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APM

Standards and CORBA update

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Abstract

A slide presentation for the ANSAworks 95 briefing on recent (1994/5) developments in standards, concentrating on ODP, OMG and Internet standardisation. Intended to run about 45 minutes, including questions. In colour.

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Standards and CORBA update

What's been happening in distributed systems standards recently

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Dictionary definition

stǎ'ndard *n.* Battle insignia or tribal totem



Why Standards?

- **“It should be as easy to plug a computer into the global information network as it is to plug it into the mains power network”**

Richard Soley, OMG Technical Director

- **Requires interoperability and portability**
- **Systems integration where no one organisation controls the whole system**
- **Interfaces standardised so that customers can select from vendors**
- **... but vendors still want to differentiate their products**



Taxonomy of standards

- **National and international (de jure)**
 - Slow to emerge
 - Consolidate experience
- **Industrial consortium**
 - Emerge more quickly than de jure standards
- **De facto**
 - Quick to emerge (market adopts a product)
 - Often single-vendor at first, then cloned
- **Unclassifiable**
 - Where do you position TCP/IP, for instance?



De Jure standards - ODP

- **ISO 10746 (Open Distributed Processing Reference Model) the relevant standard for distributed object computing frameworks**
- **X.901 / ISO 10746-1 (Overview) at CD, may go to DIS next month**
 - **Explanation and motivation**
 - **Not normative**
- **X.902 / ISO 10746-2 (Foundations) went to IS in January (Lausanne)**
 - **Defines vocabulary of concepts for building object models, to support part 3**
 - **Also some words on conformance testing**
 - **Recent clarifications on relationships between types, classes, templates**

ODP (cont.)

- **X.903 / ISO 10746-3 (Architecture) also went to IS at Lausanne**
 - Has become less prescriptive overall
 - Recent changes to information and enterprise languages
 - Computational language now supports implicit and explicit binding models
 - Computational language interaction model now encompasses streams
- **X.904 / ISO 10746-4 (Architectural Semantics) at CD**
 - Models part 2 concepts in Lotos & Z
- **Parts 2 & 3 likely to be fully-fledged ISO standards in Q3**
- **ISO 13235 (ODP trading function) at DIS**
 - Considerable pressure to move to CD soon, because of increased OMG interest
 - Still several outstanding issues



ODP and OMG

- **Both ODP participants and OMG view OMG as the place to develop standards within the ODP framework**
 - **OMG now has Category-C liaison status (representation at ODP meetings)**
 - **ODP representatives given reciprocal rights to attend OMG working meetings**
 - **OMG IDL being fast-tracked through ISO for adoption as standard IDL**
 - **OMG increasingly receptive to ODP concepts (e.g. multiple interfaces, trading)**



ODP and ANSA

- **The end of a long road**
 - ANSA worked on ECMA Distributed Application Support Environment (DASE) standard 1986-89
 - DASE was an OMA-ish architecture, but before such things were fashionable
 - ANSA, ECMA and BSI started the ISO ODP process in 1988
 - Many ODP concepts pioneered at ANSA, notably trading and viewpoints
 - Andrew Herbert Editor for Part III (architecture)
 - Jean-Bernard Stefani (France Telecom) Editor for Part II (foundations)
 - Many ODP concepts pioneered at ANSA, notably trading and viewpoints
- **ANSA will redeploy effort on application standards such as those from W³O**



Industrial consortia

- **Vendor-driven (i.e. industrial alliances)**
- **Examples in this field include OSF, OMG, TINA-C**
 - **All operate in slightly different ways**
- **OMG chooses specifications, so as rapidly to standardise OO interoperability**
 - **No OMG involvement in writing software or specifications**
 - **Specifications populate OMG's Object Management Architecture (OMA)**
- **OSF solicited technology contributions from members**
 - **OSF central organisation stitched code together into distributions to vendors**
 - **Now changing towards ESPRIT-style model of funding external teams**
- **TINA-C runs a laboratory with seconded staff**



Aside on Industrial consortia

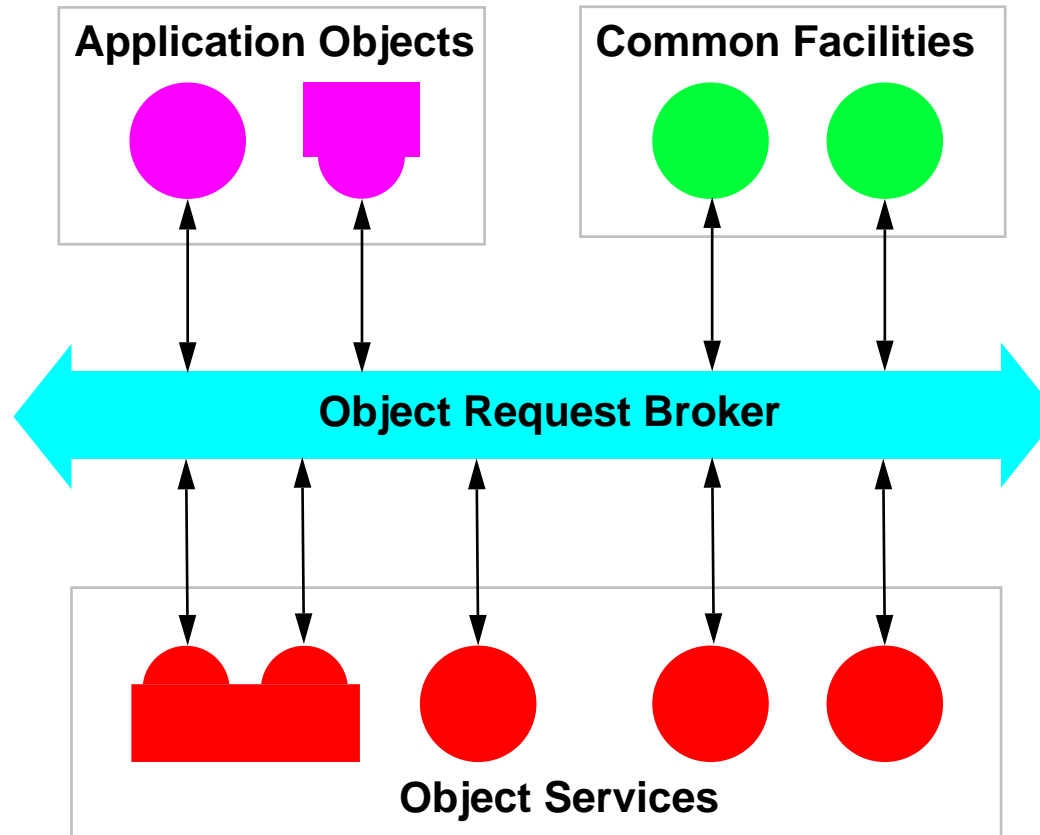
- **Adoption of consortium “standards” is by assent, not fiat**
 - **For instance, how many OSF members are deploying OSF/1?**
- **In order to ensure widespread use of standards amongst its own membership, a consortium must build consensus**
 - **Members must feel “part of the process”**
 - **... otherwise NIH and pride get in the way**
- **How to achieve widespread agreement in industrial consortia?**
 - **Anti-trust problem**
 - **Need a level playing field (“standard” must not favour one consortium member)**



Object Management Group

- **Non-profit organisation founded April 1989 to promote unified market for OO products**
 - **US-based but international in scope**
 - **Many vendors, some end-users, one or two researchers**
- **Mission: To develop a single architecture, using object technology, for distributed application integration**
 - **Provides reusability of components**
 - **Provides interoperability and portability of applications**
 - **Based on commercially-available software**

Object Management Architecture





OMG ORB developments

- **First specification adopted in late 1991**
 - The “Common Object Request Broker Architecture” (CORBA) submission
 - A specification for an ORB, with an IDL and C language mapping
- **Process for addressing CORBA’s deficiencies put in place mid-1992**
 - Interoperability
 - Unspecified aspects of the ORB
- **ORB2TF recommended several specifications in late 1994:**
 - Interoperability (UNO with DCE CIOP)
 - Initialisation (how a client gets its first object reference)
 - C++ language mapping
 - Smalltalk language mapping



OMG Object Services

- **OMG has adopted several Object Services:**
 - Naming
 - Externalisation
 - Lifecycle
 - Relationships
 - Events
 - Transactions
 - Persistence
 - Concurrency control
- **Adoption of other Object Services in progress:**
 - Security
 - Time
 - Licensing
 - Properties
 - Query
- **RFPs for Trading, change management in prospect**



Other OMG developments

- **Common Facilities' RFP for Compound Document architecture in progress**
- **Microsoft approached OMG in summer 1994 to discuss COM/CORBA interworking**
 - **Media perception is that OMG coming more into conflict with Microsoft**
- **“Brand recognition” for CORBA very high**
 - **Hence Object Services renamed CORBA services, Common Facilities renamed CORBA facilities**
- **Publication format of OMG documents about to change**
 - **Updates and amendments necessitate a loose-leaf binder approach**
 - **Subscription service to keep users up-to-date**



The undefinables - TCP/IP

- **TCP/IP is certainly the most important computer communications standard**
 - Internet now has over 5 million connected hosts
 - 91 Class A, 4979 Class B & 34,340 Class C nets advertised in DNS, Jan. 1995
 - Growth of the order of 100% per year
- **Internet Activities Board (IAB) directs TCP/IP development & standardisation**
 - Autonomous, low-budget organisation, with most work done by volunteers
 - Internet Engineering Task Force (IETF) does the technical standard-setting
- **Experiencing a success disaster**
 - IPv4 32-bit address space allocated in a fixed (and wasteful) way
 - Exhaustion of the 16,000-odd Class B networks looms ever closer
 - As designed, routing tables have one entry per subnet
 - Equal treatment of all IP packets makes multimedia difficult

IPng

- **IETF has recently selected design for next-generation IP from 3 proposals:**
 - **SIPP (Simple Internet Protocol Plus)**
 - **TUBA (TCP/UDP with Big Addresses)**
 - **CATNIP (Common Architecture for Next generation IP protocol)**
- **SIPP adopted**
 - **But with 128 bit (not 64 bit) addresses, better support for authentication, mobility**
- **Thus far IP has been a connectionless, best-effort protocol**
 - **Packets routed individually, no ordering or delivery guarantees**
- **To accommodate MM, IPv6 will have “flows”**
 - **Sequences of packets from a particular source requiring special handling by intervening routers**
 - **Labelled in header**



Internet aside

- **IMHO very few of the uses of the Internet qualify as *distributed* applications**
 - Email, FTP, Telnet, WWW, Gopher, WAIS, Archie, finger, whois all use the 'net to transmit information to a human interfaces at human behest
 - Only the Domain Name Service and routing protocols (RIP, BGP, EGP) are distributed applications
 - ... by which I mean that separate components on distributed hardware cooperate to achieve some goal without human intervention
- **Many Internet protocols are built over TCP reliable bytestreams**
 - SMTP, FTP, POP3 etc operate by exchanging semi-readable protocol messages over a TCP bytestream
 - Every implementor has to write parsers for the messages and a state machine for the protocol (with little tool support)
 - Would be trivial given a distributed object/RPC infrastructure and IDL compiler



World Wide Web

- **The Internet's Killer Application?**
 - **www is now the most popular hostname on the net**
 - **17% of all Internet use (by data volume) devoted to the Web in January 1995**
 - **One year before it was 1.5%**
- **Web "standards" originally defined at CERN in 1990/1**
 - **HTML Hypertext Markup Language**
 - **HTTP Hypertext Transfer Protocol**
 - **URL Uniform Resource Locator**
- **All aspects of the Web undergoing energetic development**
 - **Coordinated by WWW consortium, run from MIT in the X Consortium mould**
 - **ANSA contributing in effort to feed RPC experience into this community**
 - **As fast as the standards are evolving, it's still too slow for some ...**



Conclusion

- Interest in, and standardisation of, distributed computing growing apace
- ODP now in place as the general model for distributed object computing
- OMG vigorously working to populate the space with technology
- Increased interest in multi-media reflected in IETF and ODP standards
 - Beginning to see stirrings in OMG too
- ANSA maintains a policy of participation in, and influence of, a spectrum of standards bodies