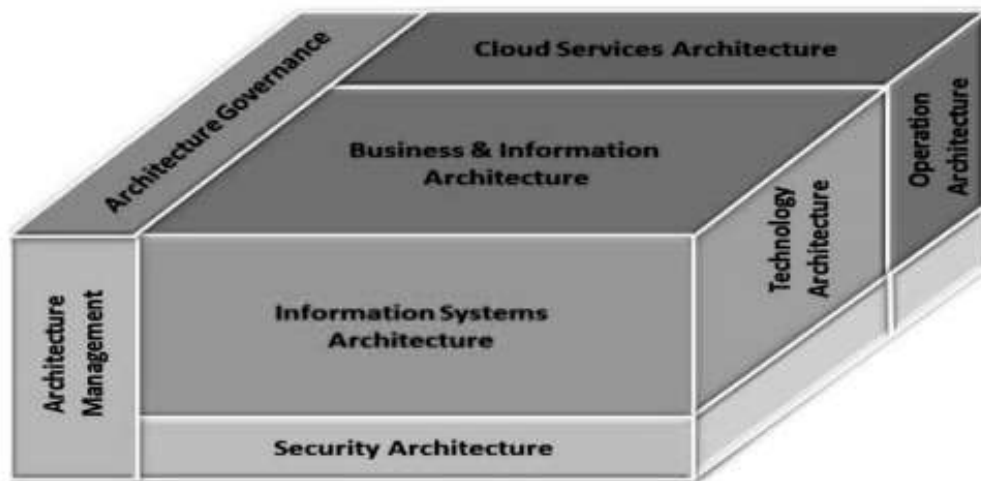


Figure 2: DEA

DEA covers additionally miniature granular structures for various advanced administrations and items. DEA abstracts from a substantial business situation or innovations since it is relevant for concrete design launches to help Digital Transformation free of various spaces. DEA upholds an all-encompassing perspective on metamodeling based extraction and base-up reconciliation strategies and methods by coordinating miniature granular perspectives, models, norms, structures, and devices into a reliable computerized undertaking engineering model.

DEA outlines these various components of a computerized design into fundamental setups of advanced engineering by giving an arranged base of building ancient rarities for related multi-point of view choice cycles. Design administration characterizes the base for very much adjusted administration rehearses through determining the executives' exercises: plan, characterize, empower, measure, and control.

Advanced administration should moreover set the casing for computerized procedures, computerized development the board, and Design Thinking approaches. The second point of administration is to set principles for esteem situated building consistency dependent on inside and outer guidelines, just as guidelines and laws. EMA for Digital Transformation (DT) a portion of the crucial laws of customary administration models to have the option to oversee and straightforwardly incorporate a lot of different miniature granular constructions, similar to the Internet of Things or Microservices.

Modelling Of Architectural Structures

Digitalization advances greatly conveyed frameworks, which are numerous somewhat little and circulated structures, like the Internet of Things, versatile frameworks, digital actual frameworks. Furthermore, we are empowering Digitalization by a thick and various measure of various help types, as Microservices, REST administrations, and put them in a cozy relationship with circulated frameworks, similar to the Internet of Things. Moreover, the Internet of Things is a fundamental establishment of Industry Revolution 4.0 (IR 4.0) and adaptable advanced endeavour models. The change from a shut world demonstrating point of view to a more adaptable Open World piece and advancement of framework structures characterizes the changing setting for versatile frameworks, which are fundamental for empowering DT. The implications of framework architectures and micromanagement that take into account an open-world methodology generally alter display settings, an old-fashioned approach distinct by way of a highly closed world, and less modern, predictable paradigms on all occasions.

Flexibility in designing small, open granular frameworks such as the Internet of Things or microservices in

general raises concerns about heterogeneity, circulation, and unpredictability. It is a comprehensive test for integrating various open-source engineering models and metallic models from different sources into a reliable computerized design. To solve this problem, we are currently formalizing smaller than expected decentralized micro-models, models, and information from structural microstructures, such as microservices and IoT into DEA-Mini (Digital Enterprise Architecture) models.

In general, midstream DEA-Mini-Data models consist of DEA data, partial DEAM models, and incomplete EA-Metamodels. Microservices are linked to DEA-Mini-Models and articles from the Internet of Things. EA-Mini-Descriptions builds, see Figure 3, [22] are expansions of the Meta-Object Facilitation Standard for the Object Management Group.

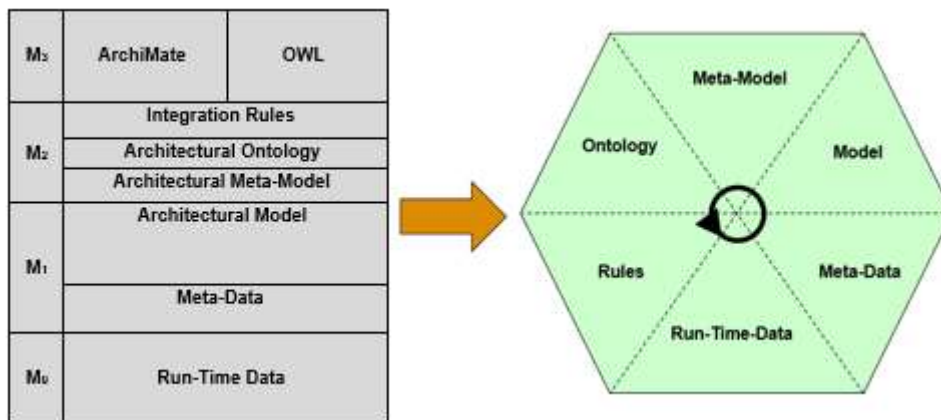


Figure 3: EA-Mini-Description.

We've extended the M1 base model layer to have the option to get metadata on top of that. Furthermore, we connected the first M2 base model to our synthetic philosophy by joining the bases. Thus, we give a linguistically relevant close-up of the metallic model for an option to help the programmed induction to distinguish between similarity models, similar to showing matches and model assignments at runtime.

For designing EA-Mini descriptions, the most noteworthy layer M3 addresses the idea of the theoretical language used in the lower M2 layer. M3 is the meta-model layer. The companion layer M2 is the metamodeling format layer. The chapter describes language materials for M1, for example, models from UML or ArchiMate. These models are structured imaging of the M0 substrate.

Unpredictable advances, necessities, and markets normally drive the development of business and IT administrations. Variation is an urgent achievement factor for the endurance of computerized endeavour designs, stages, and application conditions. The proof presents the possibility of digital environments. Environments join with fundamental vital drivers for framework advancement and framework development. Responding quickly to new innovation and market settings working on the wellness of such versatile environments.

During the coordination of DEA Mini-Models as architectural structure cells as displayed in figure 4, [23] for each significant item, for example, IoT article or Microservice, the progression astute made time-stamp subordinate structural metamodel becomes versatile.

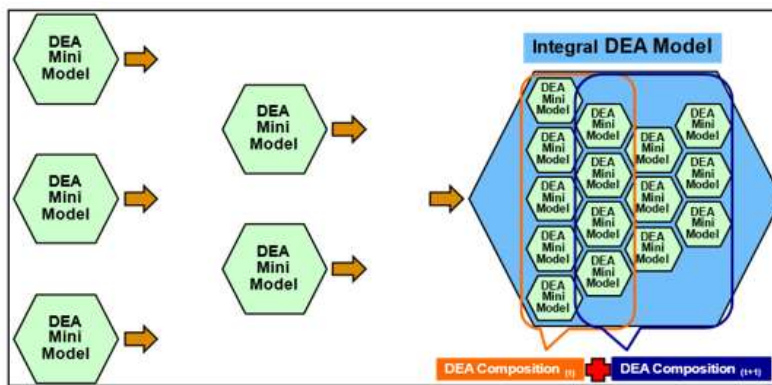


Figure 4: Architectural Structure

Being a bit nearer to the engineering and plan of frameworks, began the Living Models worldview that is worried about the model-based creation and the board of powerfully advancing frameworks. Versatile Object Modelling and its examples and utilization give valuable procedures to respond to changing client necessities, in any event, during the runtime of a framework. Also, we need to consider model compromise ways to deal with help electronic documentation of computerized designs and to sum up coordination establishments for united architecture model administration.

On account of new incorporation designs, we need to think about extra manual help. As of now, the test of our examination is to unify these DEA Mini-Models to a vital and progressively developing DEA model and database by advancing a blended program just as a communitarian choice interaction [24].

We are at present expanding model organization and change approaches by presenting semantic-upheld design portrayals, from fractional and united ontologies and partner planning rules with remarkable surmising components.

Quick changing advancements and markets for the most part drive the development of biological systems. Accordingly, we have extricated the possibility of advanced environments to connect this with the principle vital drivers for framework improvement and their development. Transformation drives the endurance of computerized structures, stages, and application environments.

Meta-Modelling Architecture In Eam

A Meta-Model is an express model of the development and rules expected to fabricate explicit models inside the space of interest, it is a model toward the end however oversees how the framework or area of interest will be displayed.

We think the underneath figure 5 ought to delineate the idea here, the framework we are worried to work as we concurred before it ought to be introduced by a model that can be seen in various manners as per the needs of partners worries, for instance, improvement see, sending view, and so forth This model is represented by a Meta-Model that portrays how to construct this model [25].

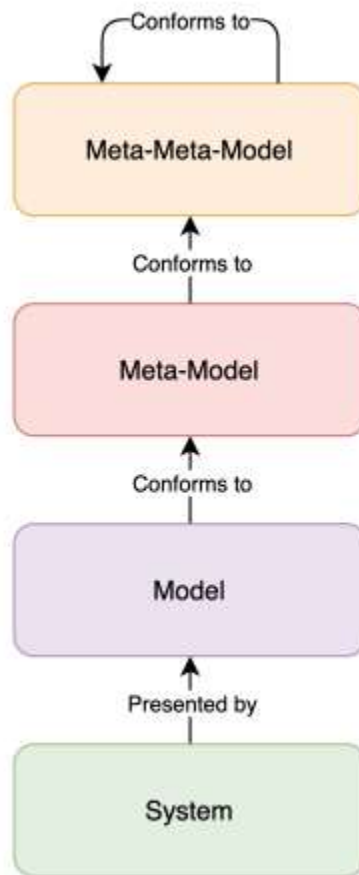


Figure 5: Meta-Meta-Model Relation

Thus, meta-meta-model is an action, and this movement produces meta-models, and the meta-meta-model is the language that communicates the meta-model.

Along these lines, envision that you might want to make demonstrating programming that requirements to make models of EAM, on the off chance that you might want to line up with the meta-model principles, you ought to observe the guidelines that administer the connections between the various classes of the model that depicted in the meta-model definition.

Conclusion

The context for digital transformation has been set by integrating value and service perspectives to make digital products with a comprehensive architecture.

The current findings also urge a digital reference architecture for companies by adopting a flexible working system that provides an integrated perspective for new digital products. To be able to support the improvement of the level of digital services provided. The company's digital structure is also benefited from in the company's adaptation to the open and provided global systems that can be accessed with ease and convenience, such as the Internet of Things.

The research also included the methods of management mechanisms and the decision of engineering digital companies with digital services and smart systems, and it showed great benefit in the corporate environment through investigations and various projects.

Despite this, there are still some limitations in the implementation of digital services in companies, with the

need to expand decision support based on analyzing data using artificial intelligence and building a context for its retrieval. There are also some obstacles to building the Internet of Things system in companies, especially in the field of multi-level evaluations.

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