

# ITU-T The leader on ASN.1 Standards

## ASN.1 and its Encoding Rules

- X.680 – Basic notation
- X.681 – Information objects
- X.682 – Constraint notation
- X.683 – Parameterization
- X.690 – Basic Encoding Rules (BER), Canonical Encoding Rules (CER), and Distinguished Encoding Rules (DER)
- X.691 – Packed Encoding Rules (PER)
- X.692 – Encoding Control Notation (ECN)
- X.693 – XML Encoding Rules (XER)
- X.694 – Mapping W3C XML schema definitions into ASN.1
- X.695 – Registration and application of PER encoding instructions

## Generic applications of ASN.1

- X.891 – Fast infoset
- X.892 – Fast web services
- X.893 – Fast infoset security

## For more information on ASN.1:

- ASN.1 home: [www.itu.int/itu-t/asn1](http://www.itu.int/itu-t/asn1)
- ASN.1 module database: [www.itu.int/itu-t/asn1/database/](http://www.itu.int/itu-t/asn1/database/)
- OID repository: [www.oid-info.com](http://www.oid-info.com)

[www.itu.int/ITU-T/studygroups](http://www.itu.int/ITU-T/studygroups)  
**workshops:** [www.itu.int/ITU-T/worksem](http://www.itu.int/ITU-T/worksem)

## ASN.1 means

- A revolution of new possibilities:
  - 3GPP (UMTS and 4G LTE)
  - ITS (Intelligent Transportation Systems, Smart Highway)
  - VoIP (Voice over Internet Protocol)
  - RFID (Radio Frequency Identification)
  - Secure e-mails
  - Network security
  - Telebiometrics
  - Emergency telecommunication
  - CAP (Common Alerting Protocol)
  - IEEE 806.16m (WiMAX 2)
- Seamless information transfer in any format (audio, data, video, XML markup, text, etc.) regardless of programming language, data structure, OS, or target platform characteristics.
- Less network bandwidth and less processing power (hence a higher transaction processing rate) for web services (see X.892).

## ASN.1 Adoption

ASN.1 is being increasingly used outside the telecommunication industry in such areas as security, transportation, Smart Grid, genetic research and many others.

Logistics:  
FAA, FedEx, ICAO, etc.

Electrical Smart Grid:  
ABB, GE, Siemens, Toshiba.

Information network:  
Cisco, Compaq, HP, IBM, Intel, Microsoft, Sun, etc.

Telecommunication:  
AT&T, Motorola, Nokia, Sprint, France Telecom Orange, etc.

**eflash and news:** [www.itu.int/net/pressoffice/press\\_releases/](http://www.itu.int/net/pressoffice/press_releases/)  
**membership:** [www.itu.int/ITU-T/membership](http://www.itu.int/ITU-T/membership)

# ASN.1

Abstract  
Syntax  
Notation  
One

## The Interoperability Solution for the Definition and Serialization of Structured Data

# The Power of International Standards

ASN.1 - Compact, Efficient, Reliable Information Transfer

## Extensibility:

Interworking between deployed systems: older and newer; updated versions designed years apart

## Reliability:

From embedded systems to enterprise systems, ASN.1 has been implemented with success

## Scalability:

Infinitely scalable from prototype to mission critical deployment

## Interoperability:

Platform and language independent. Tools on almost all operating systems support ASN.1

# ASN.1

Human-Friendly Schema Language

## Simplicity:

Easy to learn, easy to use

## Efficiency:

ASN.1 supports multiple encoding rules that can transmit the messages in text formats such as XML or in compact binary formats that can be 1/100th the size of XML

## Modularity:

Enables one standard to be used as the building block of another standard

## Readability:

XER allows data display in human readable format in the browser of your choice

## Flexibility:

In use since 1984 and continues to evolve to meet current and future industry needs

ASN.1 is a notation that allows the definition, in a language and platform and encoding independent manner, of the content of messages that are exchanged between computers. ASN.1 describes such a definition as an "abstract syntax for communication".

It can be contrasted to the concept in ABNF of "valid syntax", or in XSD of a "valid document", where the focus is entirely on what are valid encodings of data, without concern with any meaning that might be attached to such encodings. That is, without any of the necessary semantic linkages.

An ASN.1 definition can be readily mapped (by a pre-run-time processor) into a C, C++, C# or Java data-structure, among other formats, that can be used by application code and is supported by run-time libraries providing encoding and decoding of representations in either XML or TLV (Type-Length-Value) format, or a very compact packed encoding format.

ASN.1 is widely used in industry sectors where efficient (low-bandwidth, low-transaction-cost) computer communications are needed, as well as in sectors where high-speed encoding and decoding of messages is required (for example, transfer of biometric information and telephone switches).

Work on OID is carried out by ITU-T Study Group 17.

For more detailed information, see [www.itu.int/ITU-T/studygroups/com17](http://www.itu.int/ITU-T/studygroups/com17)