

# Cognitive Dynamic Software Defined Enterprise CDSDE

Research and Project  
by

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Presented to

Enterprise Computing Conference ECC June 2017  
The conference at Marist College, New York, USA

## **Introduction:**

We had studied the technologies and solutions of enterprises with different industries, we found it is better to give Out of The Box Solution to get the excellent advantages compared to the traditional models.

## **Our Mission:**

Design and Implementation with putting the new required Industry Standards for The AI driven Enterprise which will be Experiences driven, Operation driven, Strategy driven and BPM driven.

## **Our Vision**

Transferring the Enterprises from the Traditional systems to a well-Organized standardized AIDE or CDSDE Each AI driven layer will be Data Driven, Event Driven, Follow-Up Message driven, Quality Driven and Prediction Driven Layers.

## **Why “Cognitive Dynamic Software Defined Enterprise”?**

The are 2 combinations of Traditional Enterprise Computing as follows:

1. The Enterprise Computing based on Traditional technologies
2. Cognitive Computing (e.g. WATSON IoT and other WATSON systems) + Traditional Hardware and Middleware.

The above Enterprise Computing based on traditional Enterprise Architectures and it is not cost effective, very complicated, needs training for each part, needs experiences, needs updating, needs time to develop its functions, difficult to manage, difficult to configure, it needs more time to market and the Return of Investment cannot be ensured exactly.

Therefore, We suggest our Cognitive Dynamic Software Defined Enterprise as explained in the next slides.

## **The Goals of the CDSDE or AIDE:**

- 1- Our approach is Redesigning the Enterprise to take into consideration the AI capabilities and facilities to build the required Cognitive Blocks for Strategy Planning, Designing and Operation, therefore we need Cognitive Computing in Managing, Governing, Quality Assurance and Optimization of the Enterprise in the Future.
- 2- We suggest the version will either depend on the Year of Suggestion, (e.g. CDSDE or Advanced AIDE 2017) or the target year of Completion (e.g. CDSDE or Advanced AIDE 2020).
- 3- CDSDE or AIDE will take into consideration the Hundreds of Thousands or Millions of innovative technologies, solutions, Big data of new Sciences, Engineering, Medicine technologies, Industry, Economy and Administration.
- 4- We suggest that our AI driven Enterprise should be Cognitive Self-Teaching Enterprise either by NLP from books, Journals, papers and other resources, Direct Human experiences feeding for strategy, Governance, Optimization, Quality Management, IT design and configuration with maintenance.

Our New Enterprise Computing will need new Enterprise Architectures because of The Cognitive Artificial Intelligence driven hardware, Middleware and Applications in the core of the future enterprise Computing, CDSDE is right choice for new era of AI and Enterprise Computing , we suggest the following 2 Versions of Cognitive Dynamic Software Defined Enterprise Computing as follows:

### **Our Suggested versions of “Cognitive Dynamic Software Defined Enterprise-CDSDE:**

#### **CDSDE-Version 1:**

**In this Version, we suggest the Cognitive systems will be from IBM, + Plug and Play devices from IBM or other Vendors as explained below:**

A- WATSON Enterprise Center (WATSON-EC) will include WATSON IoT + other WATSON Systems+ IoT devices.

B- WATSON Network Operation Center WATSON-NOC for Cognitive SDN, SD-WAN with Cognitive SDR.

## **CDSDE-Version 2:**

This Version is the future of the Cognitive Systems to cover the needs of very advanced multidisciplinary technologies and solutions, therefore this version will be Software Defined for all layers including services, Middleware, Infrastructure and devices.

In this type, the design and Implementation may be considered as (WATSON ++)  
like ( C language and C++ language), i.e. WATSON++ is Dynamic Software Defined  
Cognitive and Artificial Intelligence driven Enterprise Computing, this system can  
be designed and implemented by using new present and future technologies  
from different companies

## Capabilities of CDSDE-Version 2:

- 1- This CDSDE can be Self-assembled, Self-Organized, Self-Configured, Self-Prediction, Self-Operation capabilities and Self-Maintenance (Predicting the Failure, Diagnostics and repairing).
- 2- Self-interconnection, Software Defined Infrastructure, Cognitive Software Defined Network + Cognitive Software Defined Radio (it is fully different from Cognitive Radio).
- 3- Self-Optimization, Self-Governance, Self- Assessment and Quality Assurance.
- 4- Works with other Cognitive systems from different companies (IBM WATSON, Microsoft CNTK, Google Tensor Flow, ...etc.).
- 5- The Connection of CDSDE will be based on Data Exchange connection, Information Exchange Connection and Experience Exchange connection.

## **Capabilities of CDSDE or AIDE**

- 1- We can make our CDSDE or AIDE system interconnects by AI driven interconnection with other Cognitive systems like IBM Watson and Microsoft Cognitive Tool CNTK for different applications in different Industries.
- 2- We don't need to redefine the traditional Enterprise Architectures, Models, infrastructures and Business Process Management because we will need tens or may be hundreds of books to define the details of each Enterprise Architecture, BPM and IT.



## **Benefits:**

- 1- Avoiding the problems related to human works.
- 2- Cognitive Multidisciplinary Enterprise that self-developing, self-prediction of failures and Self-Planning.
- 3- Cost Effective.
- 4- Scalable and services.
- 8- Speed up the Return of Investment. Expandable to integrate with future technologies and devices.
- 5- Train one time – work always (fire and forget) principle.
- 6- No need for complicated Designs, Training, Upgrading, Updating costs for technologies!
- 7- Enable the Enterprises for speeding up Time to Market
- 9- Avoid the disadvantages of other Enterprise Architectures (TOGAF, LEAD, Gartner, FEA and other Enterprise Architectures)

## **The Cognitive Dynamic Software Defined Enterprise-CDSDE Solutions and Applications:**

includes all phases of Enterprise Research & Development , Simulation, Dev. Test and Solution Operation of :

1- Smart cities infrastructures :

A- Smart transportation.

B- Smart Energy.

C- Smart water and Sewage Management.

D- Smart Healthcare

E- Smart Education.

F- Smart Public Safety.

G- Smart Agriculture.

2- Smart Projects Management and follow-up.

3- Smart e-Administration, Financial, Legal, and follow-Up.

## **The Cognitive Dynamic Software Defined Enterprise-CDSDE Solutions and Applications: ( Continued)**

### 4- Smart Technologies:

A- Internet of Things Smart Devices & Sensors for all present and future applications

B- Smart Glasses Virtual/ Augmented & Mixed Reality, Brain Wave sensors devices, Light field glasses and Teleportation (Holoportation).

### 5- Small and medium Smart Solutions:

A- Smart Machines, Robotics, 3D printers, Smart Machines, Smart Production lines and Smart Cars.

B- Smart Applications for Laboratories, buildings, Medical, Test and Quality control Labs.

### 6- Nanotechnologies.

### 7- New technologies and Sciences.

## The Description:

- 1- The description of **Cognitive Dynamic Software Defined Enterprise CDSDE** can be named or Considered **Advanced Artificial Intelligence Driven Enterprise AAIDE** as Shown in the attached **Figure 1: Multi Layers Model for Cognitive Enterprise – MLMCE**.
- 2- It is an innovative approach, The AI driven Enterprise, uses AI driven Layers and AI driven Middleware between layers, and in each layer, there is AI driven Service bus. The AI driven service buses of all AI driven Layers will be interconnected with the AI driven Middleware.
- 3- AI Enterprises Interconnection will make cognitive connections between AI driven Enterprises. The Cognitive Middleware will be responsible of cognitive relationships and connections between the layers of the CDSDE and the Interconnection with the other CDSDEs

## The CDSDE – Layers Design Philosophy:

1- The suggested CDSDE Layers.

2- The Design suggestions of CDSDE Enterprise Layers:

A- Single On Premise (logical and Physical) CDSDE Architecture Design.

B- Single Enterprise CDSDE Cloud Architecture Design.

C- Multiple Enterprise CDSDE Cloud Architecture Design.

# Cognitive Software Defined Enterprise Layers: ( Up to Down)

## 1. Layer 6 – The Cognitive Inter Connection Layer -CIC Layer:

This layer is the Highest Level of CDSDE for Interconnection between Multi Main CSDE-DMAP for exchanging Experiences.

## 2. Layer 5 - Main Cognitive Software Defined Enterprise Decision Making And Predictions Layer **CSDE -DMAP Layer.**

## 3. Layer 4 – Cognitive Quality Assurance Processor And Accreditation System Layer **CQAPAAS Layer.**

## 4. Layer 3 - Cognitive Design and Operations Layer -**CDAO Layer** (Hardware + Software + Deep Learning +Cognitive Computing):

### A. Sub Layer 1: Cognitive Software Defined Enterprise- Project Design and Test **CSDE-PDAT sub Layer:**

1) Cognitive Natural Language Processor of Project Design and Testing **CNLP-PDAT.**

2) Cognitive Mathematical Processor of Project Design and Testing **CMP-PDAT.**

3) Cognitive tested Templates Processor of Project Design and Testing **CTTP-PDAT.**

4) Cognitive Development/ Test and Simulation of Project Design and Testing **CDTS-PDAT.**

### B. Sub Layer 2: CSDE -OM Sub Layer:

1) Cognitive Natural Language Processor of Operation Management **CNLP-OM.**

2) Cognitive Mathematical Processor of Operation Management **CMP-OM.**

3) Cognitive Information System of Operation Management **CIS-OM.**

## Cognitive Software Defined Enterprise Layers: (Continued)

5- Layer 2- Cognitive Software Defined Communications Layer– **CSDCOM Layer** (Hardware, Software, Deep Learning & Cognitive Computing):

A. Traditional Communications Sub Layers :

- 1) Traditional SDN or SD-WAN Sub Layer.
- 2) Traditional Physical sub Layers.

B- Cognitive Software Defined Communication Sub Layers – **CSDC Sub Layers:**

- 1) Cognitive Software Defined Communication Networks -**CSDCN Sub layer.**
- 2) Cognitive Software Defined Communications Physical Sub Layer – **CSDCP Sublayer** including:  
, Cognitive Software Defined Radio **CSDR** + other CSDCP Technologies).

6- Layer 1 - Cognitive Operations and Maintenance of Devices -**COAMOD Layer** : Hardware, Software and Devices ( IoT Smart Devices & Sensors , Smart phones , Smart Glasses Virtual/ Augmented & Mixed Reality and others).

# The Design Philosophy of CDSDE- Cognitive Middleware

## The CDSDE Cognitive Middleware Infrastructure and Administration Designs: ( Slides 17,18,19 and 20)

- 1-Centralized CDSDE- Cognitive Middleware.
- 2-Decentralized CDSDE- Cognitive Middleware.
- 3-Hybrid CDSDE- Cognitive Middleware.

## The CDSDE-Middleware Function Systems Design: ( Slides 21,22,23, 24,25, 26, 27 and 28)

- 1- CDSDE- Cognitive Enterprise Experience Management Systems- CEEMS.
- 2- CDSDE- Cognitive Enterprise Experiences Bank-CEEB.
- 3- CDSDE-Cognitive Enterprise Relationships & Connections Management System-CERCMS.

## The CDSDE- The Layers and Cognitive Middleware Integration: ( Slides 29, 30, 31 and 32)

- 1- Local Enterprise Cognitive Middleware ( suitable for On Premise).
- 2- Shared Enterprise Cognitive Middleware ( suitable for Public Cloud, Private Cloud, Hybrid Cloud).
- 3- Hybrid (Local Middleware and Shared Middleware .



# Cognitive Dynamic Software Defined Enterprise Middleware (CDSDE-Middleware)

## **The CDSDE Infrastructure and Administration Designs:**

**1-Centralized CDSDE-Middleware.**

**2-Decentralized CDSDE-Middleware.**

**3-Hybrid CDSDE-Middleware.**

## 1-Centralized CDSDE-Middleware:

This type will be managed by one or more IT tenant administrators but with central Enterprise Management as follows:

### A- On- Premise CDSDE-Middleware:

1)Physically Centralized in the Same Enterprise Center building.

2)Logical Centralized in the Same Enterprise Center but Distributed in multi physical systems in different buildings in different areas.

### B- Cloud CDSDE-Middleware.

C- Hybrid Centralized CDSDE-Middleware: contains blocks from On-Premise CDSDE-Middleware and Cloud CDSDE -Middleware of the Same Enterprise.

## 2-Decentralized CDSDE-Middleware:

Multiple Enterprises share their CDSDE-Middleware and treat the shared blocks of CDSDE-Middleware Logically as a one entity, there are 3 types of administrating the Decentralized CDSDE-Middleware as follows:

### A- Virtual Distributed CDSDE-Middleware (Cloud Middleware Services):

Single Tenant administration of IT services with Multitenant administration of Experiences sharing.

### B- Physical distributed CDSDE-Middleware(Multiple On-Premise CDSDE-Middleware):

Multitenant IT administration & Multitenant administration of Experiences Sharing.

### C- Hybrid Distributed CDSDE-Middleware:

It is a mix from the Virtual and Physical distributed CDSDE-Middleware, i.e. mixing Distributed Cloud Middleware Services and On Premise Middleware Services, the administration will be Multitenant IT administration and Multitenant Experiences administration.

### 3-Hybrid CDSDE-Middleware:

- A- Single Centralized CDSDE-Middleware in a certain enterprise with one or more Centralized CDSDE-Middleware in other enterprises, this is very useful in Experience Exchange or Experience Sharing of Enterprises deeply.
- B- Single Centralized CDSDE-Middleware in a certain enterprise with Decentralized CDSDE-Middleware, this is very useful in Sharing the Experiences (without Exchange) between Enterprises, the enterprises share the work of its CDSDE-Middleware blocks but without giving the Know-How.
- C- Share the CDSDE-Middleware Blocks of Decentralized CDSDE-Middleware Group with other Decentralized CDSDE-Middleware groups.

## **CDSDE-Cognitive Middleware Systems Design:**

1-CDSDE- Cognitive Enterprise Experience Management Systems- CEEMS.

2-CDSDE- Cognitive Enterprise Experiences Bank-CEEB.

3-CDSDE-Cognitive Enterprise Relationships & Connections Management System-CERCMS.

## **Similarities between the Human Neural System and CDSDE-Middleware Systems:**

The 3 systems of CDSDE-Middleware will be very strong to perform successful and efficient management of all enterprise resources, self-assembling, self-Optimization, self-governance, self- assessment, self-protection and self-security as follows:

1-The CEEMS is the Brain of the CDSDE.

2-The CEEB is the Memory of the CDSDE.

3-The CERCMS is the Neural channel of the CDSDE.

# CDSDE- Cognitive Enterprise Middleware Systems:

## 1-Cognitive Enterprise Experience Management System - CEEMS:

consists of :

- A- Self-Experiences Management System SEMS
- B- Experiences Exchange Management System EEMS.
- C- Shared Multidisciplinary Experiences Management System SMEEMS.

## 2-Cognitive Enterprise Experiences Bank CEEB.

consists of :

- A- Cognitive Experiences Building, Storing and Retrieving System CEBSRS.
- B- Cognitive Experiences Operation Knowledge Base System CEOKBS.
- C- Cognitive Information and Data Management System CIDMS.
- D- Cognitive Time, Positions and Maps Management System CTPMMS.
- E- Cognitive Assets Management System.

## 3- Cognitive Enterprise Relationships and Connections Management System CERCMS:

consists of:

- A- Relationships Knowledge Base Management Processor RKBMP.
- B- Relationships Management Tasks Processor RMTP.
- C- Relationships Networks Routing and Connection Manager RRCM.
- D- CDSDE- Layers Relationships Networks Router CDSDE-LRNR.
- E- CDSDE- Contents Nodes Relationships Networks Router CDSDE- CNRNR.

## The functions of the CDSDE-Middleware Systems:

### 1-CDSDE- Cognitive Experience Management Systems- CEEMS:

The CDSDE-CEEMS will manage the Multidisciplinary STEM Experiences in the project and operation phases for Education, Healthcare, Industry, Finance, e-Government and Smart cities, CEMS do the following management duties:

#### A- Self-Experiences Management:

- 1)Managing and applying all tasks of NLP, MAP, Dev Test & Simulation sublayers.
- 2)Managing and applying all tasks of applying the experience by operation Management sublayers.
- 3)Managing and applying all tasks of self-assessment by applying Quality Assurance including estimating the required KPI for each part of application and doing the performance appraisal and then applying the quality assurance procedures to check the strength and weakness in the experience of the application and after that applying the procedure of self-repairing and updating.

#### B- Experiences Exchange Management.

#### C- Shared Experiences Management.



## The functions of the CDSDE-Middleware Systems

### 2-Cognitive Enterprise Experiences Bank -CEEB:

consists of the following:

#### A- Cognitive Experiences Building, storing and Retrieving System:

Applying AI Algorithms for Self-Assembling, self- Assessment, self-Governance, Quality assurance standard Self-Protection and Security for the following:

- 1) Well-tested Experiences.
- 2) Experiences Under Development, Test and Simulation.
- 3) Building Relationships Network Routing & Communication.

#### B- Cognitive Experiences Operation Knowledge Base System CEOKBS:

Applying AI Operation Algorithms for Modifying, updating and evaluating the following:

- 1) well-tested Experiences.
- 2) Experiences under Development, Test and Simulation.
- 3) Relationships network routing & Communication Management.

#### C- Cognitive Information and Data Management System CIDMS:

do the following duties:

- 1) Relational Database Management systems and the relational data bases.
- 2) Big Data Management System and the Big Data.
- 3) Multilevel Graph DB management systems and Graph DB.
- 4) Information Management Systems.

## The functions of the CDSDE-Middleware Systems: (Continued)

### 3- The CDSDE- Cognitive Enterprise Relationships and Connections Management System CERCMS:

Consists of the following:

#### A- Knowledge Base Management of Relationships and Connections :

- 1) Discovering relationships and connections.
- 2) Arranging relationships and connections.
- 3) Storing relationships.
- 4) Subscribing and Publishing of relationships and connections.
- 5) Attaching relationships and connections.
- 6) Updating relationships and connections.
- 7) Creating relationships and connections.
- 8) Adding relationships and connections.
- 9) Deleting relationships and connections.

#### B- Task Management of Relationships and Connections :

This is the Scheduler (Task Manager) of Relationships and Connections, do the following Tasks:

- 1) Building, Updating and Deleting Tasks of relationships and connections.
- 2) Applying Tasks of Relationships and connections.
- 3) Evaluating and certifying the above Tasks of Relationships and connections.
- 4) Sharing and transferring of the above Tasks with other
- 5) Storing and updating the above Task Management Experiences in the CDSDE-Cognitive Enterprise Operations Knowledge Base system.

## C-Relationships Networks Routing and Connection Management:

do the following duties:

### 1) CDSDE- Layers Relationships Networks Router CDSDE-LRNR:

- A) CDSDE – CDSDE in the CDSDE Complex.
- B) Layer - layer in the same CDSDE or different CDSDEs.
- C) Sublayer – Sublayer in the same main Layer or different layers.
- D) Management system – Management Systems in the Sublayer or different sublayers.

### 2) CDSDE- Contents Nodes Relationships Networks Router CDSDE- CNRNR:

do the following duties:

- A) Data-Data nodes.
- B) Information-Data nodes.
- C) Information-Information nodes.
- D) Task-Data nodes.
- E) Task -Information nodes.
- F) Experience-Data nodes.
- G) Experience-Information nodes.
- H) Experience- Tasks-Information nodes.
- I) Experience-Experience nodes.

## D- Cognitive Time, Positions and Maps Management System CTPMMS:

consists of the following:

1) Cognitive Time Management: do the following duties:

- A) Real Time Management for events and contents processing.
- B) Local (City or Country) and International Time Management.
- C) Tasks Timing and Timing Relationships Analyses Management.
- D) Experiences of Time Analyses Management.

2) Cognitive Positions & Maps Management System or Cognitive GPS/GIS System:

do the following duties:

- A) Real Time positioning and Mapping management systems.
- B) Experience of Position and Map Analyses Management.
- C) Local (City or Country) and International Position Management.
- D) Tasks positioning, Spatial Data Relationships Analyses Management.
- E) Cognitive Assets Management System: do the following duties.

3) Real time Assets position follow-up.

4) Tasks of Experience of Assets management.

## The Cognitive Software Designed Enterprise CDSDE- The Layers & Cognitive Middleware Integration types:

1- On Premise CDSDE Layers with local Enterprise Middleware.

This is the CSDE Layers with built-in Cognitive Middleware as shown in Figure -1.

2- CDSDEs Shared Enterprise Middleware thorough the CDSDE Interconnections.

This is the CDSDE layers integrated with Cognitive Middleware in Public Cloud, Private Cloud and Hybrid Cloud, as shown in Figure-2 .

3- Hybrid (Local Middleware and Shared Middleware):

This type can be made from On premise with sharing ( Giving or Borrowing the Experiences) with other CDSDEs.

Multi Layers Model for Cognitive Enterprise – MLMCE (Architecture, BPM, Data Analytics, Design and Quality Management)

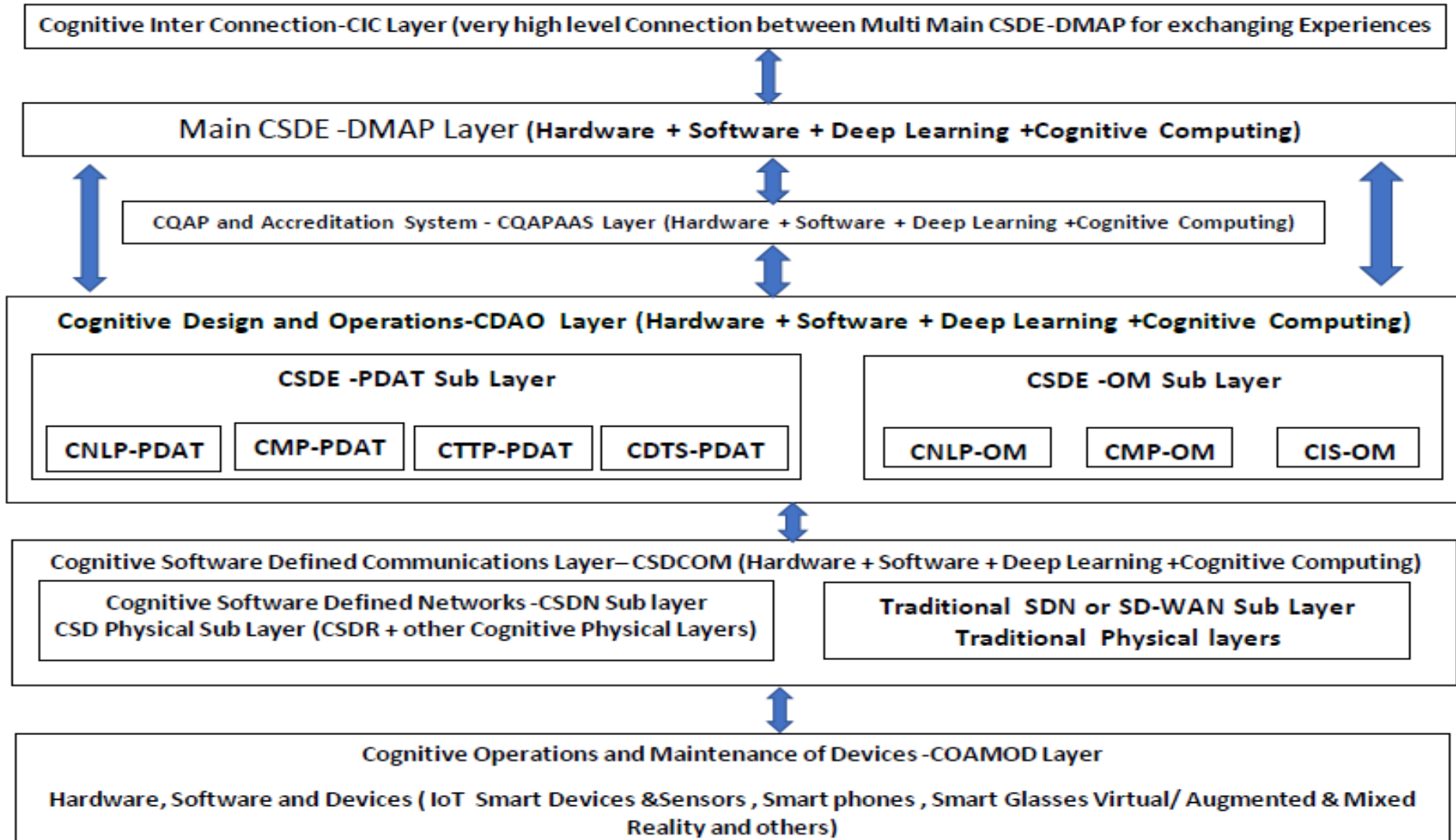


Figure 7 :Multi Layers Cognitive Enterprise

## 2- Shared Enterprise Middleware thorough the Interconnections with other Enterprises:

The sharing tasks depend on the Owner Sharing Policies, Restrictions and Authorizations which enable or disable the sharing of the specific parts of the Cognitive Middleware.

The Sharing has the following types:

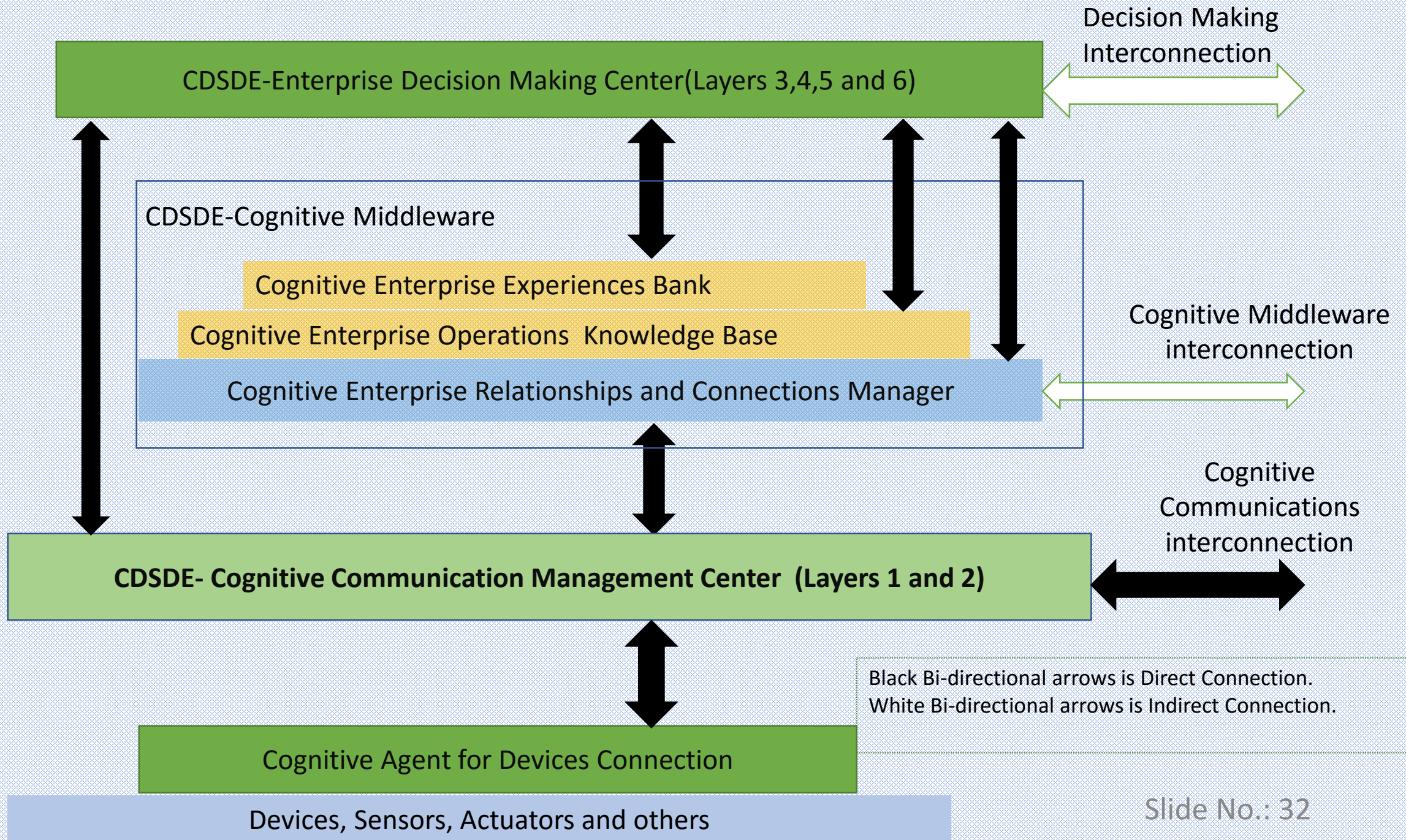
A- Manual Control Sharing: the owner of Middleware may share 1 or 2 of the following:

- 1) Cognitive Enterprise Experiences Bank CEEB ( Full or specific parts from CEEB).
- 2) Cognitive Enterprise Operations Knowledge Base CEOKB( Full or specific parts from CEOKB).

B- Cognitive Dynamic of Sharing the Middleware(Public Cloud, Private Cloud or Hybrid Cloud):

The Owner of Middleware will activate the algorithms of Cognitive sharing which will enable and disable the sharing depending on the Trust level and the requirements of the Customers, the Cognitive Sharing has the following Capabilities:

- 1)Very high control of Uni-directional Sharing or Bi-directional sharing between CDSDEs.
- 2)Very Efficient Sharing without the complexities of manual selections of thousands of components.
- 3) Estimating the Costs, Time to Market and Return of Investment efficiently.
- 4) Multiple Enterprises can Establish a cognitive Trust between them, those Enterprises in turn can share their own Cognitive Middleware with the Customers.
- 5) Very powerful Cognitive Enterprise Relationships and Connections Management of multiple CDSDEs with very high availability, Security and Privacy.





## Multi Layers Model for CDSDE

General description for the layers of CDSDE – Version 1:

Based on IBM technologies and consists of:

**1- Our suggested WATSON Network Operation Center (WATSON-NOC)**

**2- Our Suggested WATSON Enterprise Center.**

**1- WATSON –NOC:** this Cognitive Integrated system includes the following:

A- Layer 1(Lowest Layer) Cognitive Operations and Maintenance of Devices –COAMOD

1) IBM WATSON IoT.

2) Other Cognitive and Deep learning systems.

B- Layer 2 Cognitive Software Defined Communications Layer– CSDCOM which include:

1) Traditional SDN or SD-WAN Sub Layer.

2) Traditional Physical layers.

C- The Cognitive Middleware for data and information transfer between the following:

1) Layer1 and Layer2.

2) WATSON Enterprise Center which includes Higher Layers ( 3,4,5,6) with Lower layers (1,2).

## Layer 1(Lowest Layer) : **Cognitive Operations and Maintenance of Devices -COAMOD Layer**

This layer consists of:

1- Distributed Cognitive Operation and Maintenance agents :

A-Each cognitive agent is Cognitive Router or Cognitive Ad-Hoc network controller.

B- The Cognitive Agent has the following capabilities:

- 1) Peer to Peer communication.
- 2) Agent to device communication.
- 3) Agent to wireless sensors and controllers.
- 4)Agent to main COAMOD Controller.

2- COAMOD Controller to coordinate the connection between the following:

A- Higher layer (layer 2) the cognitive software defined communication –CSDC.

B- Distributed Cognitive Operation and Maintenance agents.

## **Suggested WATSON NOC Layer 2**

### **Cognitive Software Defined Communications Layer– CSDCOM**

**includes Hardware + Software + Deep Learning +Cognitive Computing as follows:**

**Version 1: if we use IBM hardware and software ( Watson), The following sub layers will be included in our suggested Watson Network Operation Center – WATSON-NOC as follows:**

**A- Traditional SDN or SD-WAN Sub Layer.**

**B- Traditional Physical layers.**

**WATSON – NOC will include:**

- 1- The above sublayers of Layer 2 Cognitive Software Defined Communications Layer– CSDCOM**
- 2- Layer 1(Lowest Layer) Cognitive Operations and Maintenance of Devices –COAMOD.**
- 3- The Cognitive Middleware for data and information transfer between the following:**
  - A- Layer1 and Layer2**
  - B- Higher Layers ( 3,4,5,6) with Lower layers (1,2).**
- 4- The Cognitive Middleware for Experience transfer between our suggested WATSON-NOC with the our suggested WATSON-Enterprise Center which will include the Higher Layers ( 3 to 6).**

## **WATSON CDSDE ( WATSON++):**

**WATSON ++** consists of the following:

### **1- WATSON Enterprise Center:**

This Cognitive Integrated System includes the CDSDE Layers 3,4,5 and 6 with Cognitive Middleware based on the Cloud.

### **2- WATSON – Network Operation Center –WATSON NOC :**

This System includes Layers 1 and 2 integrated with Cognitive Middleware and other communications networks with the other systems and the Smart devices.

**Please Note:** 1- The above Information about our suggested WATSON++ is available in the previous slides of this presentation CDSDE Design Philosophy.

2- In the next slide there is a brief information about Applying the CDSDE Enterprise Architecture on IBM WATSON

## Applying the CDSDE Enterprise Architecture on IBM WATSON

**CDSDE has the required capabilities to build or integrate multidisciplinary solutions using the required technologies by using a special type of Cognitive Knowledge Base , the Interface Layer for operation and Maintenance of the Hardware, Software and Communications of the following:**

- 1- We Can use On Premise Layers with integrated Cognitive Middleware.**
- 2- we can also apply the Cognitive Middleware using the Cloud Computing.**

**Please Note :We have many ideas of Applying CDSDE using IBM WATSON, but after the conference and we intend to participate in XPRIZE of IBM AI when we present our new ideas in August ( By Wild Card) of the XPRIZE.**

**We intend to Build the CDSDEs with cooperation from IBM , Marist College and other American Companies and universities.**

**Thank You**