Advanced IUM Understanding – Session 1.1

- Presenter: Ujjwal Barman
- Date: June,2009
- Duration: 1 days

Agenda

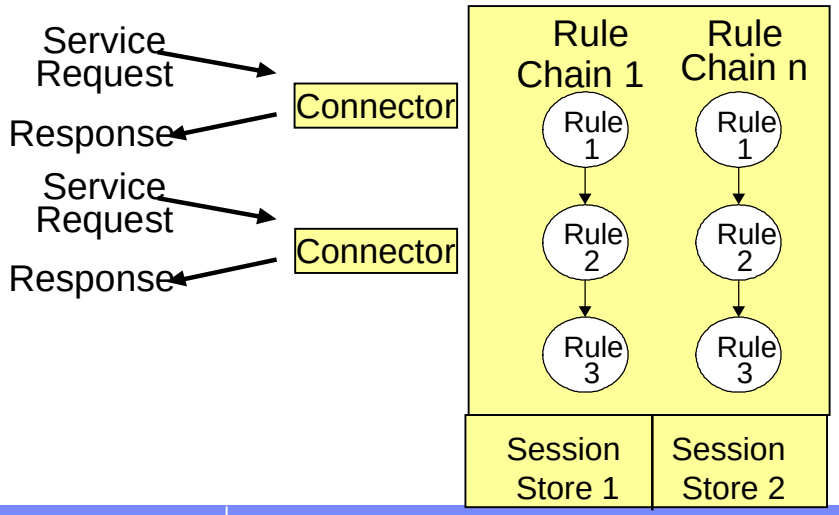
- Charging Manager/Session server Features & Architecture
- Load Balancing in IUM
- Online/Real time Mediation
- Example of Real time mediation system
- Offline Mediation system
- Example of Offline Mediation System
- End to End Flow
- Description of one Production system Architecture
- Installing IUM
- Deploying the Patch for IUM

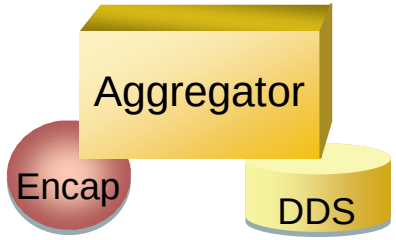
IUM-Charging Manager / Session Server Features

- Connects to Service Control Points and mediation
- Integrates with business applications
- Processes Real-Time authorization and accounting requests
- Rich rule set for flexible business logic
- Resilient and high-performance architecture
- Enables rapid deployment of new services
- Session servers do not contain encapsulators, they contain connectors.
- Session servers do not contain datastores, they contain session stores.
- Both collectors and session servers contain rule chains.

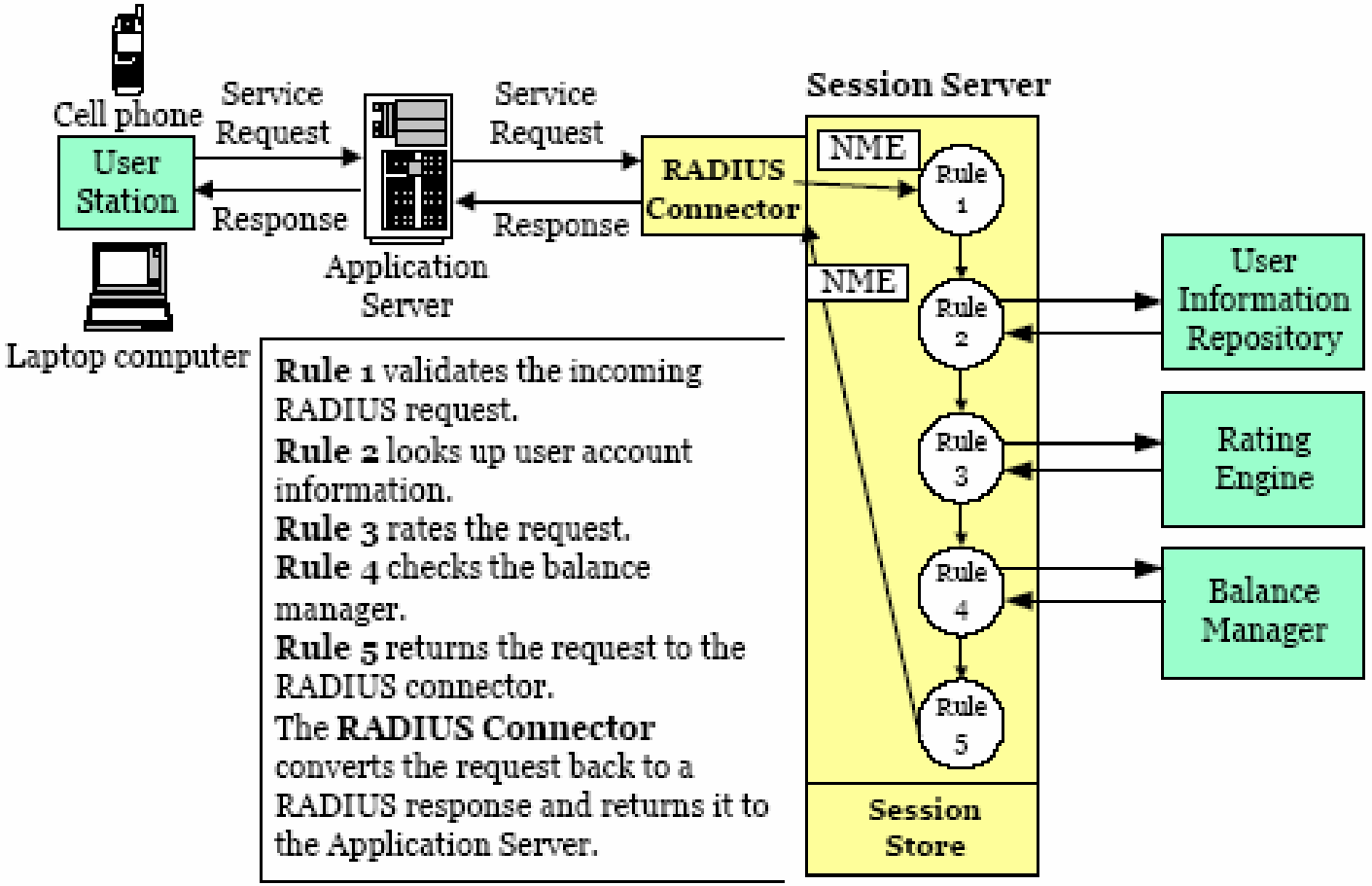
Session Server versus Collectors

- In a collector, every rule chain is invoked with every incoming NME. In a session server, the connector invokes one or more rule chains depending on the type of the incoming request.
- In a collector, after the rule chain executes, it adds the NME to the aggregation tree and eventually flushes the aggregated data to the datastores. In a session server, rules add and query session information in the session store and after the rule chain executes, it typically returns a response NME to the connector. You cannot use match rules or aggregation rules in a session server because the session server does not create or manage an aggregation tree as a collector does.

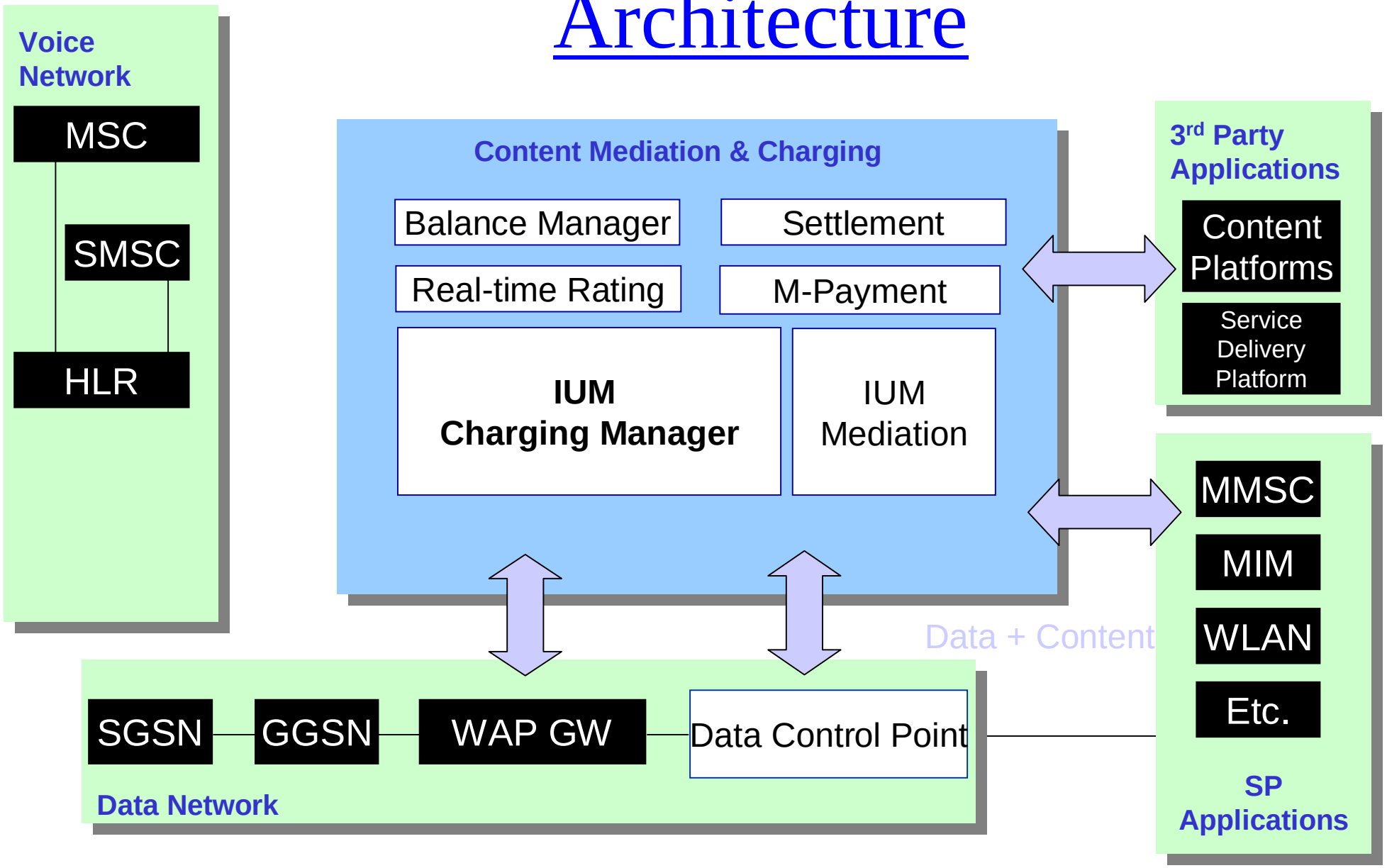




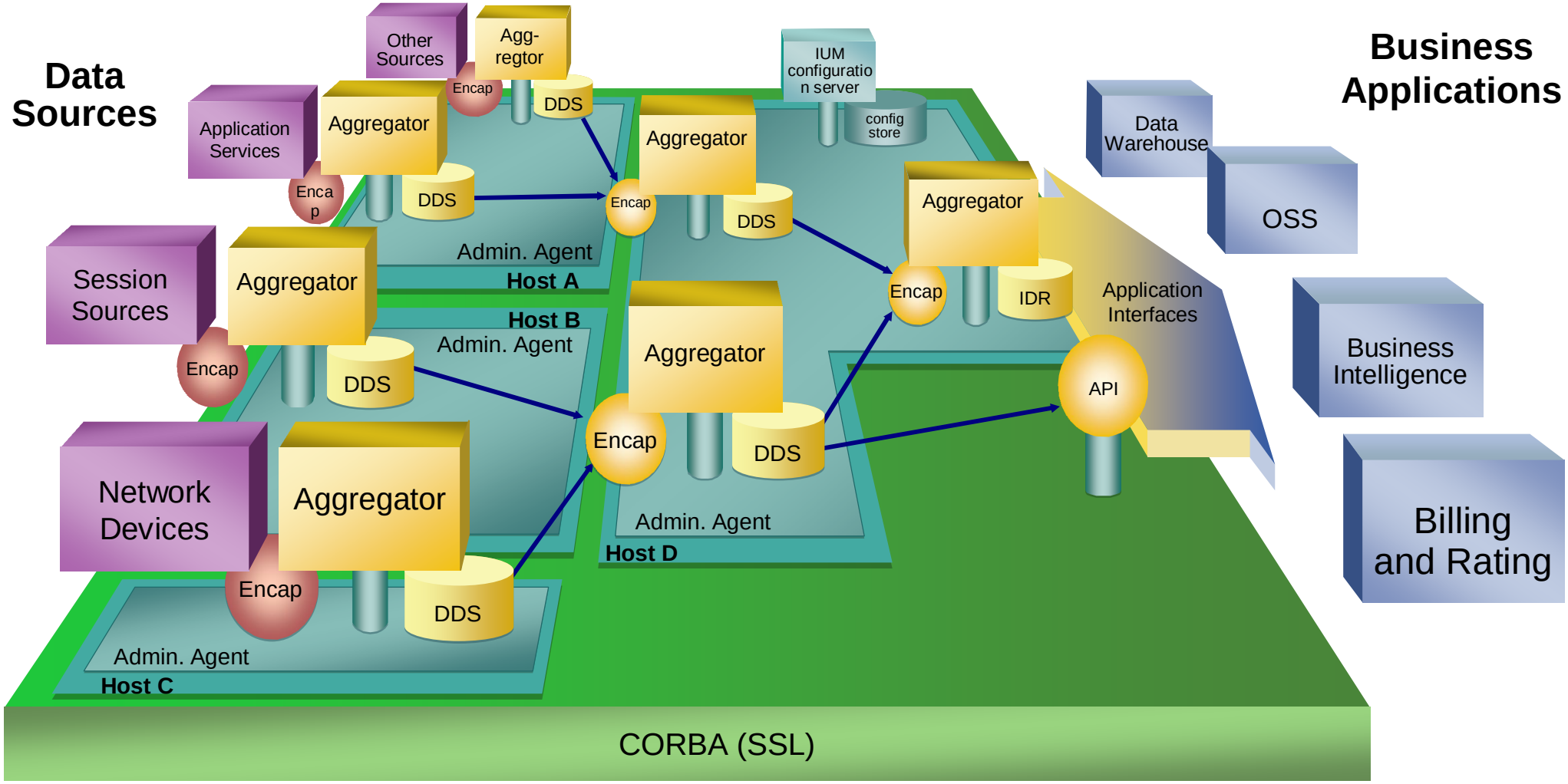
Session Server Overview - Example



Charging Manager / Session Server Architecture

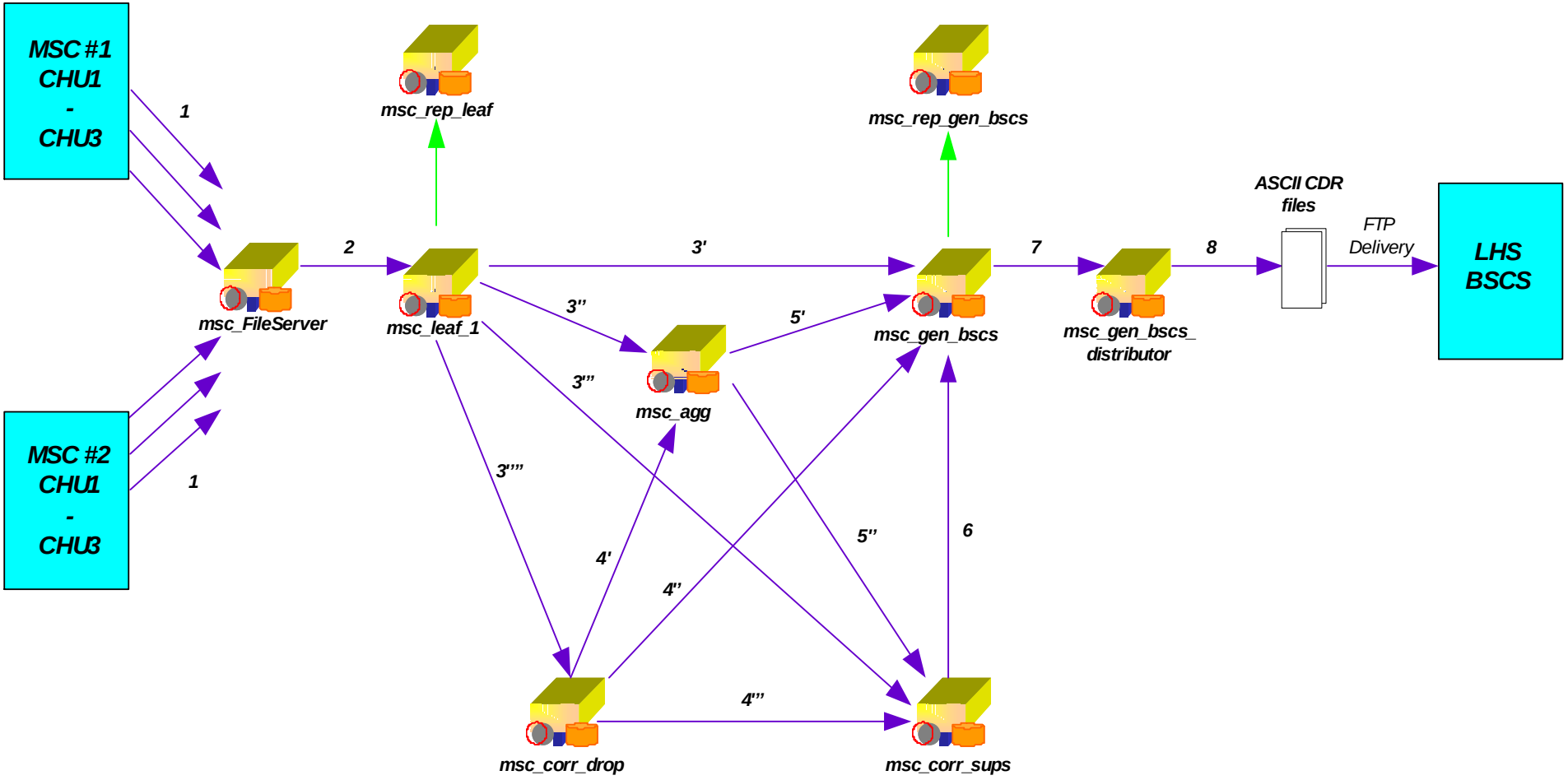


Designing a Deployment

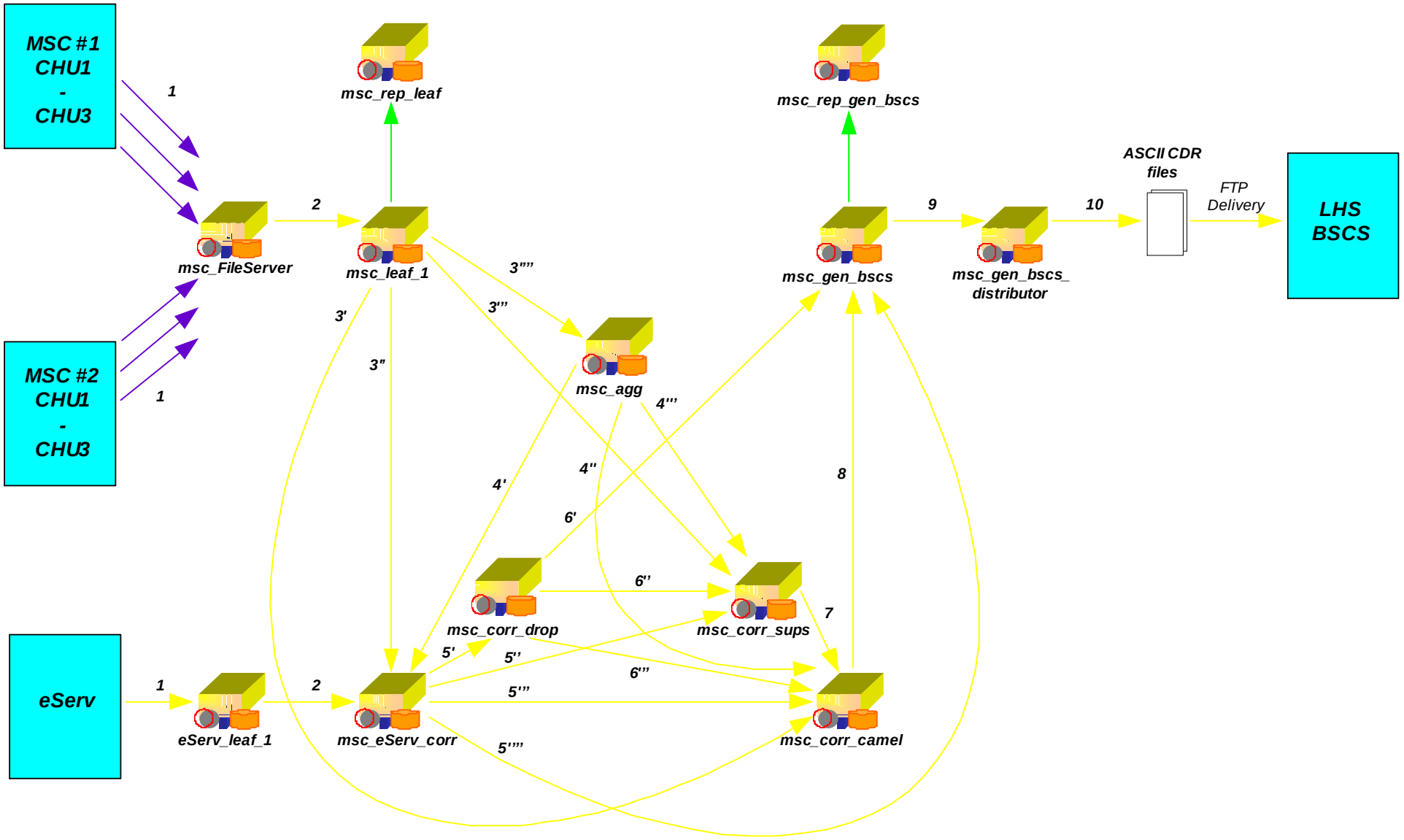


IUM Deployment- Example

MSC Collector Architecture – Post Pay



MSC Collector Architecture – Pre Pay



File Validation in IUM

- The handler validates files received from network elements like MSC/SMSC/MMSC. This component is used as a handler for the files validation in the InputFilePreprocessor component of the encapsulators for these sources

- The file validation handler validates the following
  - ✓ Header type and trailer values
  - ✓ Header and trailer lengths
  - ✓ Header format version
  - ✓ Charging block size
  - ✓ Actual data length in block as against the value put in header
  - ✓ Record count and match with record count in trailer

- In case the file validation fails in IUM, IUM parks the whole file in the configured error directory and logs a message in the collector log file. This file will not be processed in IUM until the file is corrected

Long Call Assembly in IUM

- For long call assembly we need to find the partial records belonging to the same session
- Hold on to partials for configurable amount of time when one or more are missing
- Create single output record for all available partials after predefined period of time. The consolidated CDR has the start time of the first available CDR, the end time of the last available CDR and an elapsed time, which is the sum of the individual durations
- In case of 1st partial CDR is missed, aggregate all the remaining records and send the aggregated CDR to downstream application. The consolidated CDR has the start time of the first available CDR, the end time of the last available CDR and an elapsed time, which is the sum of the individual durations

CAMEL Correlation in IUM

- IUM performs the CAMEL CDR (COC/CTC) correlation with the following various call types like MOC/MTC/FORW
- The correlation keys will be used to correlate camel records with call records.
- IUM will check if the value of that specific field in the call records is NOT null, if so, such records (aggregated in case of partials) are chosen for CAMEL correlation
- Based on the architecture both SUPS and camel correlation can be done on the same record.
- In case of missing camel records, IUM will send the call detail records (aggregated in case of partials) to downstream applications as normal voice without any CAMEL information correlation
- In case of missing call detail records, then IUM will send the camel records to unbillable stream and no CDR will be sent to downstream applications

MSC/eServ(prepaid) Correlation in IUM

- IUM correlates voice CDRs from MSC with prepaid CDRs for call cost information
- IUM uses keys for MSC MOC and eServ CDR correlation:
- IUM picks the COSTS field for balance type and sends it to billing applications

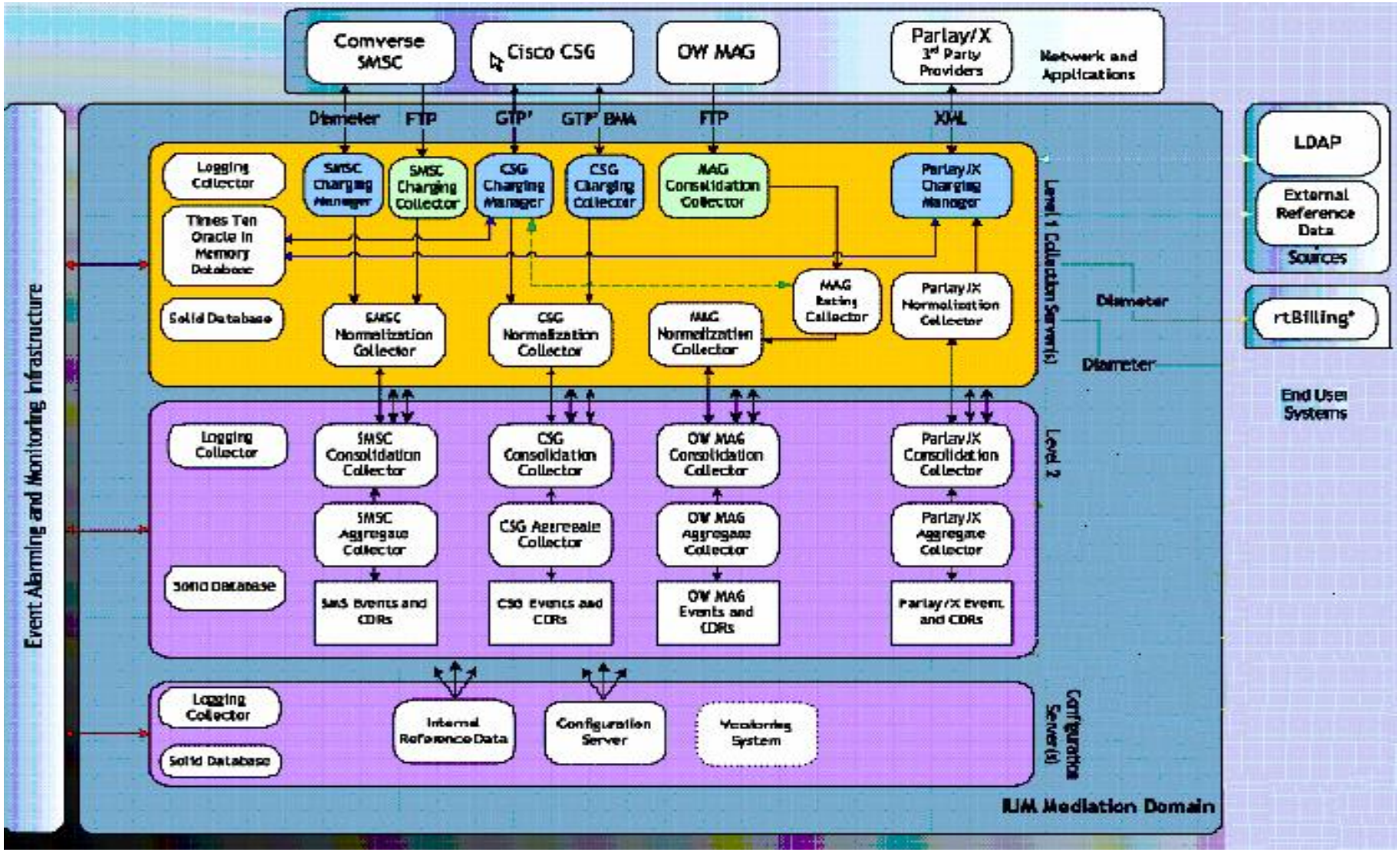
Load Balancing in IUM

- Most of Production system of IUM runs parallal instances for load balancing and failover enablement. Load balancing between the two independent systems is done by the networks team.
- Each collector based on the amount of traffic and amount of logic being applied will have a maximum capacity of file to process. Based on that figure we need to decide the load balancing and how to design the architecture.
- Failover enablement should be configured and tested by IUM team. And load sharing should be tested by networks team.

Online/Real time Mediation

- Real time / Online mediation is termed as High Alert system because they deal with the real time files. And in worst scenario if IUM is down its possible that no one in the network will be able to make or receive any calls.
- It deals with upstream applications like Cisco CSG(Real time system),etc and doen stream applications like rtBilling, LDAP server,Ranger,etc
- In real time it handles functionalities like authenticating each user information from LDAP servers before making or receiving any calls, Making checks with the rtBilling, checks with Ranger system for any fraud registered,etc.
- Real time system sits in the middle tier and do have the responsibility of doing the mediation and also doing the check on a real time basis and that makes the deployment complex and interesting too.

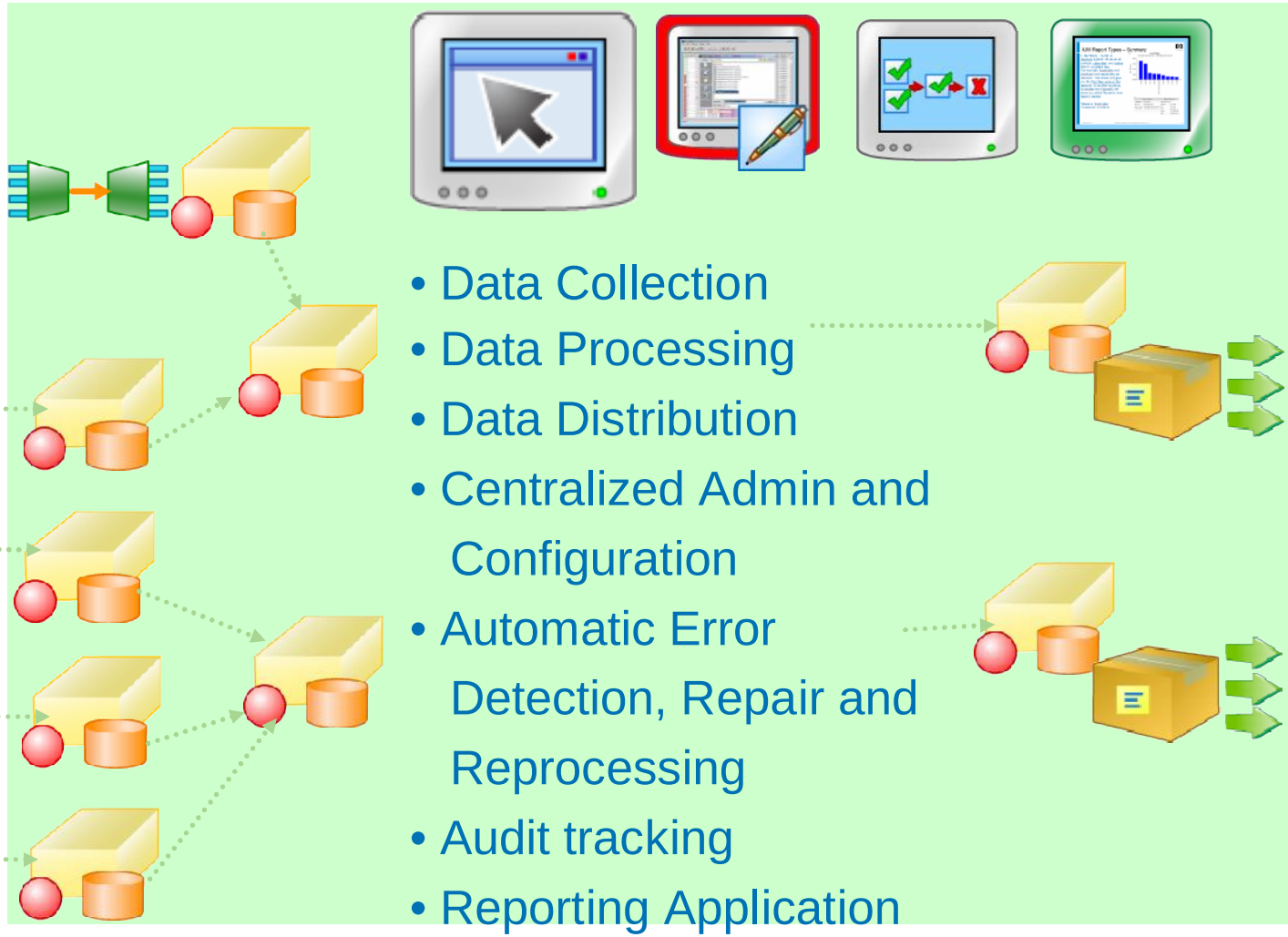
Example of Real time mediation system



Offline Mediation system

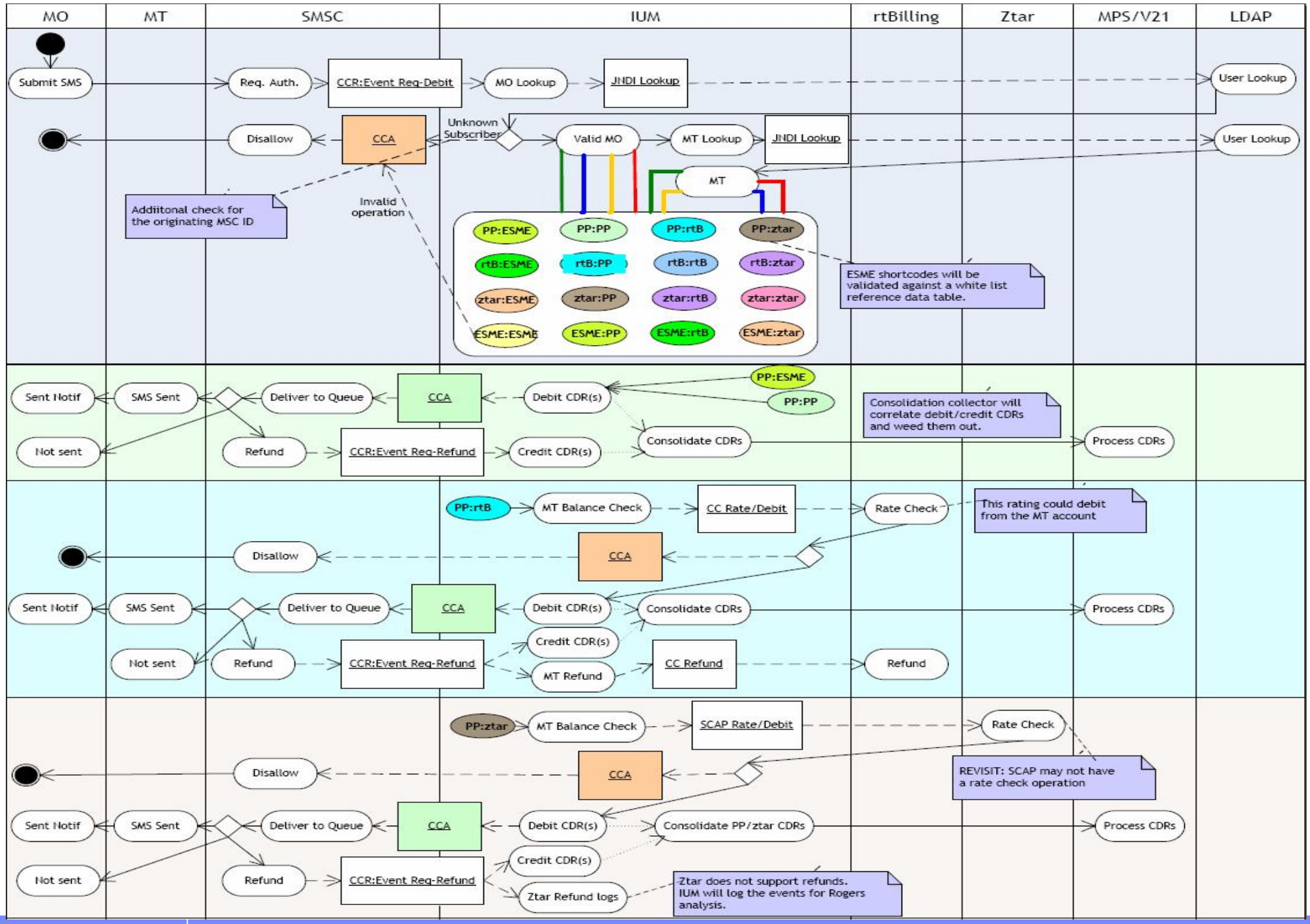
- As per the name it deals with the offline switch level data
- The Usage data captured at the switch level is collected by IUM
- IUM processes the data and delivers the mediated O/P data to down stream applications like BSCS, DWH, FMS,etc
- It pulls the data from switches using file collection service or any of the fetch mechanism.
- It does' not deals with real time functions like authenticating each user and real time checks

Example of a Offline mediation

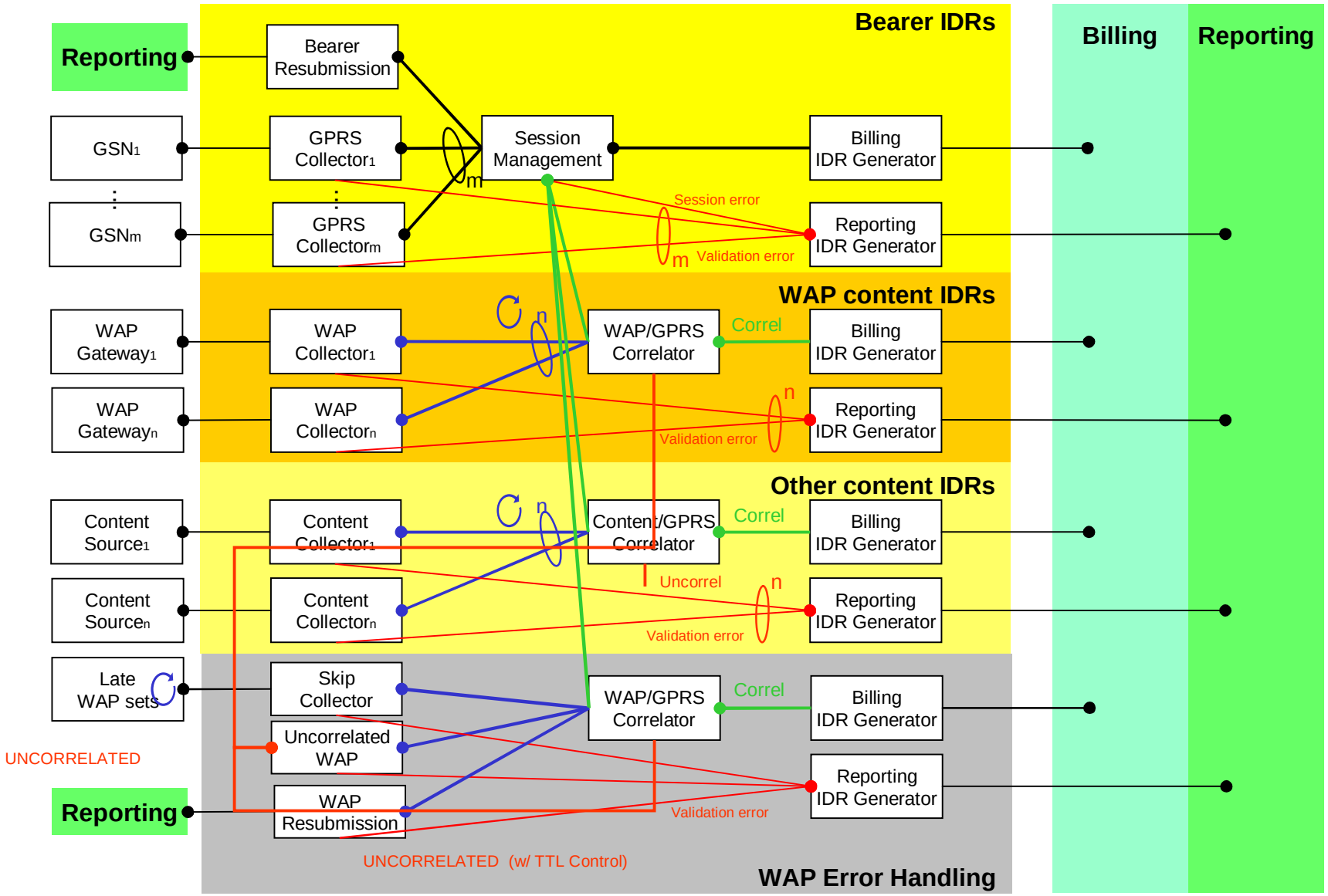


- Data Collection
- Data Processing
- Data Distribution
- Centralized Admin and Configuration
- Automatic Error Detection, Repair and Reprocessing
- Audit tracking
- Reporting Application
- Guaranteed data delivery

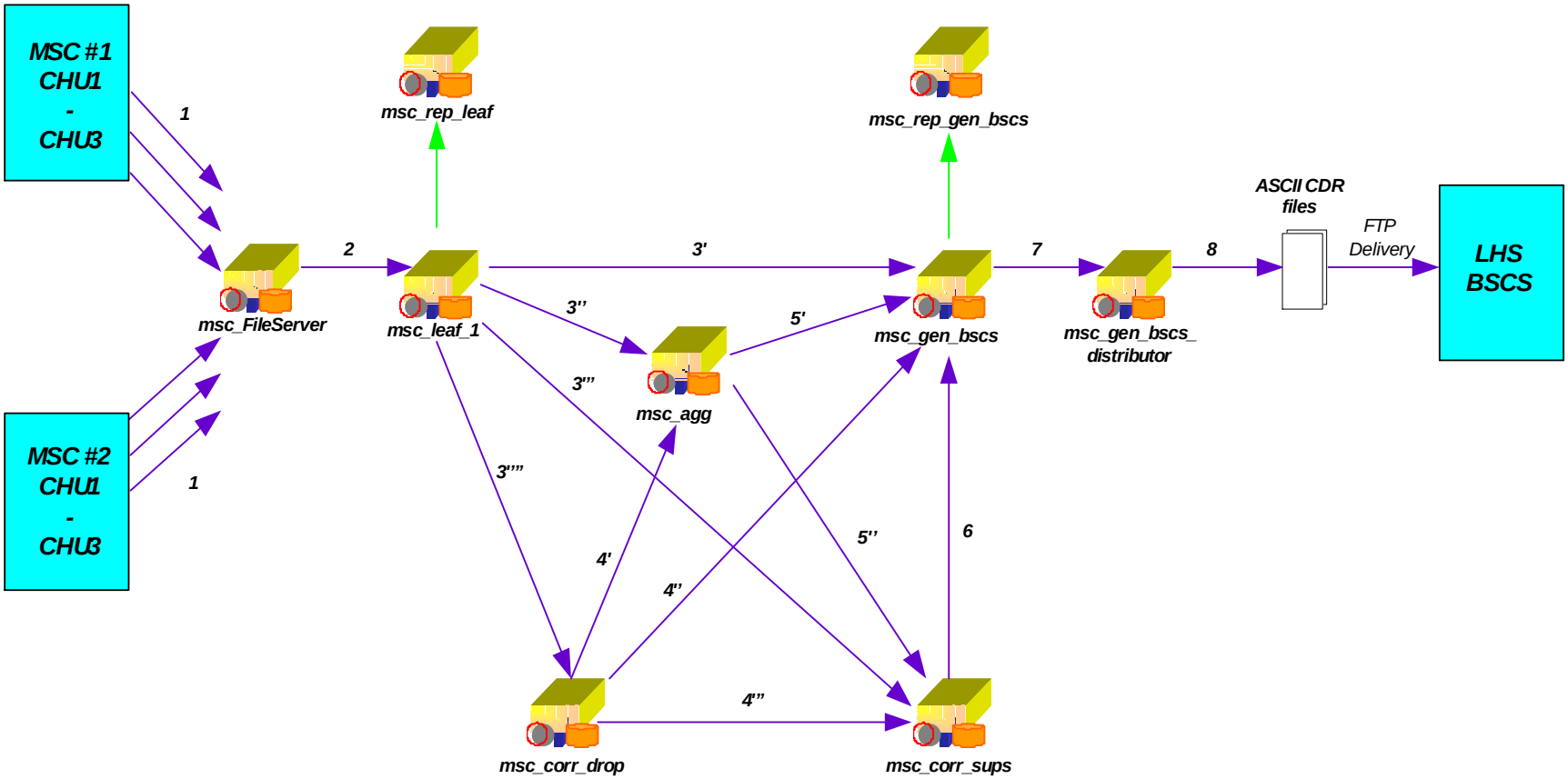
- **End to End Flow – Real time scenario**


MO
MT
SMSC
IUM
rtBilling
Ztar
MPS/V21
LDAP
Submit SMS
Req. Auth.
CCR:Event Req-Debit
MO Lookup
JNDI Lookup
User Lookup
Disallow
CCA
Unknown Subscriber
Valid MO
MT Lookup
JNDI Lookup
User Lookup
MT
Addiitonal check for the originating MSC ID
Invalid operation
PP:ESME
PP:PP
PP:rtB
PP:ztar
rtB:ESME
rtB:PP
rtB:rtB
rtB:ztar
ztar:ESME
ztar:PP
ztar:rtB
ztar:ztar
ESME:ESME
ESME:PP
ESME:rtB
ESME:ztar
ESME shortcodes will be validated against a white list reference data table.
Sent Notif
SMS Sent
Deliver to Queue
CCA
Debit CDR(s)
PP:ESME
PP:PP
Consolidation collector will correlate debit/credit CDRs and weed them out.
Not sent
Refund
CCR:Event Req-Refund
Credit CDR(s)
Consolidate CDRs
Process CDRs
PP:rtB
MT Balance Check
CC Rate/Debit
Rate Check
This rating could debit from the MT account
Disallow
CCA
Sent Notif
SMS Sent
Deliver to Queue
CCA
Debit CDR(s)
Consolidate CDRs
Process CDRs
Credit CDR(s)
Not sent
Refund
CCR:Event Req-Refund
MT Refund
CC Refund
Refund
PP:ztar
MT Balance Check
SCAP Rate/Debit
Rate Check
REVISIT: SCAP may not have a rate check operation
Disallow
CCA
Sent Notif
SMS Sent
Deliver to Queue
CCA
Debit CDR(s)
Consolidate PP/ztar CDRs
Process CDRs
Credit CDR(s)
Not sent
Refund
CCR:Event Req-Refund
Ztar Refund logs
Ztar does not support refunds. IUM will log the events for Rogers analysis.

End to End Flow – Offline Mediation scenario


Bearer IDRs
WAP content IDRs
Other content IDRs
WAP Error Handling
Billing
Reporting
Reporting
Bearer Resubmission
GSN1
GSNm
GPRS Collector1
GPRS Collectorm
Session Management
Billing IDR Generator
Reporting IDR Generator
Session error
Validation error
WAP Gateway1
WAP Gatewayn
WAP Collector1
WAP Collectorn
WAP/GPRS Correlator
Correl
Validation error
Content Source1
Content Sourcen
Content Collector1
Content Collectorn
Content/GPRS Correlator
Uncorrel
Late WAP sets
Skip Collector
Uncorrelated WAP
WAP Resubmission
UNCORRELATED
UNCORRELATED (w/ TTL Control)

Description of one Production system Architecture



What is IUM launchpad ?

- Tool to run all the collectors
- shows the complete deployment with all the collectors
- Gives option to start, stop any collector,admin agent, config server
- Gives option to see the logs
- Gives option to see the data getting processed.
- Gives option to query the solid DB
- Gives option to set log level of each collector.

Installing IUM

The IUM License

- IUM Licenses are associated with the IP address of the management host machine (ConfigServer).
- Licenses can be requested from:
- http://www.hp.com/support/usage
- (Login and Password Required)
- The license gets emailed back to you as a an ASCII file – “license.config”.
- Copy the file to C:\Siu or /etc/opt/SIU
-
- Note: Demo/Evaluation Licenses can have “open IP addresses”
- (0.0.0.0) but will expire after 3 months.

The IUM License

- If the License expires, License.config can be over-written with a new License without having to reinstall IUM.
- Adding new solutions to IUM (for example, Session Server) means adding to the existing license.
- To update an existing license while IUM is running, overwrite existing license.config and the type: C:\Siu\bin updatelicense –f <license.config> or /opt/SIU/bin/updatelicense –f <license.config>.
- If IUM is not running, overwrite existing license.config and start IUM application (or restart Admin Agent process).

Install the Java Development Kit

- IUM 4.5 requires the full J2SDK (not the JRE) to be installed before you install IUM.

- To download, go to **http://www.java.sun.com** to download Solaris, Windows and Linux version. Go to **http://www.hp.com/go/java** for the HP-UX version

Time Synchronization

- All datasources and IUM Collectors within a deployment must be time synchronised. This allows correct data rule processing and correlation.
- IUM manages components based on UTC (GMT) Time.
- It is recommended that IUM host machines and data source that IUM receive data from use a NTP Service. Check with your network administrator.

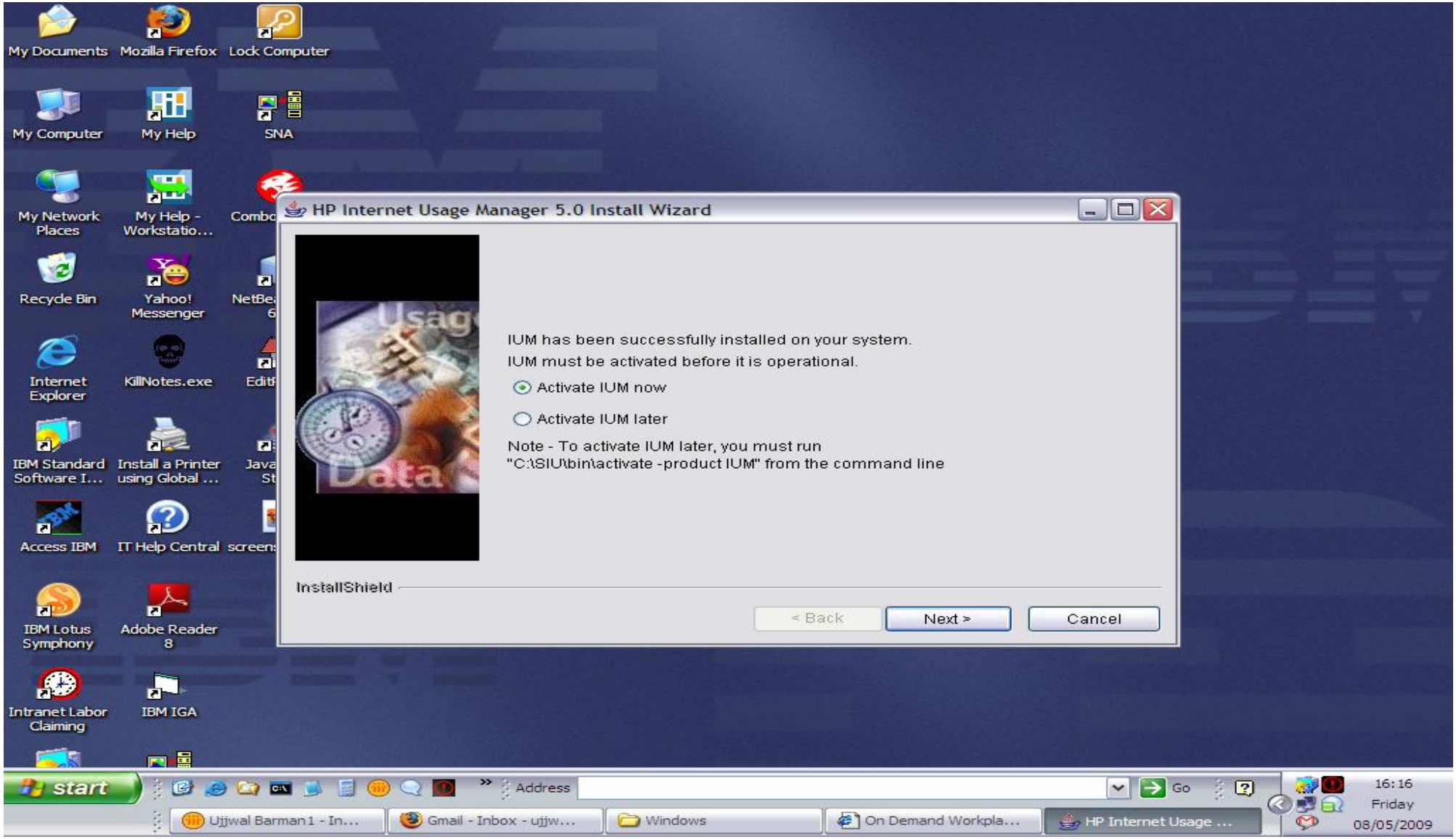
The Installation Process

- Run the IUM installation wizard and following the instructions.
- The installation process copies all IUM related files into default locations - C:\SIU on Windows and /opt/SIU, /var/opt/SIU and /etc/opt/SIU on UX.

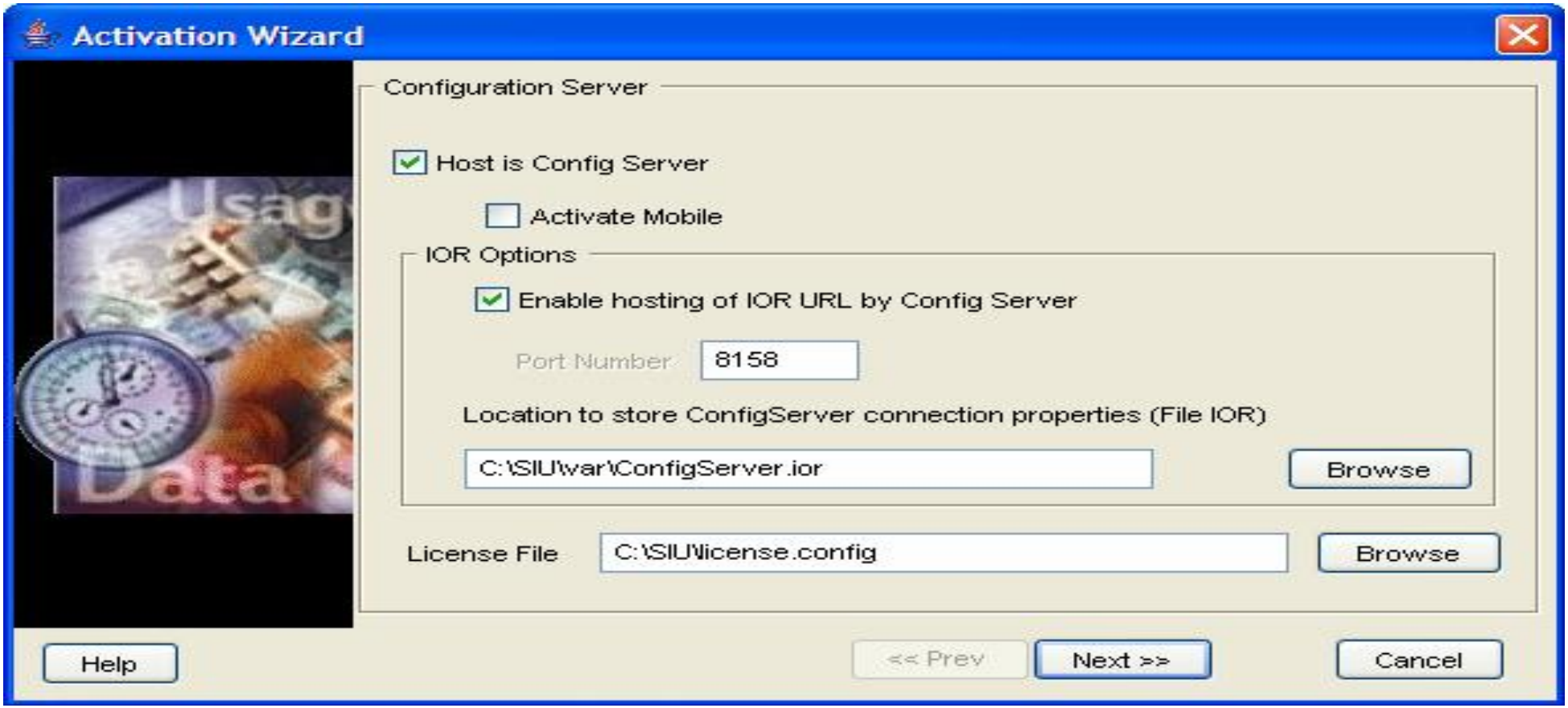
Notes:

1. You can install multiple instances of IUM on the same host.
2. There is also an unattended install option.
3. On Unix platforms there is a non-root installation option.

The Installation Process



Installing IUM Continued ....

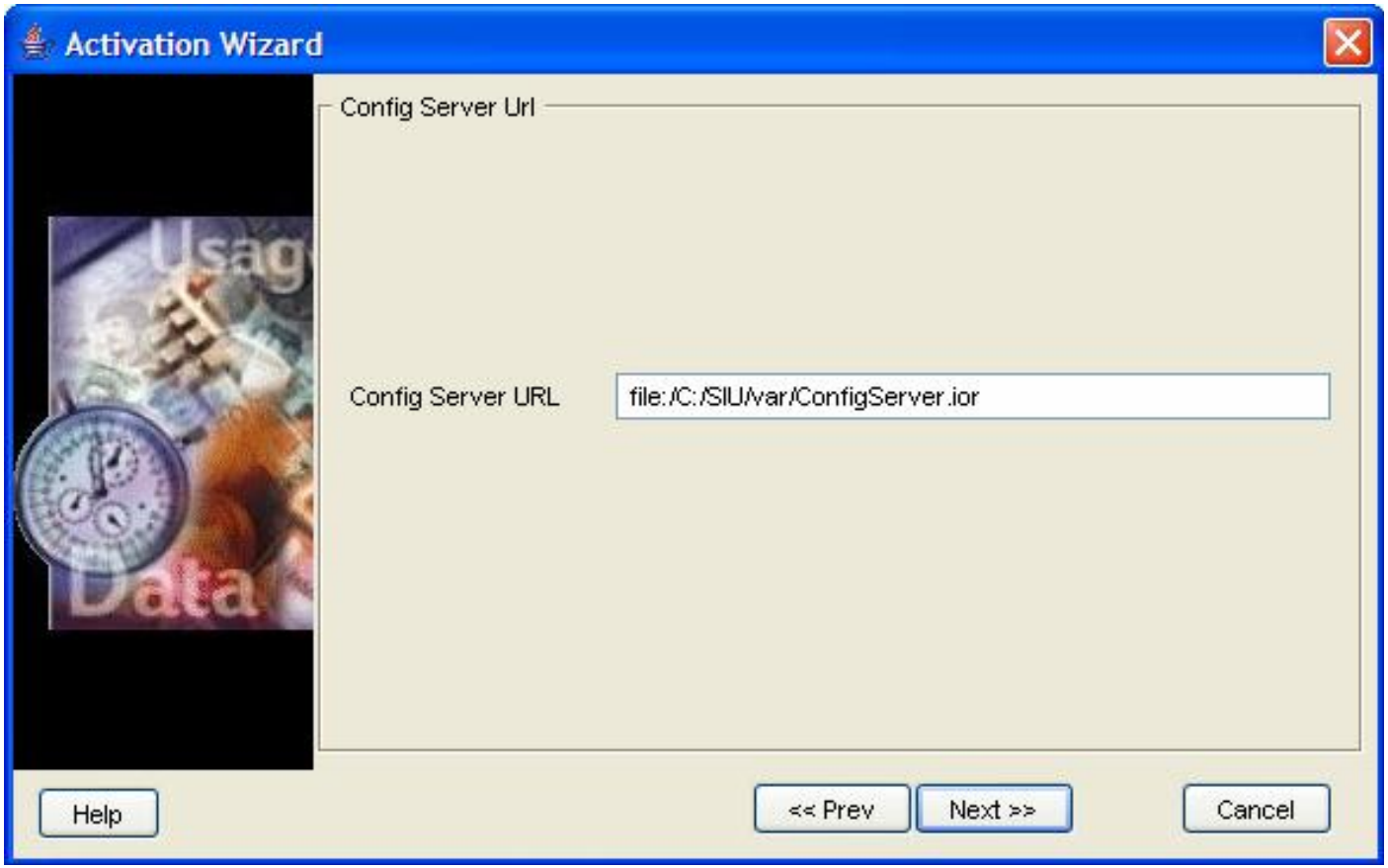


In UNIX/LINUX the IOR path is:

/var/opt/<Instancename>/ConfigServer.ior

Licence files in UNIX can be accessed at: /etc/opt/SIU

Installing IUM Continued ....



In case of UNIX, the path is: file:/var/opt/<Instancename>/ConfigServer.ior

Installing IUM Continued ....

Activating IUM 4.5

Once the earlier steps are done it will start installing and the later on it will ask if we want to activate the product. Click Yes and then automatically IUM product will be activated. The activation process is a separate process from the installation process. The installation process copies the IUM files onto the host.

The activation process does the following:

- Verifies the license.
- Configures access to the Config Server process on all hosts
- Starts the hosts Admin Agent process.
- Installs and starts the Config Server process on the management host.
- Loads all initial configuration information into the Config server.
- Starts the IUM Report Server if selected.

Activating IUM 4.5 (continued)

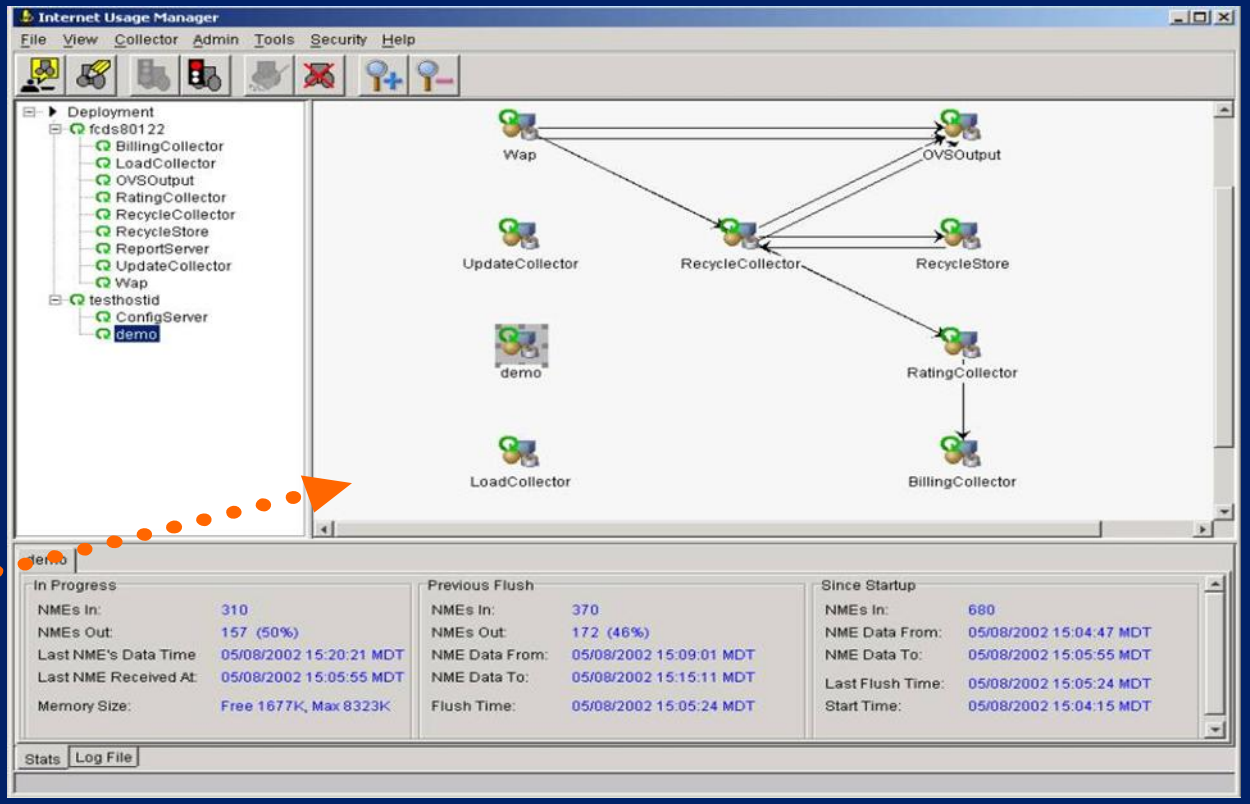
The activation process typically is run immediately after the installation process.

However it can be run separately, for example to add new functionality, as:
/opt/SIU/bin/activate –product ium on Unix platforms
C:\Siu\bin\activate –product ium on Windows platforms

IUM 4.5 GUI- Launchpad

Internet Usage Manager Launchpad

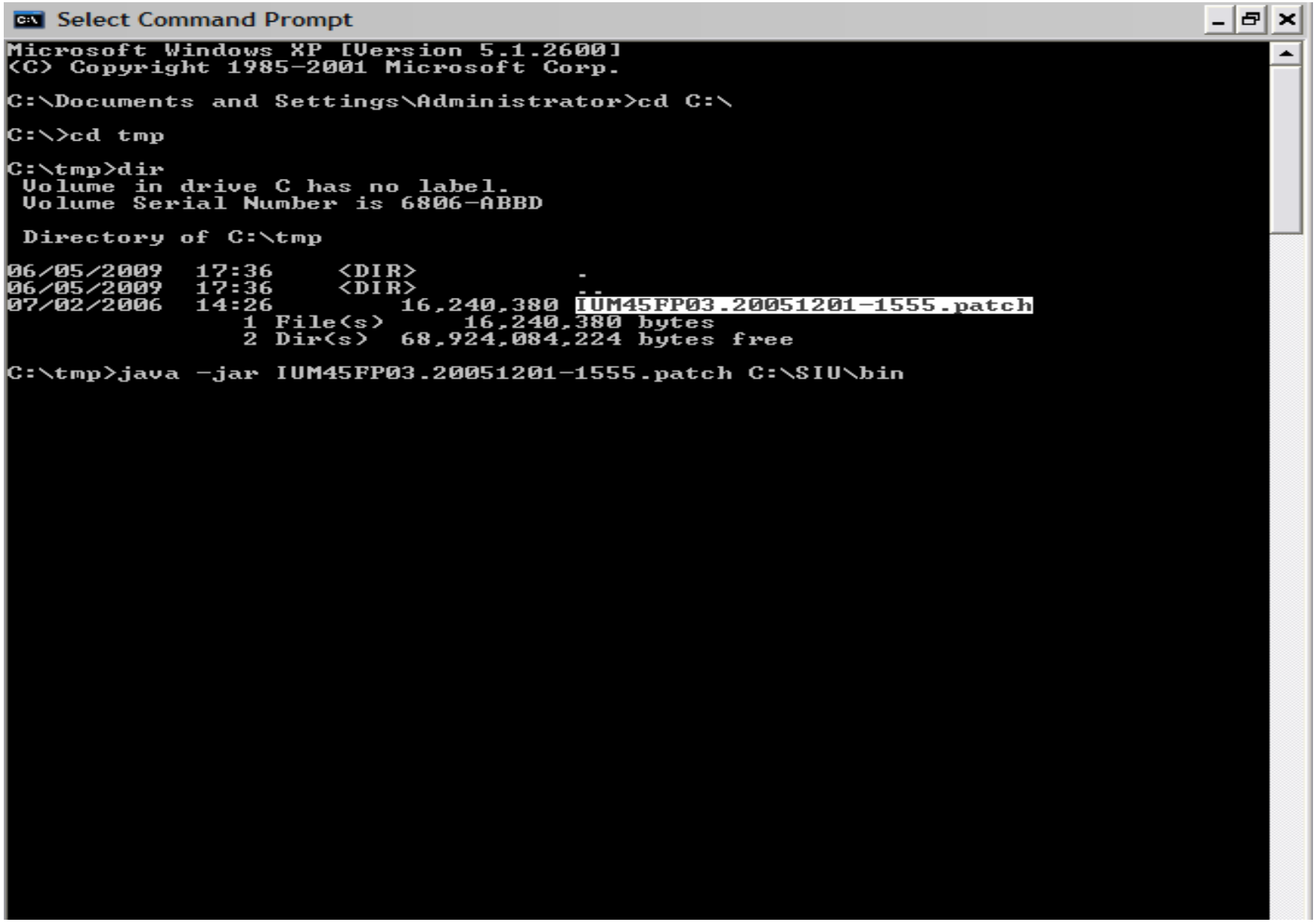
easy configuration, administration and monitoring of the entire IUM deployment



Deploying the Patch for IUM

- Lets take an example.
- I want to install the new oatch FP06 for IUM 4.5 my file is under “C:\tmp” . And always remember the IUM will be installed under the folder “C:\SIU” in windows and in UNIX under “ /var/opt/<instancename>.
- Now go to command prompt and follow the steps shown and press enter:

Deploying the Patch for IUM Contd..



IUM Processes

Config Server Process:

- The ConfigServer writes all configuration information for an IUM deployment to a database file: C:\Siu\var\config.db or /var/opt/SIU/config.db

- Every time a configuration change is made to a deployment, for example, changing a Collector attribute, the whole configuration is written to config.db, not just the changes.

- The last known copy of config.db is always written to config.db.last. This can be used to recover from if necessary.

- The log file C:\Siu\var\log\ConfigServer.log or /var/opt/SIU/log/ConfigServer.log records all changes to the Config Server.

IUM Processes (continued)

Admin Agent Process:

- The AdminAgent process is the IUM bootstrap process or parent process on an IUM host/server.
- If the process is not running, then no other processes or collectors can start-up or run.
- The AdminAgent is always associated with hostname of the host where it is running.
- The Admin Agent log file which records all processes starting and stopping is at: C:\Siu\var\log\hostname.log or /var/opt/SIU/log/hostname.log

IUM Processes (continued 2)

Process ids for every IUM process - AdminAgent, Config Server and all collectors are written to the log file of that process when that process starts up.

The PID is also written to a text file in the var directory for that process.

- End Of Session 1

- Thank You….