## Subscription-based Sensor Collection Service (SBSCS): Architecture description

### 1 Overview

The SBSCS architecture description example was originally contributed by James N. Martin (Aerospace) to be a part of ISO/IEC WD4 42010 (dated 26 January 2009). WG42 determined that a small example presented in an annex to the International Standard would not do justice to the concepts and that a larger example should be prepared not as an annex to the Standard but as a separate document. It is made available here, as a "Hello World"-sized example of a conforming architecture description (AD), and a basis for further examples.

NOTE 1 This example of an architecture description conforms to the requirements of ISO/IEC 42010 and is therefore in full conformance.

NOTE 2 Items marked with an asterisk (\*) in the example are not required by the Standard and are therefore optional. They are included in this example for completeness. Items marked N/A are not applicable.

#### 2 Normative References

Requirements in this AD are made with reference to the following standards:

ISO/IEC CD1 42010, Software and systems engineering — Architecture description, dated 25 Jan 2010.

# 3 Architecture identification: Subscription-Based Sensor Collection Service (SBSCS)

Version:	v02
Date of issue and status*:	15 April 2010, approved
Issuing organization*:	Dunder Mifflin and Associates, Inc.
Change history*:	Version v02 was updated to reflect requirements and numbering changes between WD4 and CD1 of ISO/IEC 42010.
Summary*:	This architecture provides a subscription-based service of providing access to a widely- distributed set of sensors.
Scope*:	Includes only weather sensors. Does not consider acquisition or maintenance issues.
Context*:	Gore and Associates commissioned this architecture study.
Glossary*:	Not applicable.
Results from evaluations:	The SBSCS AD was reviewed on 6 Nov 2009 and 14 February 2010. The results of evaluations can be obtained at: https://dunder-mifflin.com/sbscs-eval
References*:	Technical Memo, SCS Architecture Study, 12 March 2010

SBSCS architecture description identification (per ISO/IEC CD1 42010, 5.2):

#### 4 SBSCS system stakeholders and concerns

The following stakeholders were considered and identified (per ISO/IEC CD1 42010, 5.3):

- users of the system
- operators of the system
- developers of the system

The following stakeholders were considered and determined to be not applicable (for this version): acquirers, owners, suppliers, builders and maintainers.

The system concerns listed in ISO/IEC CD1 42010, 5.3 were considered, and the follow concerns were identified for SBSCS (with the stakeholders holding them):

System Concerns	Stakeholders
Return on investment	Operators
Timely delivery of sensor data	Users
Understanding of interactions between system elements	Developers

Check (per ISO/IEC CD1 42010, 5.4): all system concerns are framed by at least one viewpoint.

#### 5 SBSCS architecture viewpoints

The SBSCS AD uses three viewpoints: a financial viewpoint (FVP) an operational viewpoint (OVP) and a system viewpoint (SVP). These are defined in accordance with the requirements on viewpoints (per ISO/IEC CD1 42010, 7).

Viewpoint rationale (per ISO/IEC CD1 42010, 5.8.1): The Financial viewpoint (FVP) is used to show return on investment and justify investment by the Operator in the project over time. The Operational viewpoint (OVP) is used to show the required time budgets of key operations to insure achieving timely delivery of data. The System viewpoint (SVP) is used to show overall data flow between system nodes.

Editor's Note: Add metamodels for each viewpoint (or use template in ISO/IEC CD1 42010, annex B) in next revision.

System concerns framed by viewpoint:	Return on investment (ROI)
Typical stakeholders	Acquirers, Accountants, Investors, Owners, Operators
Model kinds:	Cash flow statement (CFS) and ROI curve
CFS conventions:	See [IAS 7]
ROI curve conventions:	Cumulative profit year by year
Sources:	[IAS 7] International Accounting Standard 7, Cash Flow Statements, 1994.

#### 5.1 Financial viewpoint (FVP)

## 5.2 Operational viewpoint (OVP)

System concerns framed by viewpoint:	Timely delivery of sensor data
Typical stakeholders	Users, Operators, Owners
Model kinds:	Timeline diagram (TLD)
TLD conventions:	Ad hoc. Depicts Actions by one or more Actors over units of time.
Sources:	Not applicable

## 5.3 System viewpoint (SVP)

System concerns framed by viewpoint:	Interactions between system elements
Typical stakeholders	Developers, Maintainers, Users
Model kinds:	System interface diagram (SID)
SID conventions:	Connector and node dataflow diagram
Sources:	Derived from DODAF SV-1 format, see: http://jitc.fhu.disa.mil/jitc_dri/pdfs/dodaf_v1v2.pdf

## 6 SBSCS architecture views

## 6.1 Financial view (FV)

Version and Configuration ID:	FV, v01
Overview:	This view projects that SBSCS will achieve breakeven after five years of system operation.
Governing Viewpoint:	FVP (see 5.1)
Models:	Model ID: SCS profit statement; Version: v1.1; Model kind: cash flow statement (per FVP). Shown in figure 1.
	Model ID: SCS profitability curve; Version: v1.4; Model kind: ROI curve (per FVP). Shown in Figure 2.
Known Issues:	No known issues.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Income	0	2	4	6	8	12	14	16	18
Expenses	(13)	(1)	(1)	(1)	(2)	(15)	(3)	(4)	(5)
Profit	(13)	1	3	5	6	(3)	11	12	13
ROI	(13)	(12)	(9)	(4)	2	(1)	10	22	35

Figure 1 — SCS profit statement

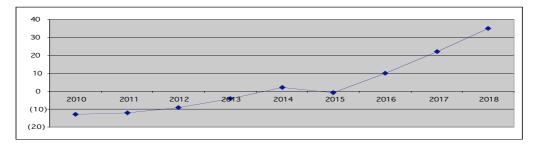


Figure 2 — SCS profitability curve

## 6.2 Operational view (OV)

Version and Configuration ID:	OV, v2.0
Overview:	This view shows that a typical user request will be satisfied within 20 seconds.
Governing Viewpoint:	OVP (see 5.2)
Models:	Model ID: Collection TLD; Version: v2.4; Model kind: Timeline diagram (per OVP). Shown in FIgure 3.
Known Issues:	No known issues.

Node	Action	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
User	request																				
USEI	data																				
Exec	chk user																				
LXEC	status																				
Exec	command																				
LXCO	sensor																				
Sensor	collect data																				
Distri-	distribute																				
bution	data																				
User	receive																				
0361	data																				

# 6.3 System view (SV)

Version and Configuration ID:	SV, v1.3
Overview:	This view shows system nodes and dataflow between nodes.
Governing Viewpoint:	SVP (see 5.3)
Models:	Model ID: SCS Dataflow; Version: v0.5; Model kind: Dataflow diagram (per SVP): Shown in Figure 4.
Known Issues:	No known issues.

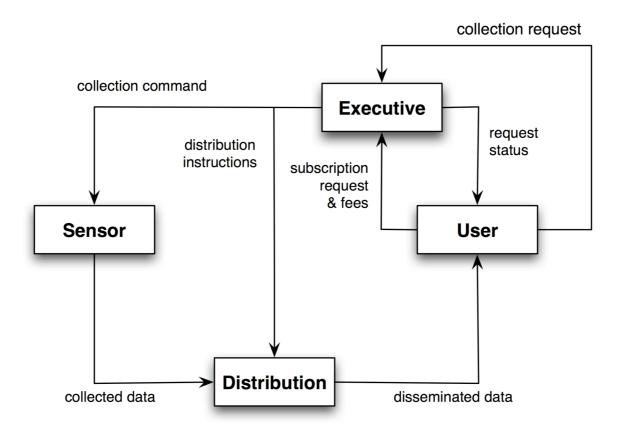


Figure 4 — SCS Dataflow

#### 7 View consistency and correspondences

There are no known inconsistencies between views in this architecture description (per ISO/IEC CD1 42010, 5.7.1).

The following correspondence rule (per ISO/IEC CD1 42010, 5.7.3) applies to the SBSCS AD:

**NodeCheck**: Each node in a dataflow diagram must appear at least once in the timeline diagram with its corresponding response time for that node.

Assessment of **NodeCheck**: This rule holds true for this SBSCS AD. All nodes in SCS Dataflow (figure 4) are present in Collection TLD (figure 3). Each entry in Collection TLD specifies a response time.