



Standard Autonomous File Server: SAFS

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URL: <http://www.wff.nasa.gov/~websafs/>

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SAFS: First Application - June 1997



Provide an autonomous intermediary between NASA Ground Networks and their satellite data customers.

Development Schedule

Single project support - ready for QuikSCAT testing by June 1998

- n retries to “push” customer’s system
- failover “push” to customer’s secondary system

Multiple project support - ready for project testing by Dec. 1999

- Develop project priority scheme
- Expand web reporting information



SAFS: Design Requirements



What SAFS does:

- ◆ Requires no human interaction for nominal operations.
- ◆ Provides for transmission status messages to and from customers.
- ◆ Allows customers to “pull” data.
- ◆ Provides option for data “push” to customers.

What SAFS does NOT do:

- ◆ Does not perform data compression, file splitting, or data encryption.
- ◆ Does not perform as a data archival system.



SAFS: Benefits to SAFS Usage



- ◆ Flexible, reliable and timely data distribution
- ◆ Addition automation of ground station activities
- ◆ Reduction of interference to ground station operations
- ◆ Reduction of interference to customer systems
- ◆ Reduction of cost through unattended SAFS operation
- ◆ Standardization of project interfacing
- ◆ Reduction of development cost through using COTS
- ◆ Central point for customer interaction
- ◆ Ability to do remote diagnosis and problem resolution
- ◆ Simplified network configuration
- ◆ No additional development when adding new standard projects

July 17, 2000



SAFS: COTS Advantages



- ◆ Guaranteed file delivery
- ◆ Recovery from point of failure
- ◆ Stop/resume transmission control for priority transfers
- ◆ Programmable network bandwidth (adjustable transmission rates)
- ◆ On-the-fly compression
- ◆ File transfer security
- ◆ Multi-platform support provides standardization
- ◆ On-line network monitoring
- ◆ Shorter development time
- ◆ Application interface for automated tasks, and pre- and post-transfer processing.



SAFS: Station Locations

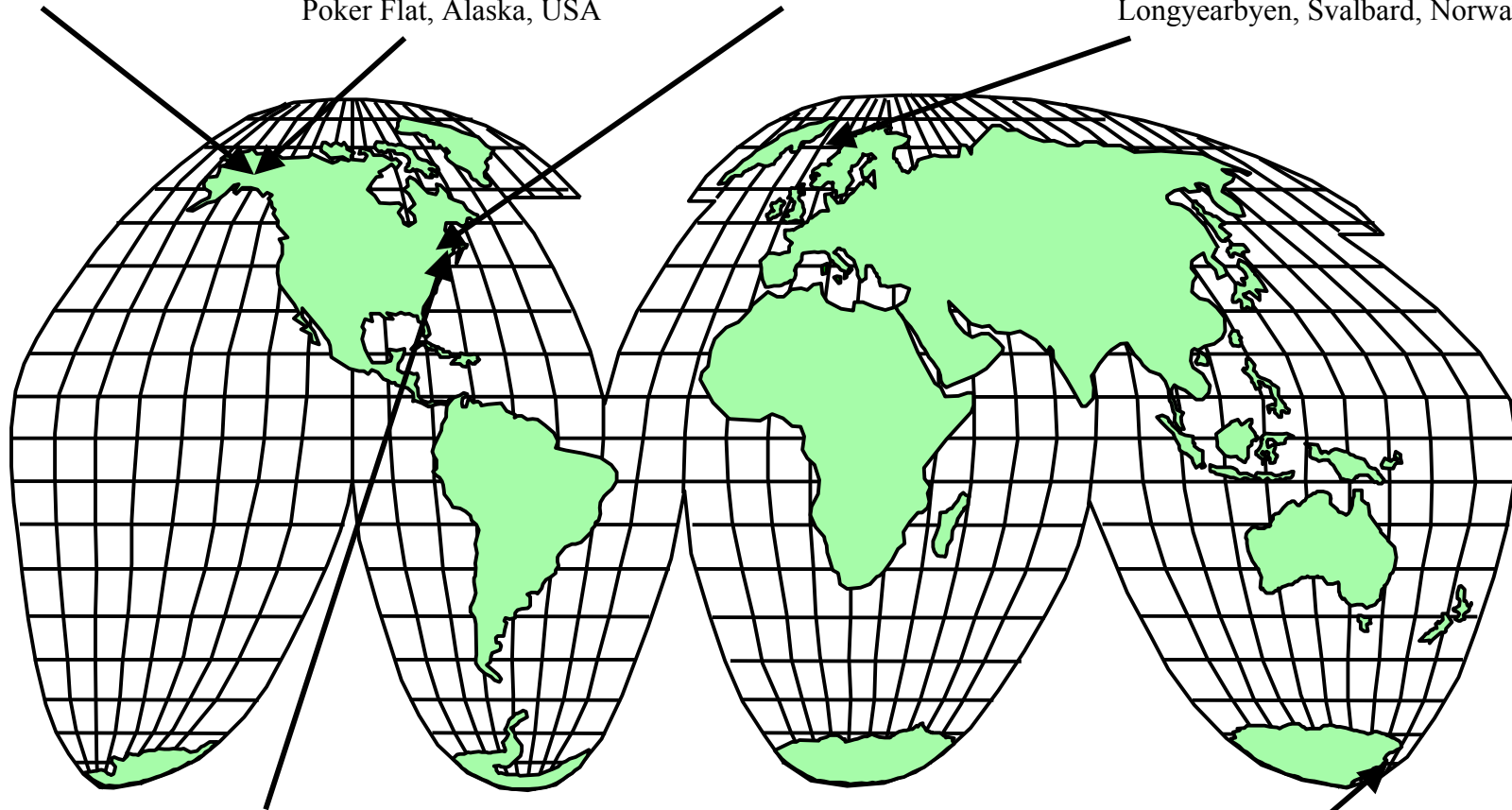


Alaska SAR Facility
Fairbanks, Alaska, USA

Alaska Tracking Station
Poker Flat, Alaska, USA

Goddard Space Flight Center
Greenbelt, Maryland, USA

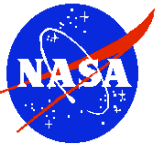
Svalbard Ground Station
Longyearbyen, Svalbard, Norway



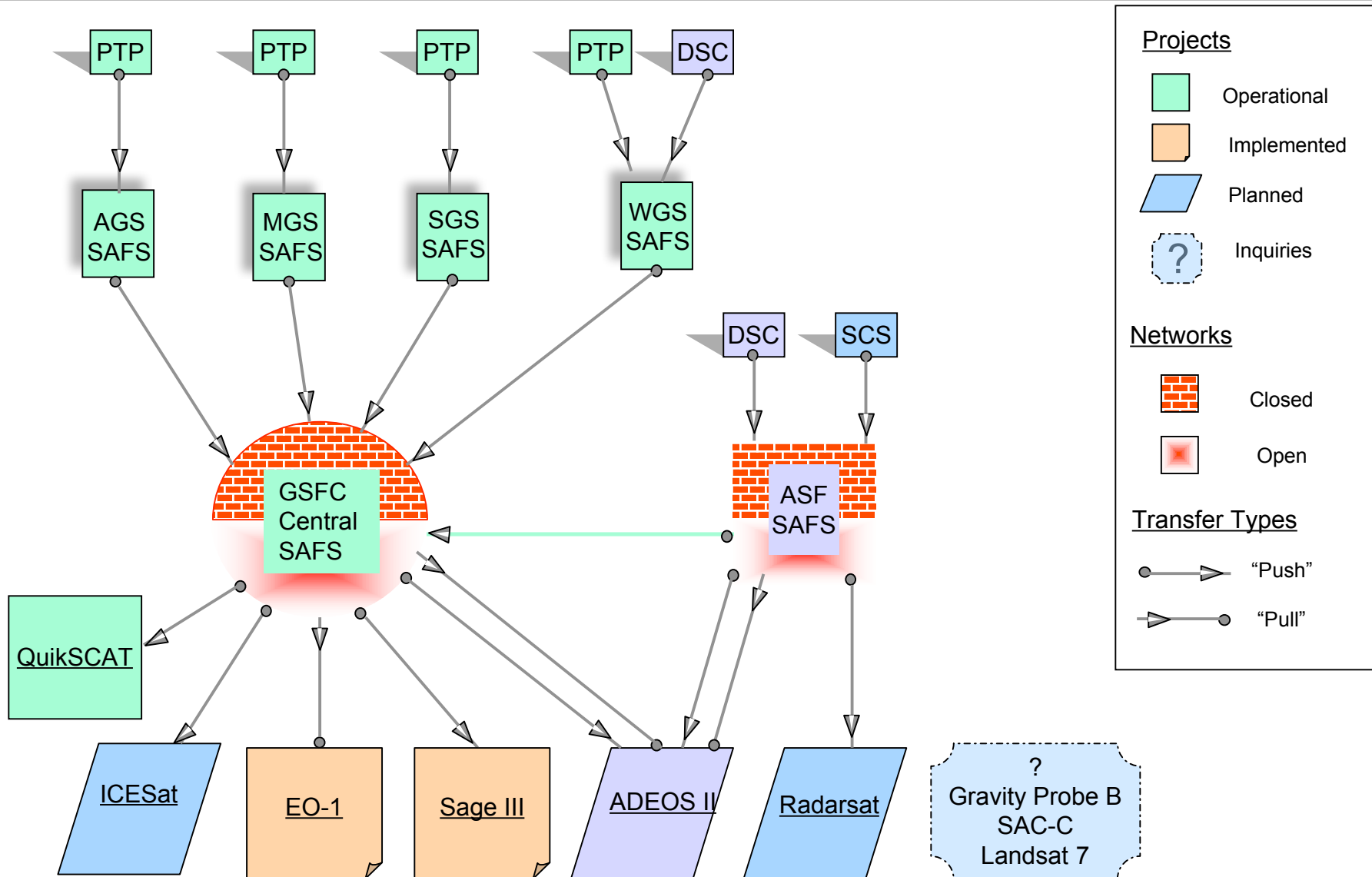
Wallops Orbital Tracking Station
Wallops Island, Virginia, USA

McMurdo Ground Station
McMurdo Station, Antarctica

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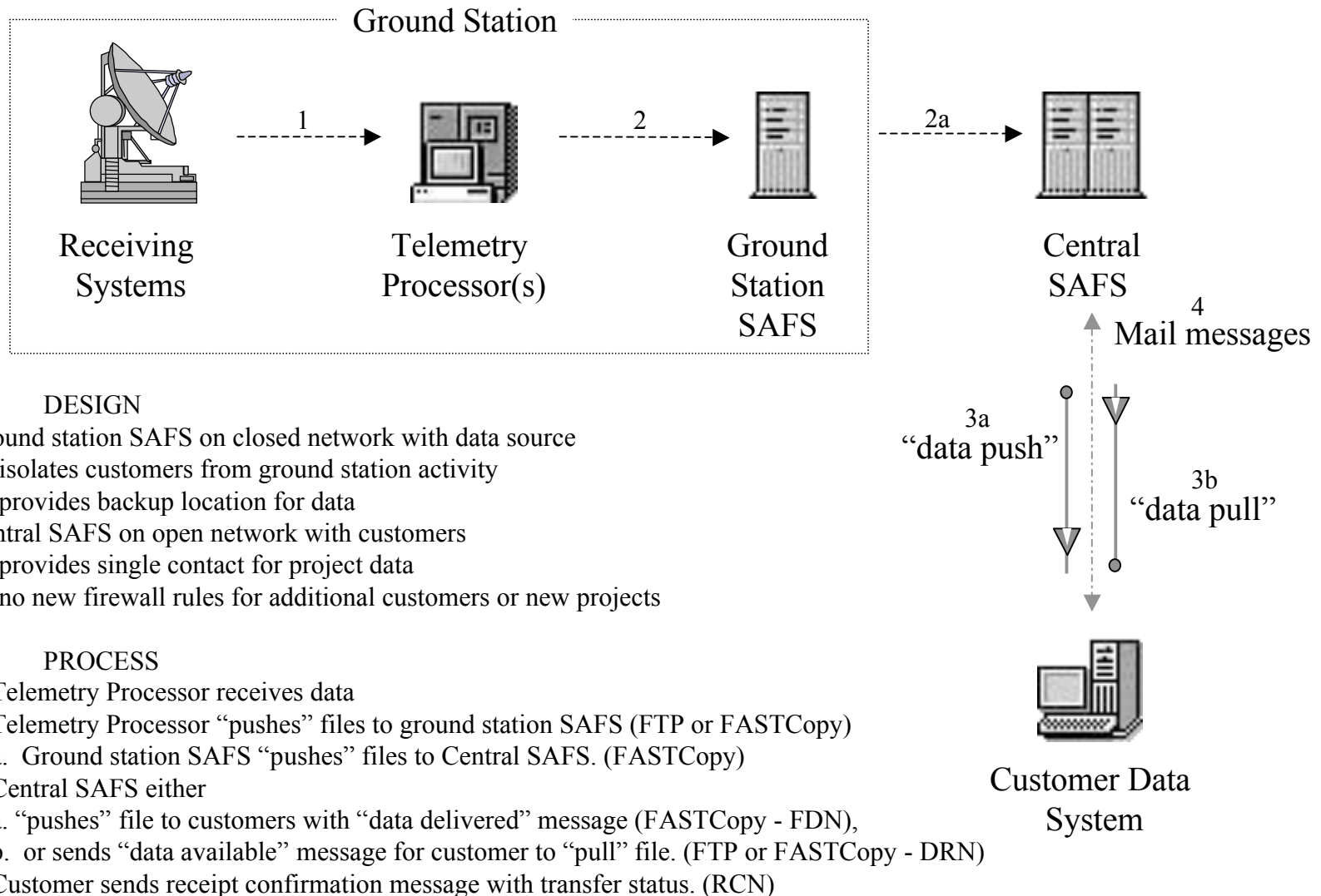
SAFS: Projected Configuration as of mid 2000



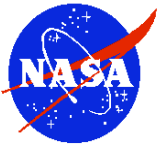
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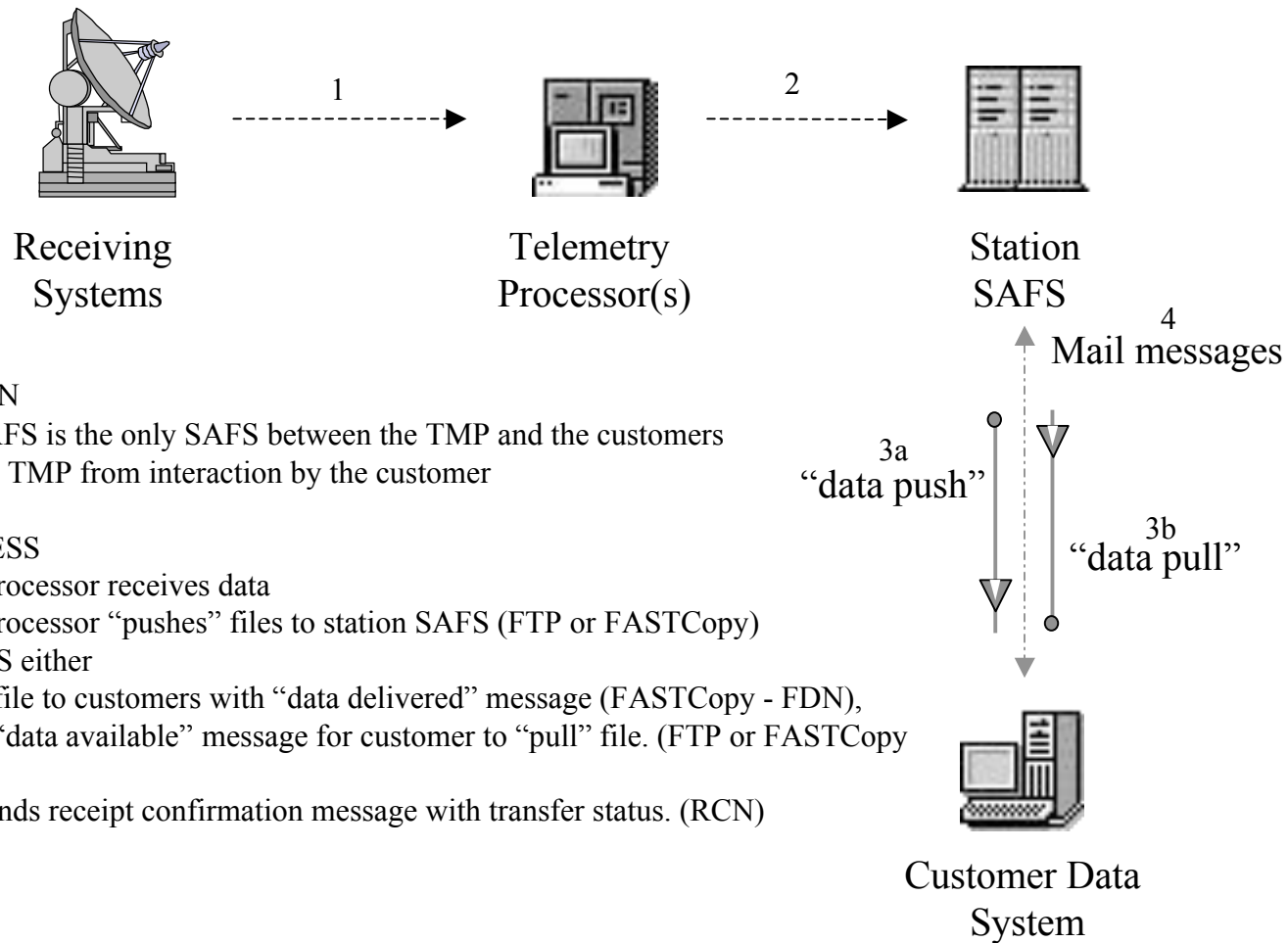
Ground Station SAFS Data Transfer Model



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ASF: Station SAFS Data Transfer Model



DESIGN

The Station SAFS is the only SAFS between the TMP and the customers
- isolates the TMP from interaction by the customer

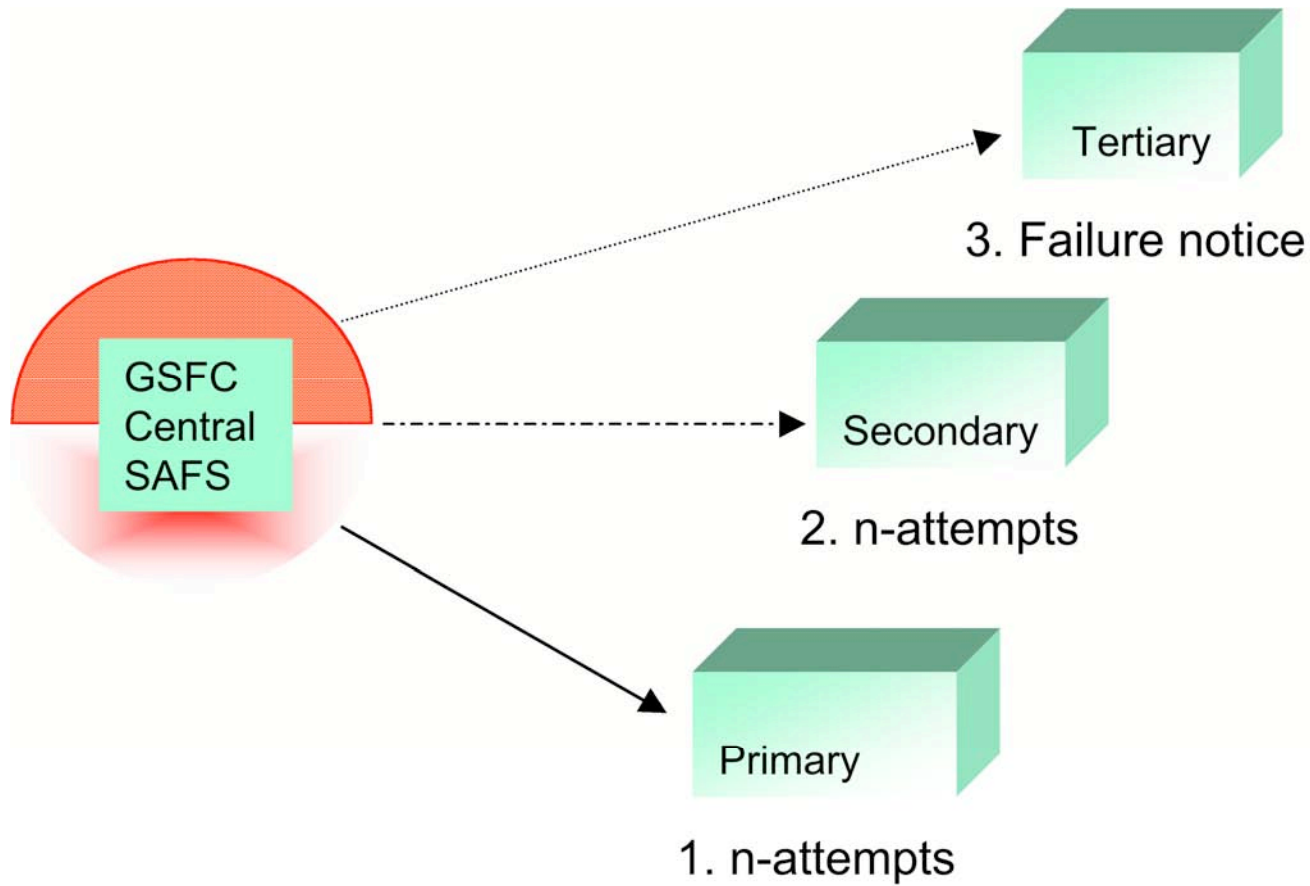
PROCESS

1. Telemetry Processor receives data
2. Telemetry Processor "pushes" files to station SAFS (FTP or FASTCopy)
3. Station SAFS either
 - a. "pushes" file to customers with "data delivered" message (FASTCopy - FDN),
 - b. or sends "data available" message for customer to "pull" file. (FTP or FASTCopy - DRN)
4. Customer sends receipt confirmation message with transfer status. (RCN)

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SAFS: Failover “Push” Option

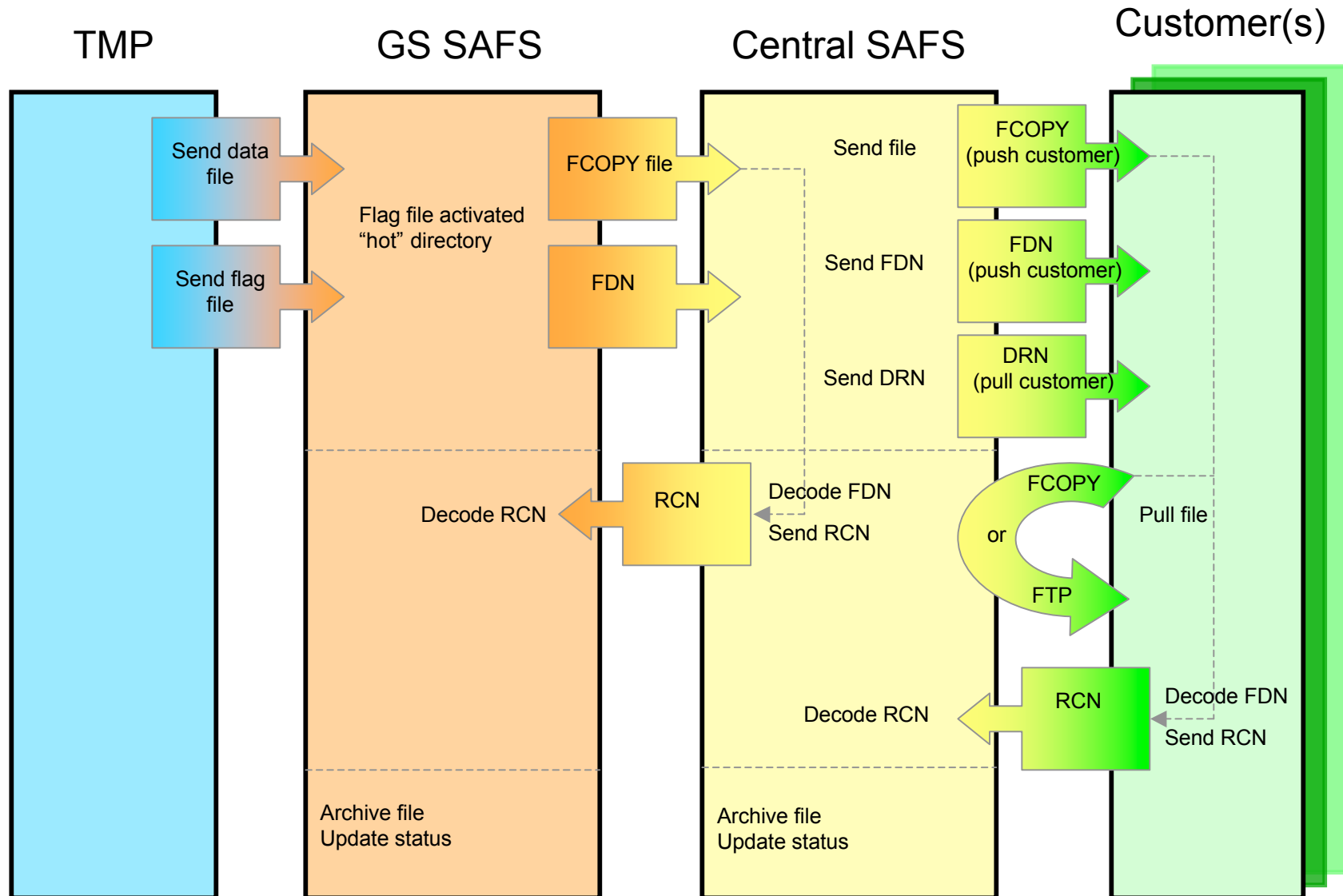


Customer Systems

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SAFS: File Transfer Logic



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SAFS: Priority File Transfers



- ◆ Priority needed when files arrive simultaneously or arrive while another file is being transferred
- ◆ Proposal: Define 4 prioritization categories
 - SPECIAL* - for spacecraft or weather emergencies, or launch and early orbit activities
 - HIGH* - for files needing speediest delivery (ie, within an hour)
 - MEDIUM* - for files with normal delivery requirements (ie, within several hours)
 - LOW* - for files with least urgent delivery requirements (ie, within 1/2 day)
- ◆ There will be 2-3 levels within each priority category to allow for differences due to projects, file types, customer distributions, and latency requirements.
- ◆ To Be Determined:
 - Who sets priorities at each site?
 - Who sets priorities at the Central SAFS?
 - Who can change priorities for special events?



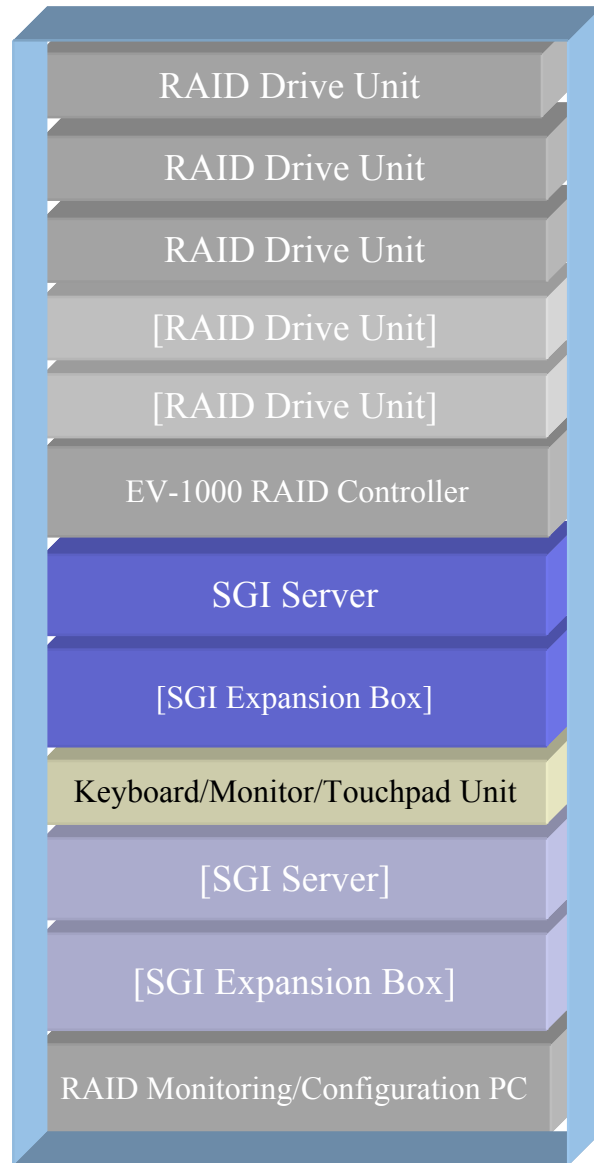
SAFS: Administration



- ◆ Distribute “heart beat” status indicator (“a SAFS Light”).
- ◆ Provide for customer/project updates, additions and deletions.
- ◆ Perform disk management.
- ◆ Provide reporting functions:
error, logs, WEB page status updates,
- ◆ Oversee system configuration updates:
server OS, drive capacity, communication interfacing,



SAFS: System Components



Current hardware configurations:

Ground Station SAFS (AGS, MGS, SGS, WGS)

- DataDirect Networks EV-1000 RAID drive system
- SGI Origin 200 server(s) with one Ethernet card (WGS - two Ethernet cards)
- Industrial Computer Source keyboard/monitor/touchpad unit

Central SAFS (GSFC)

- DataDirect Networks EV-1000 RAID drive system
- SGI Origin 2000 server with two Ethernet cards
- Industrial Computer Source keyboard/monitor/touchpad unit

Non-Ground Station SAFS (ASF)

- DataDirect Networks EV-1000 RAID drive system
- SGI Origin 200 server(s) with four Fast Ethernet cards
- SGI Expansion Box(es)
- Industrial Computer Source keyboard/monitor/touchpad unit

Current software configurations:

All SAFS systems

- FASTCopy 2.5 software from Softlink, Inc.
- IRIX 6.5 operating system
- Custom shell scripts

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ASF SAFS Rack

WFF



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