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# **OBJECT IDENTIFIER MANAGEMENT GUIDELINE**

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**BANGLADESH COMPUTER COUNCIL**  
**MINISTRY OF INFORMATION & COMMUNICATION TECHNOLOGY**  
**GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH**

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## 1. Preamble

Bangladesh Computer Council (BCC) in assistance with Bangladesh Telecom Regulatory Commission (BTRC), the ITU member state and Bangladesh Standard Testing Institute (BSTI), the ISO member body applied to become country Registration Authority (RA) for Object Identifier (OID) on 08 July 2012. Accordingly, on 30 July 2012 BCC got the approval of ITU to work as country RA (<http://www.oid-info.com/get/2.16.50>).

The initiative of being country RA for OID allocation was taken from the necessity of having OID in Bangladesh PKI framework. OID is very important for PKI participants and PKI components to comply with the global standards for future development of Bangladesh PKI.

BCC, as country RA will manage OID allocation in Bangladesh. Bangladesh has the OID value 2.16.50, which is known as country OID or country arc for Bangladesh. BCC, the country RA of Bangladesh, is also the First Registration Authority of the country for OID allocation. This country arc in the subsequent arc of 2.16 or [{joint-iso-itu-t\(2\) country\(16\)}](#). Subsequent arcs of 2.16.50 will be issued and managed by either the country RA (i.e. by BCC) or by entities to whom the delegation will be given.

“Object Identifier Management Guideline” is prepared with an intention of making OID registration, OID management and allocation process in a procedural way.

## 2. Objective

“Object Identifier Management Guideline” is formulated for BCC (the country RA of OID), for agencies/individuals who will be registering OID hence will act as Registration Authority and for OID users. The objectives of this guideline are:

- Defining procedures to operate as country RA for OID allocation and management in the country,
- Assisting agencies/individuals to know how to get an OID for an object,
- Defining valid objects for OID,
- Defining roles of an agency or an individual as RA,
- Defining OID registration process,
- Defining OID allocation structure of Bangladesh,
- Illustrating example for OID allocation.

## 3. Scope

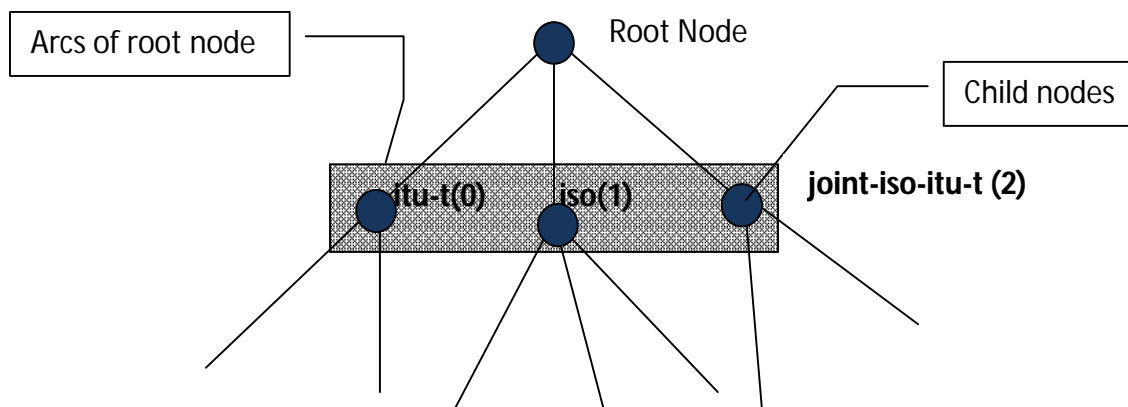
This guideline is classified as a public document. This guideline is applicable for BCC as country RA, agencies/individuals who will be registering for sub-arcs under country arcs, and OID users.

## 4. Object Identifier (OID)

This section will give the audience a brief idea about OID, objects valid for OID, structure of OID, global OID repository, etc.

### 4.1 OID Definition

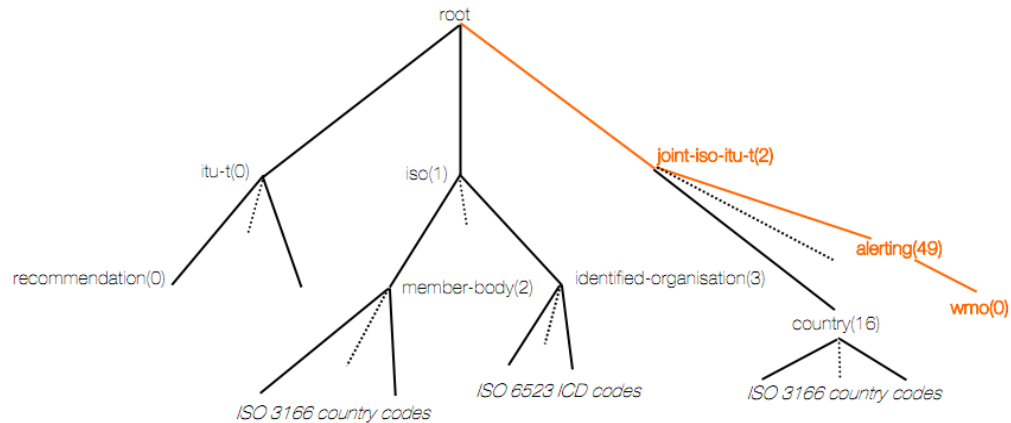
Object Identifiers (OIDs) are an identification scheme for physical or virtual entities based on a tree structure of identification components called the "Internationalized Object Identifier Tree". This is a tree of nodes where each node is simply a sequence of digits. Once an entity is assigned a node in the Object Identifier (OID) tree, it has sole discretion to further sub-delegate sub-trees from that node. The tree consists of a series of nodes, starting from a root node. From every node there are arbitrarily many arcs, each leading to a unique child node at the next level. There is no limit to the number of levels in the tree.



An object identifier (OID) is an extensively used identification mechanism jointly developed by ITU-T and ISO/IEC for naming any type of object, concept or "thing" with a globally unambiguous name which requires a persistent name (long life-time). It is not intended to be used for transient naming. OIDs, once allocated, should not be re-used for a different object/thing. Almost any organization, Recommendation, or Standard can obtain an OID node. OIDs are fundamental for all security work in ITU, ISO and IETF, and are widely used in many standards.

### 4.2 Structure of OID

OID of an object represents with numeric values. OID structured in hierarchical tree manner with a root at the top of the tree. The root has no numeric value. The root has three child nodes for itu-t (0), iso (1) & joint-iso-itu-t (2). All other nodes beneath these 3 nodes represent OID of that corresponding object.



### 4.3 Objects

Objects that can typically be identified by an object identifier are:

- an ITU-T Recommendation, an ISO International Standard;
- a country, a company, a project;
- a certificate policy, an encryption algorithm;
- identification schemes for tag-based applications;
- e-Health data;
- Common Alerting Protocol (CAP) emergency messages;
- an attribute of an ITU-T X.500- or LDAP-based directory to make up a Distinguished Name;
- an ASN.1 module, an ASN.1 type (or abstract syntax), a set of ASN.1 encoding rules;
- a MIB for SNMP network management;
- a managed object class, one of its attributes, a notification or even other templates used in the area of network management and the GDMO standard
- an information object (see Recommendation ITU-T X.681);
- the type of some part of an ITU-T X.400 electronic message body;
- a file format etc.

### 4.4 Purpose of having OID

Any agencies or individuals need identification of objects (Please see section 4.3 for valid objects) can request for OID to country RA or its parent RA. Many countries in the world are using OID to identify IT security objects, standards, PKI components, algorithm, MIB etc. Most common use of OID is to identify PKI objects or components. India is using OID only to identify

their PKI components where as Japan is using OID to identify PKI objects, domestic standards, directory services, government digital contents, etc.

#### **4.5 OID Representation**

OID can be denoted in any of the following way:

- Dot Notation (2.16.50)
- ASN.1 Notation ({joint-iso-itu-t(2) country(16) bd(50)} or {2 16 50})
- URN Notation (urn:oid:2.16.50)
- OID-IRI Notation (joint-iso-itu-t/country/bd or /2/16/50)

#### **4.5 Global Repository of OID**

There is a global public repository of OID maintained by ITU-T. There are more than 642,000 OID descriptions stored in that repository. The OID repository address is [www.oid-info.com](http://www.oid-info.com). It is possible to search OID from the repository with any of the notation mentioned above. It is also possible to see the synthetic graphical view of OID tree. Addition, modification or deletion of OID description is available in the repository.

This OID repository is not an official Registration Authority, so any OID described in this OID repository has to be officially allocated by the Registration Authority of its parent OID. This OID repository gathers information about OIDs that has been submitted by any RA of this repository.

### **5. OID Management & Allocation**

This section will explain about registration authority country RA, how the country RA will manage OID and how OID will be allocated throughout the country.

#### **5.1 Registration Authority (RA)**

At each node, including the root, there is a requirement for some organization or standard to be responsible for allocating arcs for subsequent nodes and recording that allocation, not necessarily publicly. This activity is accomplished by a Registration Authority (RA).

In the OID tree, RAs are generally responsible only for allocation of sub-arcs to other RAs that then control their own sub-nodes. In general, the RA for a sub-node operates independently in allocating further sub-arcs to sub-ordinate organizations, but can be constrained by rules imposed by its superior node.



The registration tree is indeed managed in a completely decentralized way (a node gives full power to its children). The registration tree is defined and managed by following the ITU-T X.660 & X.670 Recommendation series (or the ISO/IEC 9834 series of International Standards).

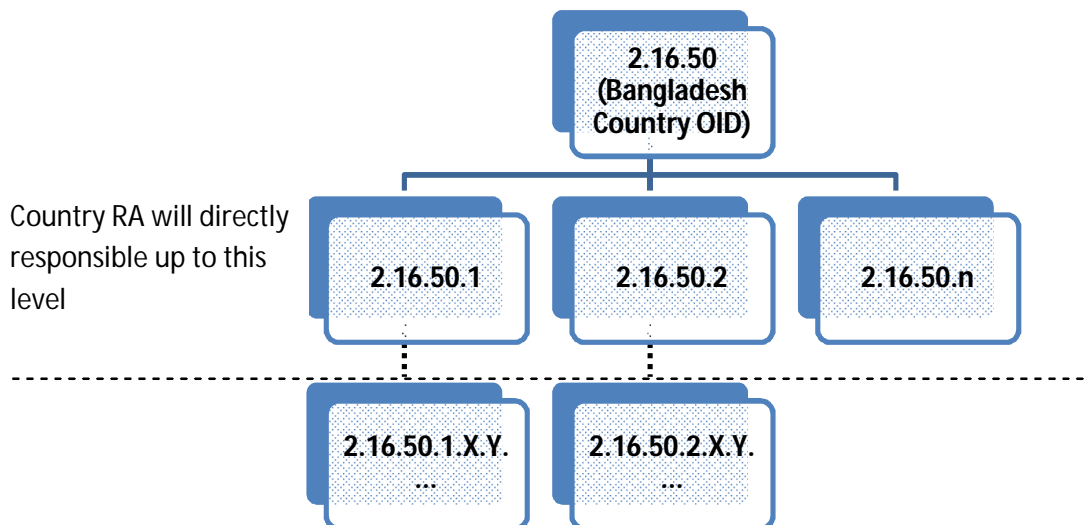
## 5.2 Country RA

Bangladesh Computer Council (BCC), on behalf of the Government of Bangladesh, is authorized to act as country RA for OID registration and management in the country. The delegation of working as country RA is given through a written agreement sent to ITU-T SG17 by BTRC & BSTI as ITU-T & ISO counterpart respectively. Mr. Md. Zabed Ali Sorker, Director (Systems), BCC is the first registrant of Bangladesh for OID allocation. Detail of country OID can be known from [www.oid-info.com/get/2.16.50](http://www.oid-info.com/get/2.16.50)

## 5.3 Roles of Country RA

The management of the entire registration tree of OID is accomplished by a process of delegation of authority known as the Registration Authority (RA). The authority who manages the OID tree under a country OID is known as country RA. Country RA shall assign OID to level below country OID of Bangladesh which is 2.16.50. As country RA, BCC will keep on monitoring all other OIDs beneath any level under 2.16.50 as well as. No OID will be approved in OID repository without the approval of its parent RA. The following roles will be accomplished by country RA:

- Country RA is responsible for the OID level next to country OID and shall assign OIDs under country OID to different objects in Bangladesh through registration process;
- Since the entire OID assignment is the repeated delegation of OID registration, country RA will not issue OID at any level next to 1<sup>st</sup> level under country OID (i.e. under 2.16.50.N, N=1, 2, 3, .....n).



In the above structure, country RA is directly responsible for the assignment of OID sub-arc below country RA only, i.e. for the assignment of 2.16.50.N (N=1, 2, 3, ....., n).

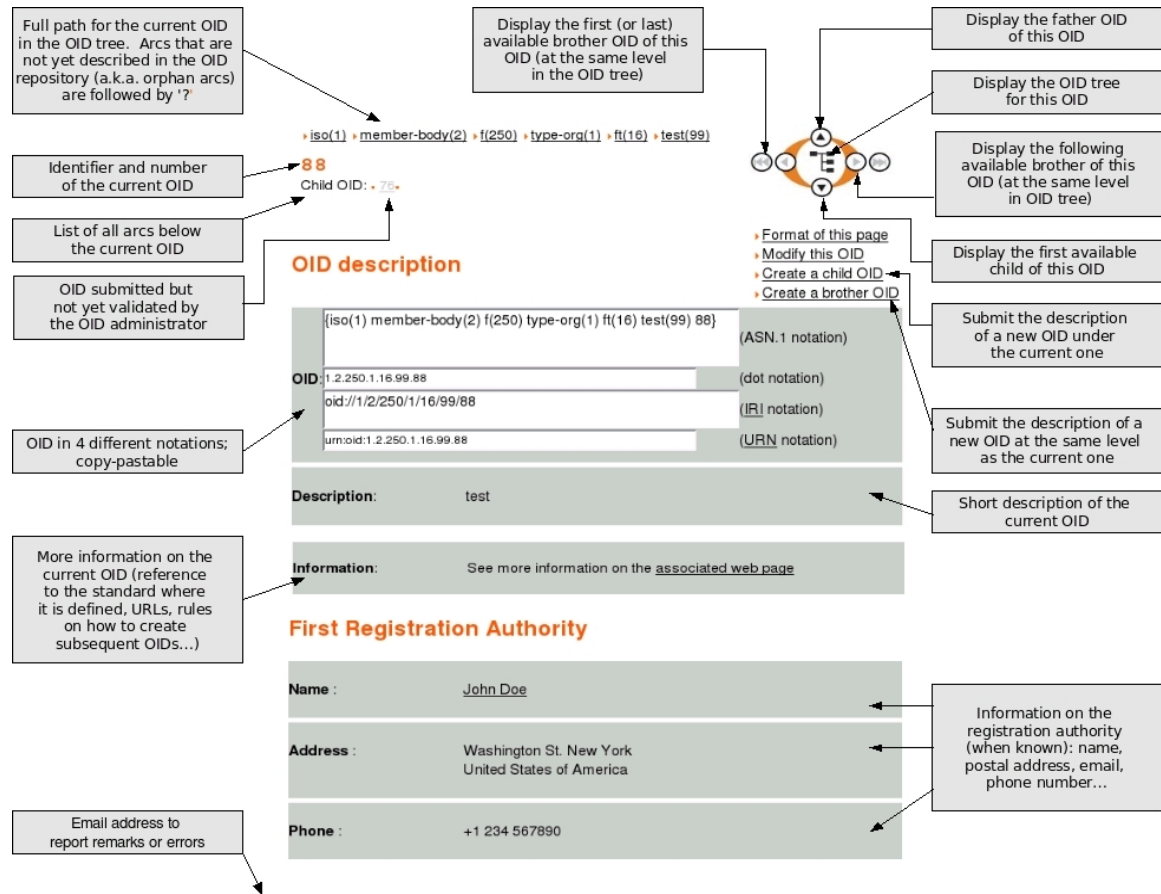
- Approval from country RA is required to add OID in the global OID repository, so First Registration Authority of Bangladesh will check and approve any OID request to him.
- Country RA is responsible for approving OID beneath country node that needs to be inserted in the global repository of OID; after creation of each child OID under country node, mail will be sent to the first Registration Authority of the country for approval of that newly created child node.
- Country RA is responsible for defining OID allocation structure for Bangladesh, the OID allocation structure shall be in such a way so that there will be no ambiguous allocation;
- OID allocation can be withdrawn but shall never be reused for different objects;
- Country RA is responsible to maintain a registration process for OID allocation in level next to country OID of Bangladesh;
- Country RA before approving any OID will check the name and justification carefully for that OID;
- Country RA shall update its OID tree in the OID repository ([www.oid-info.com](http://www.oid-info.com)) as new OID is registered. To add new OID, fill out the form after clicking on **Create a Child OID** in [www.oid-info.com/get/2.16.50](http://www.oid-info.com/get/2.16.50);
- Country RA may maintain a database (local OID repository) for OID in its website (i.e. in [www.bcc.net.bd](http://www.bcc.net.bd));
- Country RA shall maintain cooperation with ITU-T and other related entities regarding OID.

#### **5.4 Roles of OID Requester**

Agency or company or individual who is requesting for OID to an OID registrant have the following responsibilities:

- The requester for sub-arcs beneath country arc must apply through a prescribed form and process (Section 6: OID Registration Process);
- For any sub-arcs, the requester shall give a name for OID requested;
- For any sub-arcs, the requester shall state a reason for registering an OID;
- The requester can only request for OID for an object mentioned in section 4.3;
- The requester must get approval from its parent RA;
- The requester after getting approval may include child OID in global OID repository under its own OID from **[http://www.oid-info.com/cgi-bin/manage?father\\_oid=<Insert Own OID Number>&action=create](http://www.oid-info.com/cgi-bin/manage?father_oid=<Insert Own OID Number>&action=create)** or by creating child OID from own OID page (to access own OID page please type your own OID in any notation in the Display OID box

and click Go button). See the figure below for more information on a OID page in OID repository.



- The requester must submit any information as required by the country RA whenever necessary.

## 6. OID Registration Process

As said earlier Bangladesh Computer Council (BCC) as country RA will accomplish the OID registration process only for the sub-arc 2.16.50.N under country arc (2.16.50) or by the country OID allocation structure (Appendix B). Any government, non-government or private agency can apply for OID by filling out the prescribed form and submitting that form to its RA (it could be BCC or any registrant under BCC or below that). In case of applying to BCC i.e. to the country RA, there are two ways to apply for OID, one is submitting through a printed form (downloadable from [www.oid.bcc.net.bd](http://www.oid.bcc.net.bd)) and another is submitting online ([www.oid.bcc.net.bd](http://www.oid.bcc.net.bd)). Online submission is encouraged and will be processed faster than physical submission. Any government agency can request for OID through a request letter to the country RA (Bangladesh Computer Council) along with a filled out form at least with following information:

- Agency Name and Type;

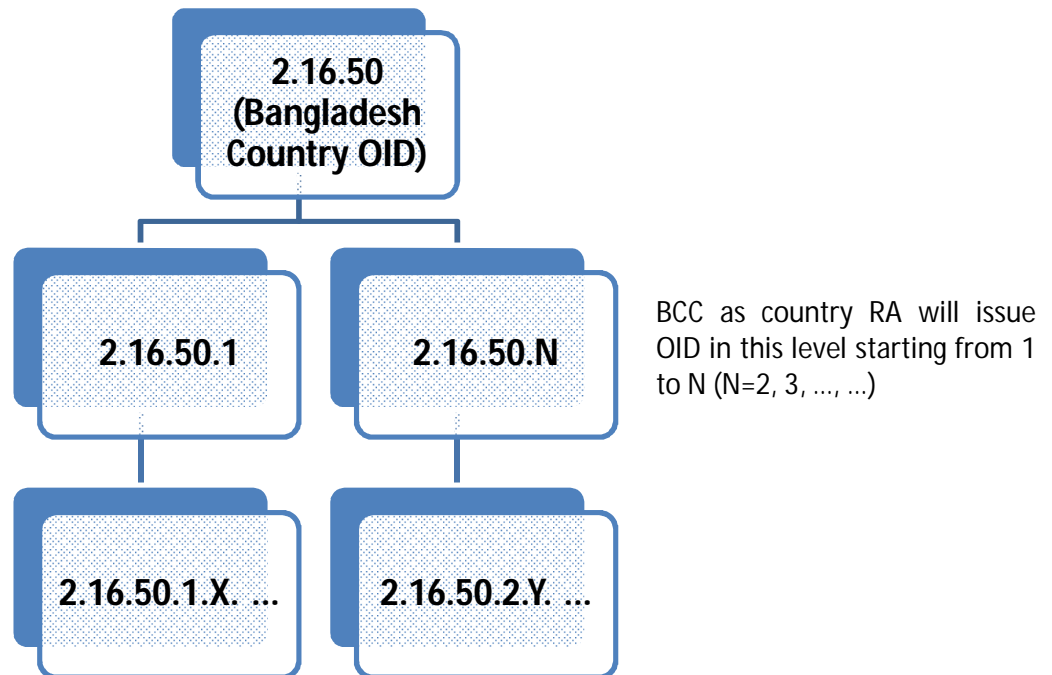
- Name of the object(s) and probable child objects to be identified by OID and sub-arcs;
- Justification of having OID;
- True copies of updated VAT and/or TIN certificate or license (for private/non-government agencies);
- True copy of Certificate of Incorporation in case of Joint Stock Company/Business license;
- Name, e-mail, phone, fax of the person who will be act as registrant on behalf of the agency;
- Authorised Person Details and Signature;

It is mandatory for government agencies to take OID from their respective parent organizations if the parent organizations already have OID. It is mandatory for non government/private agencies to take OID from their respective parent organizations (government/non-government) if the parent organizations already have OID. Please see **Section 7** for more clarification.

### ***6.1 Unified OID Registration Form***

This form is made unified so that anyone in any level in the OID tree can use the same form. In Bangladesh, everyone is obligated to follow this unified form at any level of OID registration process. The form is given in **Appendix: A**.

## 7. Country OID Allocation Structure



Any government, non-government or private agency can request OID at level 2 in the above diagram, i.e. under 2.16.50. There's no need to maintain hierarchy of government agencies unless it is required. For example, if ABC agency need OID who is under XYZ Ministry and XYZ has no reason of taking OID, then ABC agency can directly request for OID to country RA. Afterwards, a government agency can assign OID sub-arcs to its subordinate objects. In case of assigning OID to private agencies (as object), there must be some legal relation between the government agency and private agencies (e.g. Recognition, Accreditation or Licensed under the government agency). There are some cases, where hierarchy chain should be maintained. For example Office of the CCA shall assign OID to private agencies those are licensed as CA under Office of the CCA, and licensed CA must apply to Office of the CCA for OID (not to country RA).

Private agency (as an object) who doesn't have any hierarchical relation with any government agency, can directly apply to country RA for OID showing valid reason for OID usage. A private agency can take OID from any public agency if they were lawfully related with each other.

It is recommended to OID registration authority at any level of OID allocation structure not to issue or assign digit 0 (zero) to identify any objects.

OID allocation process from both RA and Requester point of view is illustrated with example in **Appendix: B**.

## 8. Appendix A: OID Registration Form

<b>Part A. Registrant Information</b>		
Registrant First Name	:	
Registrant Last Name	:	
Registrant National ID	:	
Registrant Designation	:	
Registrant Phone	:	
Registrant Email	:	
Alternate Email	:	
Registrant Office Address	:	
City	:	
Postal Code	:	
Country	:	
Web URL	:	
Signature with Seal & Date	:	
<b>Part B. OID Related Information</b>		
Parent OID	:	
Purpose of having OID	:	
Objects Name (probable)	:	
Number of probable tier of OID sub-arcs	:	
Probable Child OID	:	
<b>Part C. Administrative Information</b>		
Organization Name	:	
Full Name	:	
Designation	:	
Phone	:	
Email	:	
Web URL	:	
Administrative Office Address	:	
City	:	

Postal Code	:	
Country	:	
Declaration	:	Information given above is true and I hereby authorize above mentioned Registrant (Part A) to act as official OID registrant for this organization.
Signature with seal & date	:	
<b>Part D. Official Use Only (By Parent OID)</b>		
Registration Tracking No.	:	
Allocated OID	:	
Parent OID Number	:	
Parent Registrant Name	:	
Designation	:	
Approval Date	:	
Signature with seal & date	:	

## 9. Appendix B: OID Allocation Example

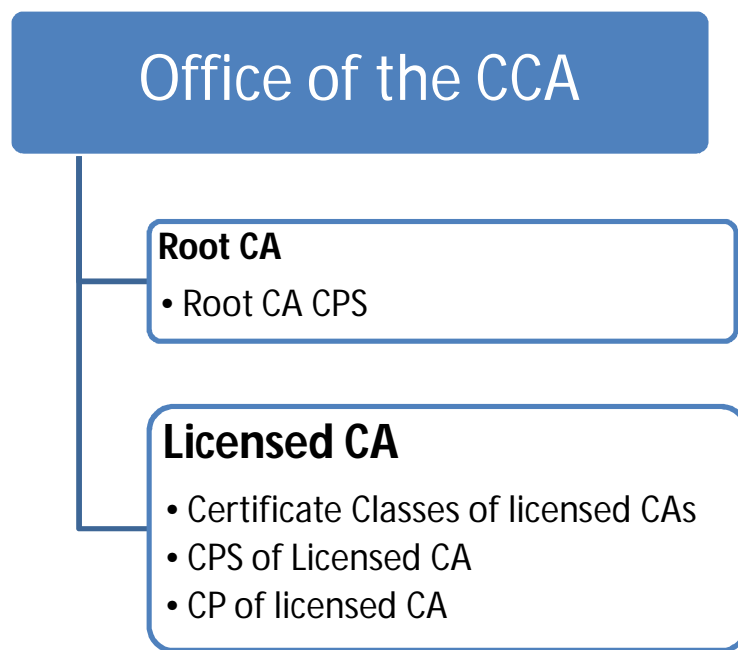
To assist the reader of this guideline, illustration of example of OID allocation given below:

### Example: A

The probable OID requester in Bangladesh till the guideline has been prepared is for the Office of the CCA under Ministry of ICT. This office deals with National Public Key Infrastructure (PKI) in Bangladesh. The office has its Root Certifying Authorities (Root CA) and 6 (six) Certifying Authorities (CA) Licensed under their regulatory framework. PKI requires Object Identifier to identify different objects of PKI like Office of the CCA, Root CA, Certification Practice Statement (CPS), Certificate Policies (CP), CA, Certificate Classes, and in some case Digital Certificates too.

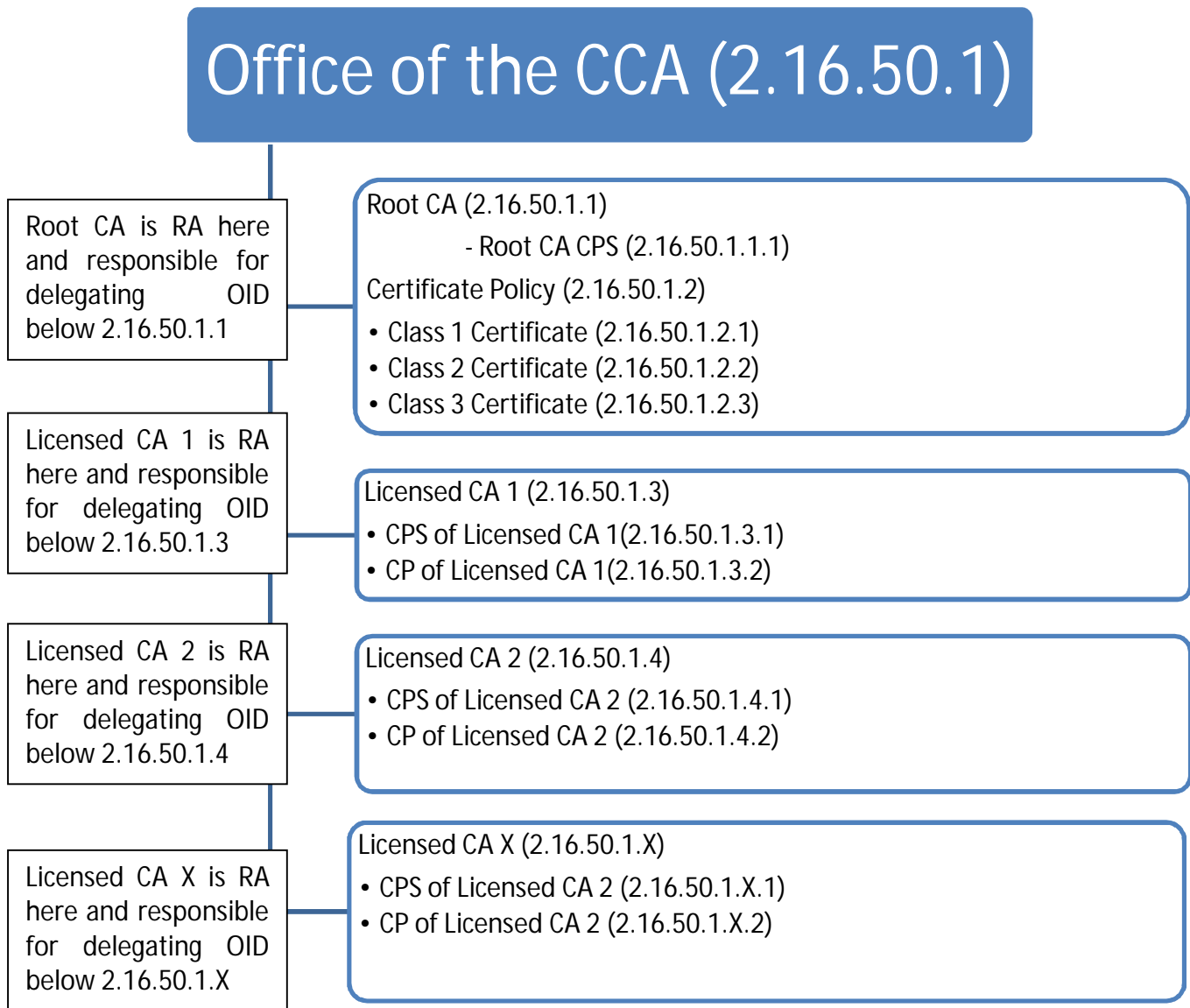
Office of the CCA shall request to BCC (First RA or Country RA) for assigning OID to them. Since Office of the CCA is a government office, BCC shall assign OID to them under 2.16.50 which may be 2.16.50.1, if it is so, the OID of the Office of the CCA is 2.16.50.1 and they can assign any new OID under 2.16.50.1 (i.e. 2.16.50.1.X).

Office of the CCA has objects like its own Root CA, CPS, Certificate Classes, CA licensed under its regulatory regime, and so on. Object hierarchy of Office of the CCA may be as below:





The objects illustrated above can be identified as below:



Office of the CCA must regulate OID for certificate classes and it should be of equal value for all CA to let certificate classes known from PKI applications.

Office of the CCA is required to fill out the form in Appendix A and submit it to BCC for OID allocation.

**Example: B**

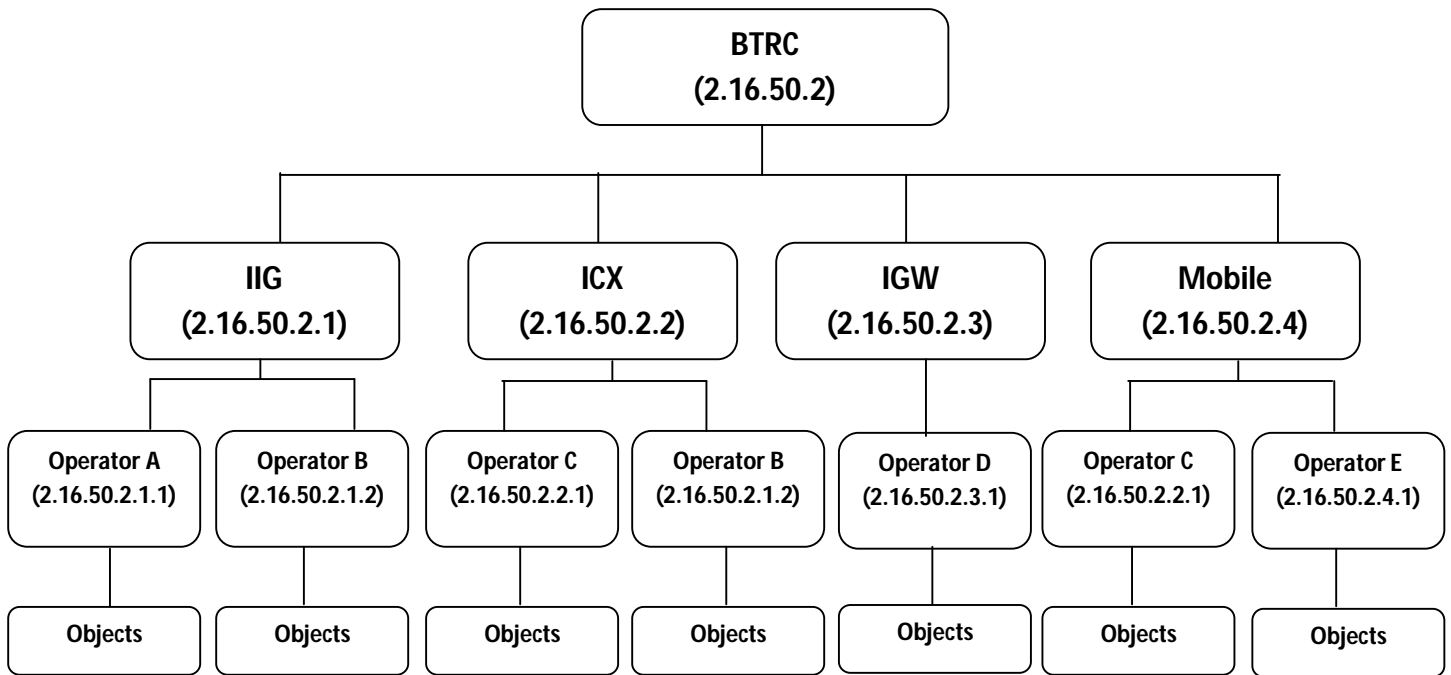
Another example of an organization with complex hierarchy is BTRC. BTRC may have OID to identify all licensees in different category of license. BTRC may request the first registration authority to obtain OID for itself. Then under that node BTRC can assign OID

different licensees. Since BTRC is a government office, BCC shall assign OID to them under 2.16.50 which may be 2.16.50.2, which implies OID of the BTRC is 2.16.50.2 and they can assign any new OID under 2.16.50.2 (i.e. 2.16.50.2.X or downwards).

For this example, assume that BTRC has 4 categories of license, namely:

- IIG Operator
- ICX Operator
- IGW Operator
- Mobile Phone Operator

If BTRC want to assign OID to operators under these 4 licenses, may do this in following manner:



In the above illustration, even though Operator B and Operator C have multiple licenses, they are given only one OID each. They can distinguish their services with child nodes under that single OID (for example, Operator B can identify IIG service with OID 2.16.50.2.1.2.1 and ICX services with OID 2.16.50.2.1.2.2). It is recommended to assign only one OID to identify one organization.

## 10. Appendix C: Definition & Glossary

**ASN.1:** Abstract Syntax Notation number one is an international standard notation used in describing transmitted data in telecommunications and computer networking.

**CAP:** Common Alerting Protocol is an XML-based data format for exchanging public warnings and emergencies between alerting technologies.

**GDMO:** GDMO stands for **Guidelines for Definition of Managed Objects**. GDMO is a standard for defining objects in a network in a consistent way. GDMO uses Abstract Syntax Notation One (ASN.1) as the rules for syntax and attribute encoding when defining the objects.

**ITU-T X.500:** It is a series of computer networking standards covering electronic directory services.

**MIB:** Management Information Base (MIB) is a virtual database used for managing the entities in a communications network. MIB database is hierarchical and each entry is addressed through an object identifier (OID)

**PKI:** PKI is a framework that consists of hardware, software, policies, and procedures for managing keys and certificates.

**SNMP:** Simple Network Management Protocol (SNMP) is an "Internet-standard protocol for managing devices on IP networks. OID identifies a variable or data (MIB) that can be read or set via SNMP.

**ISO/IEC 9834:** It is a series of standards that defines:

- Procedures for the operation of object identifier registration authorities
- Procedures for the operation of OSI Registration Authorities
- Generation and registration of Universally Unique Identifiers (UUIDs) and their use as ASN.1 Object Identifier components
- Registration of object identifier arcs for applications and services using tag-based identification

**ITU-T X.681:** ITU-T X.681 is a Recommendation by ITU. This Recommendation provides the ASN.1 notation which allows information object classes as well as individual information objects and sets thereof to be defined and given reference names.

**ITU-T X.400:** It is a Recommendation by ITU that provides an overview of system and service of Message Handling Systems (MHS).

**ITU-T X.660:** This Recommendation is identical to ISO/IEC 9834-1 that provides procedures for the operation of object identifier registration authorities.

**ITU-T X.670:** This Recommendation specifies procedures for a registration agent that operates on behalf of international organizations to register organization names subordinate to country names.

**ITU-T SG17:** ITU-T SG17 is the Study Group 17 of ITU-T works on ICT security related issues.

**URN:** Uniform Resource Name is a namespace for encoding Object Identifier.

**OID-IRI:** OID Internationalized Resource Identifier (IRI) is a string of slash-separated Unicode labels from the root of the OID tree, which unambiguously identifies a node in the OID tree.

## 11. Appendix D: Abbreviations

ASN	Abstract Syntax Notation
BCC	Bangladesh Computer Council
BD	Bangladesh
BSTI	Bangladesh Standard Testing Institute
BTRC	Bangladesh Telecommunication Regulatory Commission
CA	Certifying Authorities
CCA	Controller of Certifying Authorities
CPS	Certification Practice Statement
GDMO	Guidelines for Definition of Managed Objects
ICT	Information and Communication Technology
ICX	Interconnection Exchange
IEC	International Electrotechnical Commission
IETF	Internet Engineering Task Force
IIG	International Internet Gateway
ISO	International Organization for Standards
IT	Information Technology
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication Standardization Sector
LDAP	Lightweight Directory Access Protocol
OID	Object Identifier
OID-IRI	OID Internationalized Resource Indicator
MIB	Management Information Base
PKI	Public Key Infrastructure
RA	Registration Authority
RFC	Request for Comment
SNMP	Simple Network Management Protocol
URN	Uniform Resource Name