A ALMA do LLAMA, seu software de controle

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Encontro SPANet de Instrumentação 2019
25 de Outubro de 2019

Summary

Outline

Introduction
APEx
ALMA
LLAMA

Software
ACS
CORBA - Overview
ALMA Software... counts!!
ALMA Control Software
LLAMA Control Software

Figure: Credit:ESO
https://cdn.eso.org/images/screen/apex_close1.jpg e
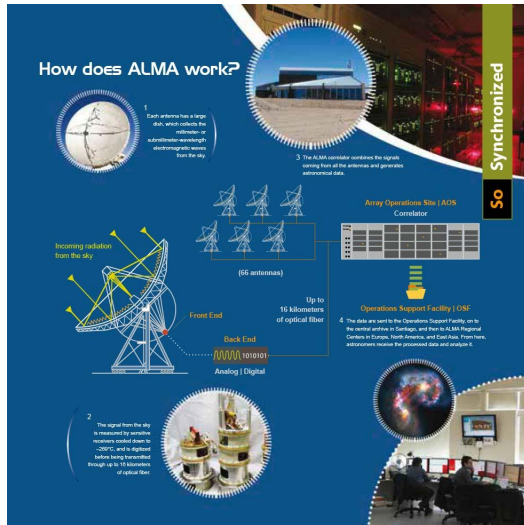apex-mar2009-1680.jpg

ALMA - Atacama Large Millimeter Array

Figure: Credit:ALMA
https://www.almaobservatory.org/wp-content/uploads/2016/05/
How-does-ALMA-works.jpg

LLAMA - Large Latin American Millimeter Array

Figure: LLAMA - Block diagram of antenna

(a) Photo of ALMA cryostat, with 10 receivers, doing tests in Operating Site Facility (OSF), San Pedro de Atacama, Chile - 2017

(b) Photo of LLAMA cryostat, doing tests in band 5 receiver (163-211 GHz), in Kapteyn Instituut, Groningen, Netherlands - 2017

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APEx
ALMA
LLAMA

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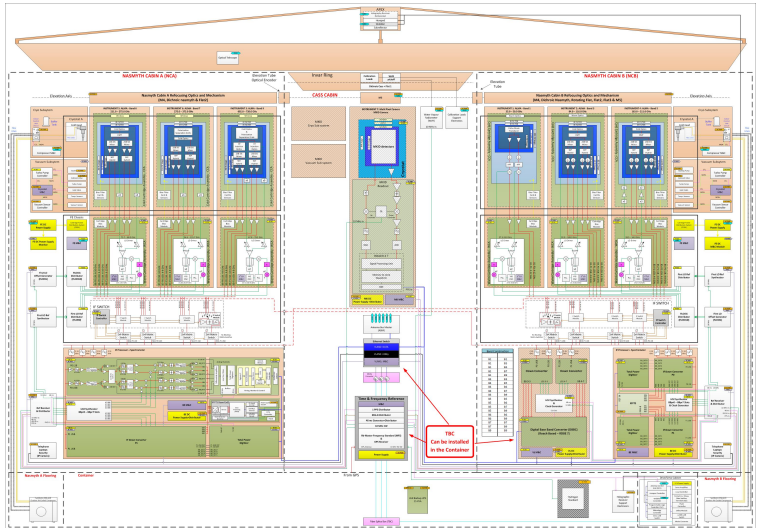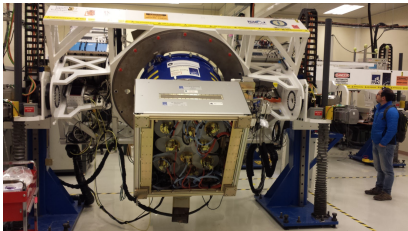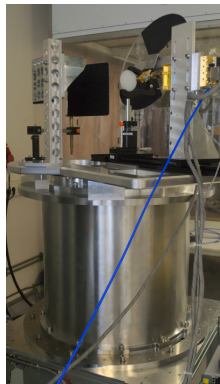INSTITUTO DE ASTRONOMIA, GEOFÍSICA E CIÊNCIAS ATMOSFÉRICAS

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The ALMA Common Software (ACS) is located in between the ALMA application software (Applications) and other basic commercial or shared software on top of the operating systems. In particular, ACS is based on CORBA (CORBA Middleware), which provides the whole infrastructure for the exchange of messages between distributed objects.[1]

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[1]Fonte: ALMA Common Software Architecture - 2009

ACS - ALMA Common Software

Figure: UML diagram of ACS packages.
Fonte: ALMA Common Software Architecture - 2009

The reasons for using CORBA are in short: Object Orientation, support for distributed systems, platform independence, it is a communication standard, it provides a variety of services. [2]

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[2]Source: ALMA Common Software Architecture - 2009

Introduction
APEx
ALMA
LLAMA

Software
ACS
CORBA -
Overview
ALMA Software...
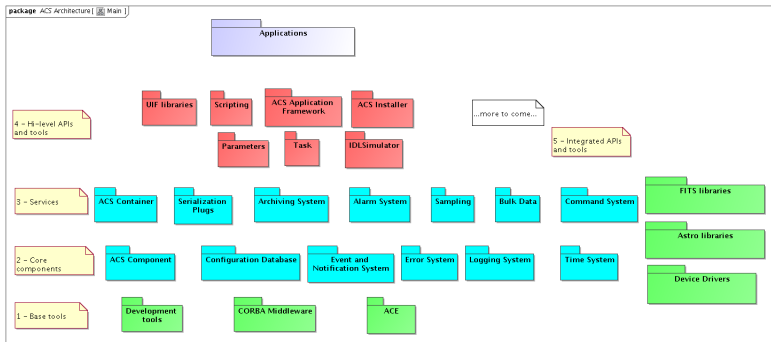counts!!
ALMA Control
Software
LLAMA Control
Software

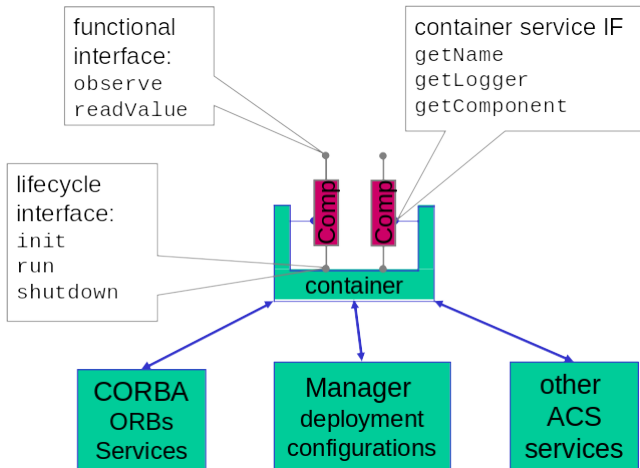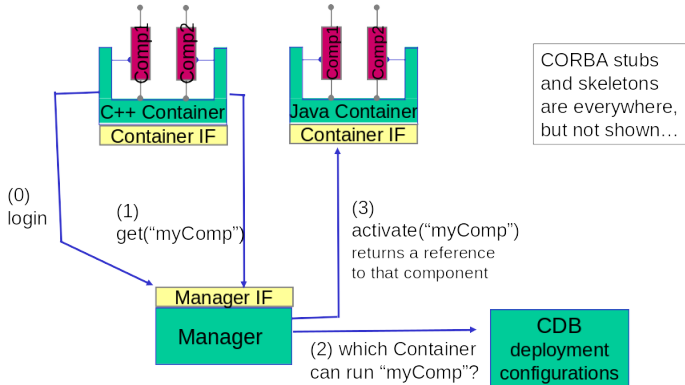## ACS - CORBA Container-Component Model (CCM)

functional
interface:
`observe`
`readValue`

container service IF
`getName`
`getLogger`
`getComponent`

lifecycle
interface:
`init`
`run`
`shutdown`

container

CORBA
ORBs
Services

Manager
deployment
configurations

other
ACS
services

Figure: Container-Component diagram. Source: 6st ACS Workshop UTFSM - Nov. 2009

Figure: Interactions diagram, component activation and retrieval. Source: 6st ACS Workshop UTFSM - Nov. 2009

ALMA Software... counts!!

Table: ALMA source code statistics.

Language	Files	Lines of code
XML	4433	3.58M
Source C++	5267	1.67M
JAVA	11423	1.25M
Python	2833	522K
Header C/C++	4770	366K
Source C	247	82K
Makefiles	1158	74K
IDL	396	42K
Totals	31047	7.65M

ALMA - Physical Architecture

Figure: ALMA Physical Architecture. Source: ALMA Control Design - Nov. 2009

ALMA - Software System

Introduction
APEx
ALMA
LLAMA

Software
ACS
CORBA -
Overview
ALMA Software…
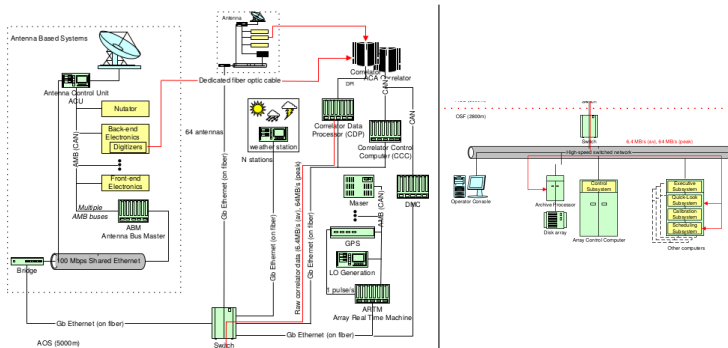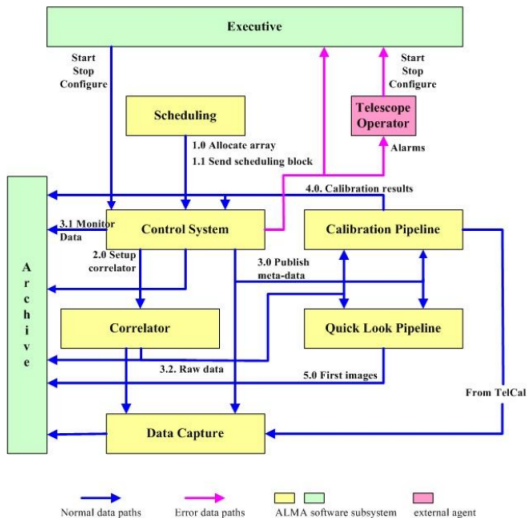counts!!
ALMA Control
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LLAMA Control
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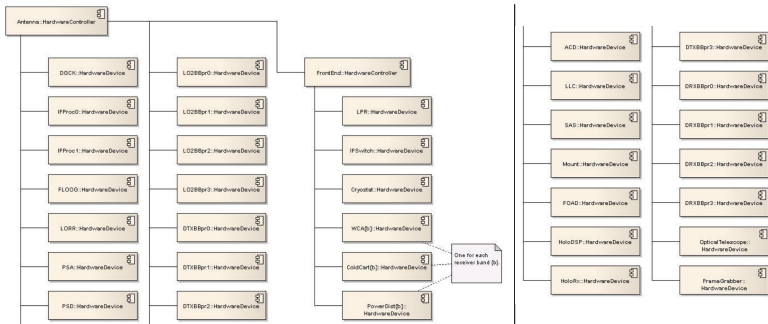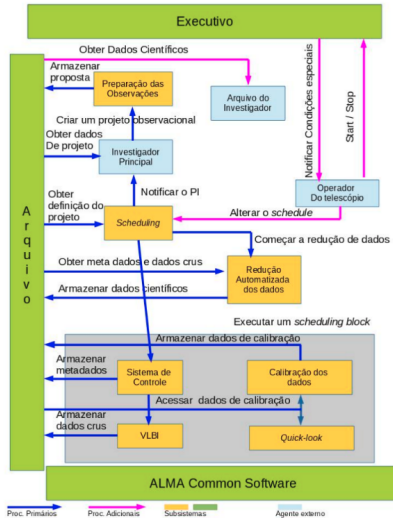Figure: ALMA Software System from Control's perspective. Source: ALMA Control Design - Nov. 2009

Figure: Antenna module hierarchy. Source: ALMA Control Design - Nov. 2009

Figure: LLAMA Software System from Control's perspective. Source: G. Gimenez de Castro - Aug. 2016

Thanks!