



Consistent Answers

Release 1.0 Detailed Design Document

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April 11, 2002



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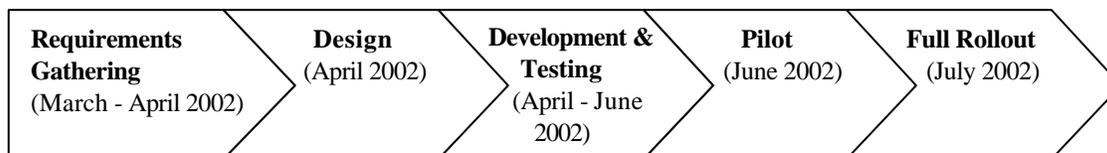


1.0 INTRODUCTION

Release 1.0 implements the “One Number for Students” initiative for Federal Student Aid (FSA). This design document is based on business requirements (included in this binder) developed with key stakeholders including:

- FSA
- AFSA, EDS and NCS Pearson (Operating Partners)
- WorldCom (voice network carrier)
- iBasis (IVR outsource vendor)
- Vanguard (scripting vendor)
- Modernization Partner Telephony Team

A pilot will take place prior to full implementation of Release 1.0 (Pilot Approach document included in this binder). Metrics will be monitored during the pilot to ensure call centers and customers are not negatively impacted.





2.0 OBJECTIVES AND SCOPE OF RELEASE 1.0

2.1 Objectives

The objectives of Release 1.0 are as follows:

- Provide centralized prompter and messaging functionality
- Provide a foundation for future releases to build intelligent call routing, improve customer self-service rates, and establish a consistent customer experience

2.2 Scope

Release 1.0 includes the following elements:

- **Redirection of existing toll-free numbers to a centralized platform**
Release 1.0 incorporates the student-facing call centers for FSA, which include Federal Student Aid Information Center (FSAIC), Debt Collection Service Information Center (DCSIC), Direct Loan Servicing Center (DLSC), and Direct Loan Consolidation Center (DLCC) into a single access point. The following table depicts the toll-free numbers that are in scope for Release 1.0:

Redirected Toll-Free Numbers	FSA Function	Call Volume (per year)	Operating Partners
800-4 FED AID	FSAIC	6.8 million	NCS Pearson
800-801-0576			
800-256-7346			
800-621-3115	DCSIC	1.2 million	AFSA
800-848-0979	DLSC	6.4 million	
800-557-7392	DLCC	1.6 million	EDS
888-758-9729			
800-726-5163			
888-799-2474			
888-758-9730			
10	4	16+ million	3

- **Implement Standardized Functional Routing Script**
Release 1.0 allows all callers to hear the same menu choices no matter which number they dial and to have their call directed based on the function they choose.
- **Implementation of Warm Transfers Across Centers**
Release 1.0 enables warm-transfer capabilities, meaning that students can reach multiple centers during a single call, without having to hang up and dial a separate number.



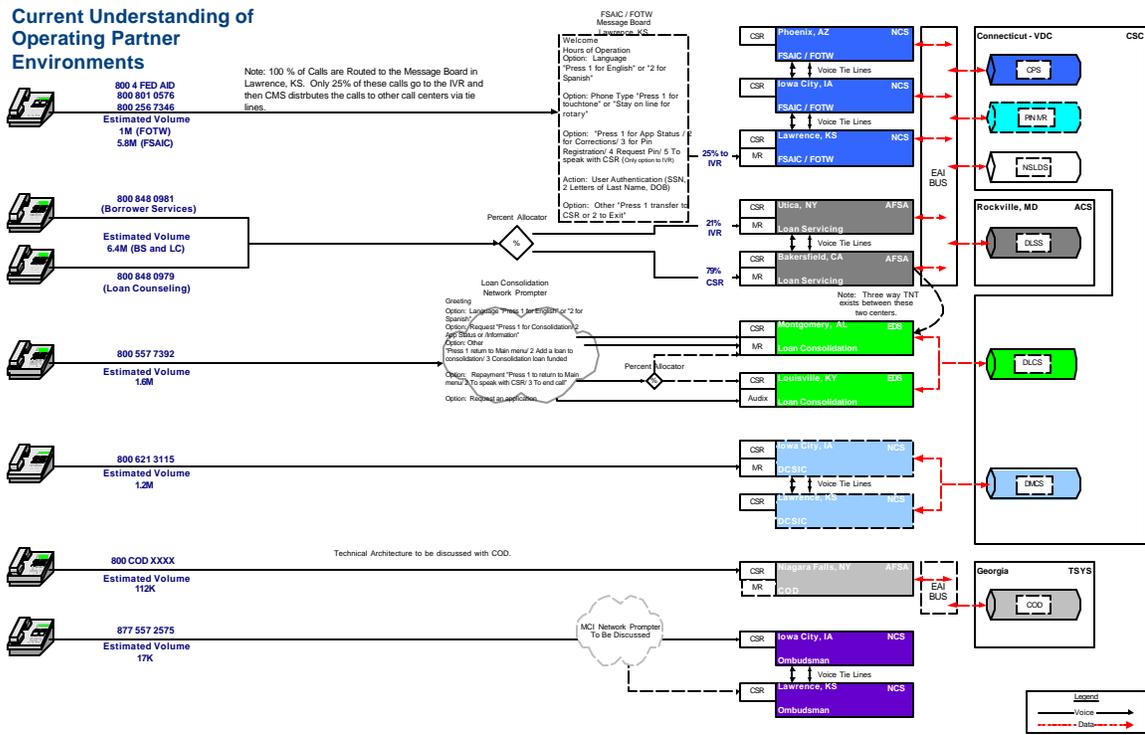
- **Introduction of Consolidated Reporting**
Release 1.0 reporting captures all inbound student call activity. (Traditionally, reports have been provided separately for Operating Partners and centers.) This enables FSA to better understand and manage enterprise-wide operations.



3.0 OVERALL ARCHITECTURE

3.1 Current Environment

The diagram below depicts the routing flow of the current Operating Partner environment:



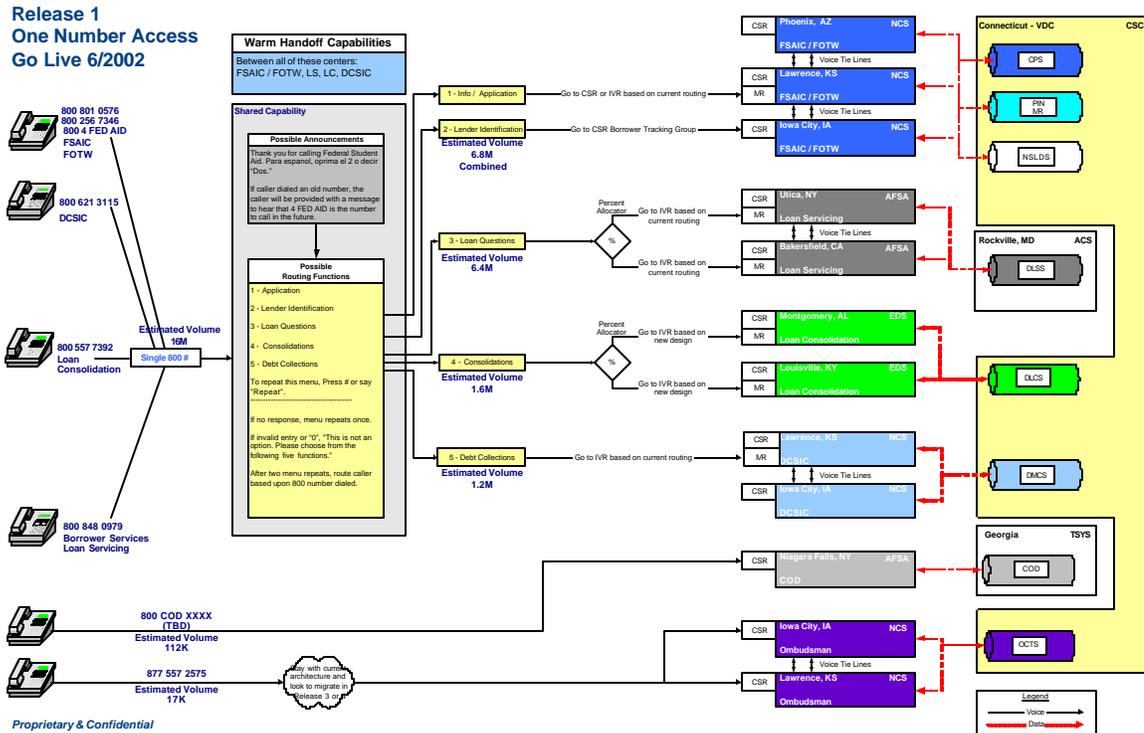
The following limitations are evident in the current environment:

- Numerous contact phone numbers
- Inconsistent voices (e.g., male and female) within the system
- Multiple platforms support call routing
- Potential for confusion leading to misdirected calls
- Warm transfers not performed at all centers



3.2 "To-Be" Environment

The diagram below depicts the routing flow of the Release 1.0 "To-Be" environment:



Release 1.0 addresses the limitations of the current environment as follows:

Current Environment	"To-Be" Environment
Numerous contact phone numbers	Migration to single 800 number
Inconsistent voices (e.g., male and female) within the system	Single male voice on the centralized prompter
Multiple platforms support call routing	All calls routed initially through single platform (i.e., iBasis)
Potential for confusion leading to misdirected calls	Introduction of functional routing
Warm transfers not performed at all call centers	Warm transfer capability implemented at all call centers



4.0 SCRIPTING DESIGN

4.1 *Current Scripts*

In the current environment, Operating Partners are responsible for creating and maintaining their own IVR scripts. This lack of centralization has resulted in many inconsistencies. For example, not all scripts include Spanish menus. Operating Partners ascribe to different scripting best practices, resulting in varying menu styles, levels of complexity, and menu tiers. “Global” menu commands (e.g., pressing the star key to go up a level) are not standardized. When callers are placed on hold, they may or may not hear music, messages, or expected wait time, depending on which center they call.

Release 1.0 begins to address these inconsistencies. Callers will initially hear one standardized Main Menu before they are routed to the appropriate center or IVR. (Subsequent releases will drive to eliminate all inconsistencies.)

4.2 *“To-Be” Scripts*

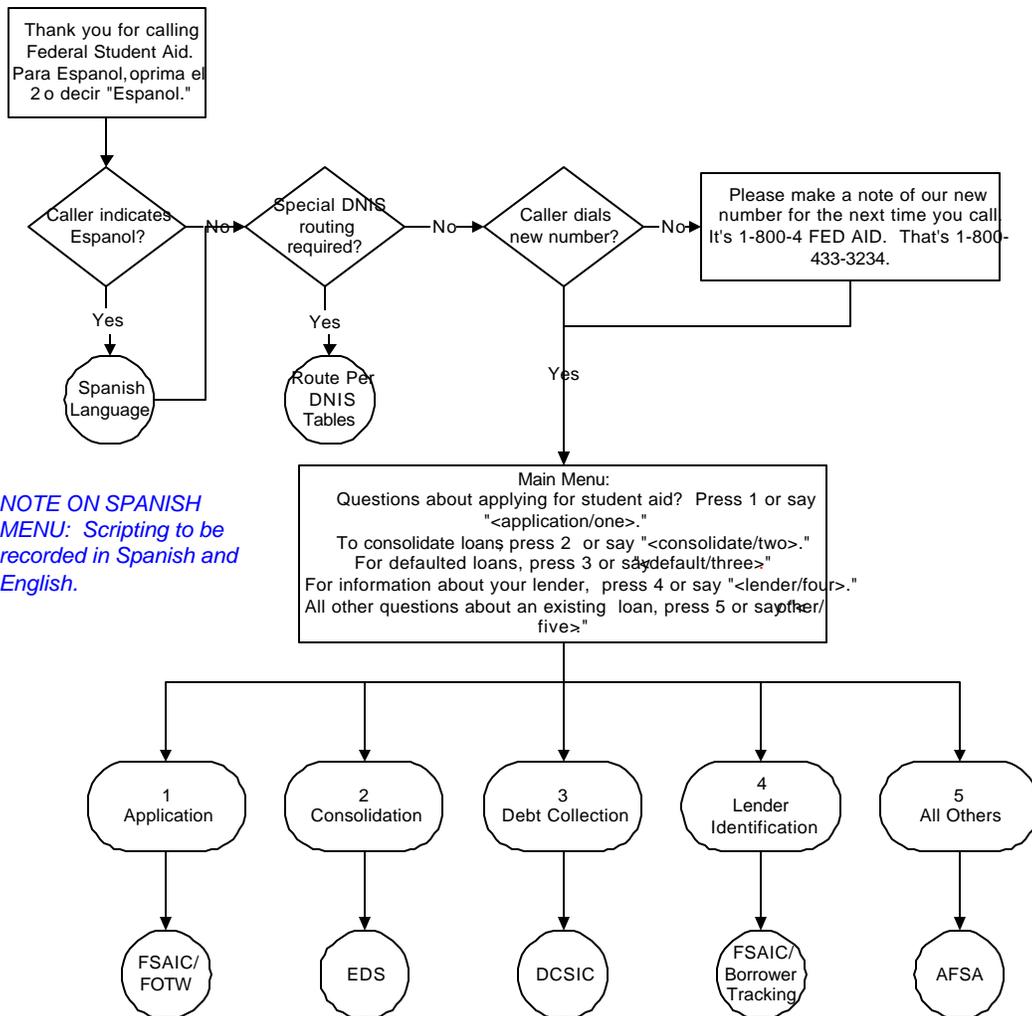
Vanguard made the script recommendations included in this section based on call observations from EDS, AFSA, and NCS Pearson.

“To-Be” scripts will be offered in both English and Spanish. The scripts are identical with the exception of language.

The “To-Be” menu was designed to accommodate directed speech (e.g., Application, Consolidation) or simple speech (e.g., One, Two).



The following script flow depicts the "To-Be" English version of the Main Menu:





4.3 Scripting Standards

The following standards apply to Release 1.0 (unless exceptions are explicitly stated):

- **Global Touchtone Entry**

If Caller Presses:	Go To:
Star (*)	Repeat Prompt
Nine (9)	Main Menu
Pound (#) by itself at interruptible information steps (not at menu or data entry steps)	Next Step
Pound (#) as terminator following a string of digits	Next Step

- **Standard Treatment of Invalid Entries/Timeouts**

Callers are transferred to a CSR after the second user error (invalid entry or timeout).

	Timeout:	Invalid Entry:
<i>First Occurrence</i>	<ul style="list-style-type: none"> • "To help us route your call, please make a selection." • Repeat prompt. 	<ul style="list-style-type: none"> • "Sorry, <x> is not a choice." • Repeat prompt.
<i>Second Occurrence</i>	<ul style="list-style-type: none"> • "Please hold while we transfer your call." • Route callers based on DNIS tables. 	<ul style="list-style-type: none"> • "Please hold while we transfer your call." • Route callers based on DNIS tables.

- **Wait Time at Menu Steps**

Callers will be given five seconds to respond at each menu step. One exception will be made at the language prompt. After only three seconds, if no entry is received, the menu will default to the English language and move caller automatically to the next step.

- **"Barge-Ahead" Guidelines**

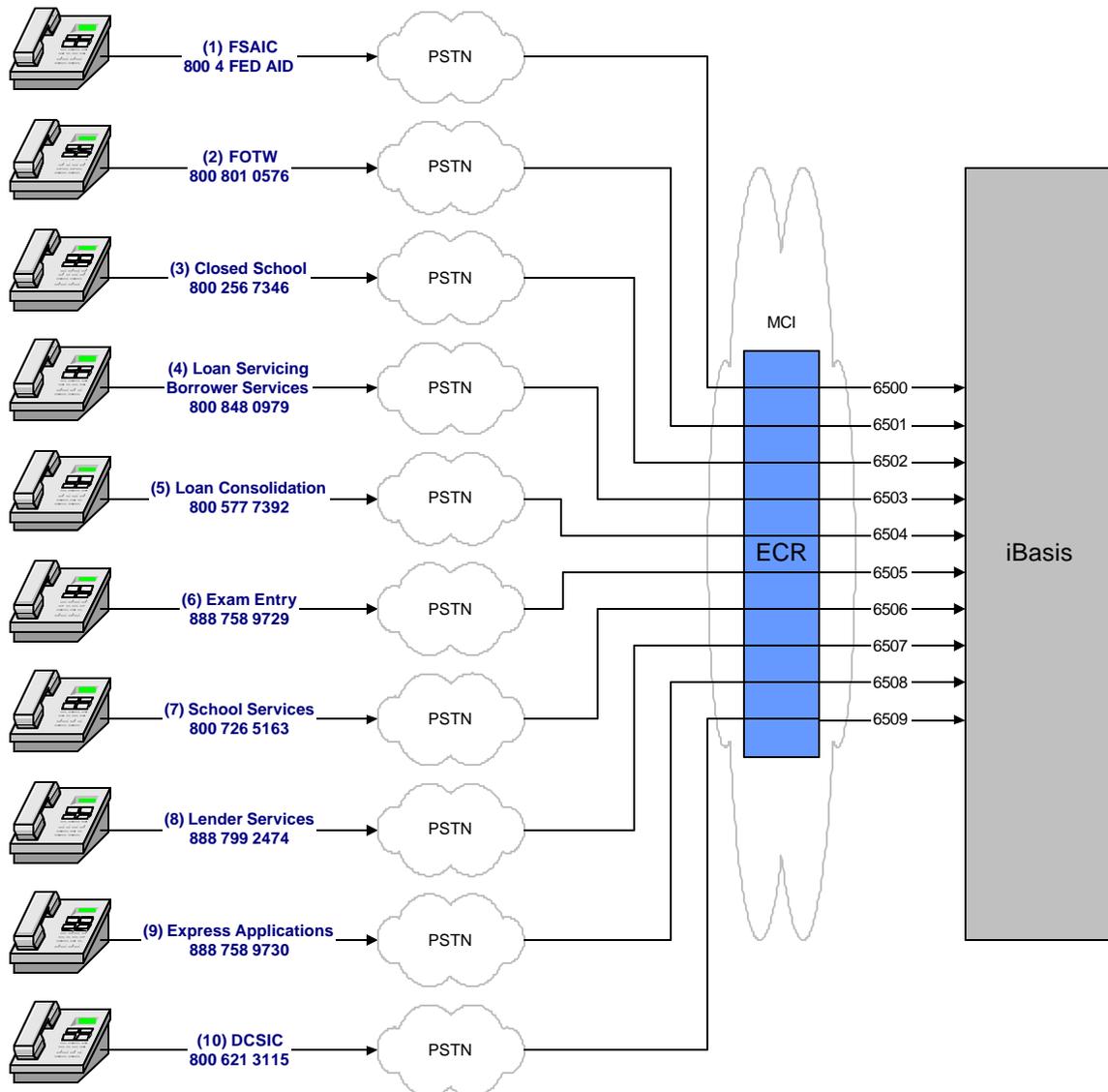
All prompts may be interrupted and callers will be allowed to "barge-ahead" with one exception: the new 800 number message in the network cannot be interrupted.



5.0 ROUTING AND NETWORK DESIGN

5.1 Routing a Call to the iBasis Platform

When a caller dials one of the targeted toll free numbers, they will be directed through the Public Switched Telephone Network (PSTN) to the WorldCom ECR platform. This call will then be activated in the WorldCom ECR application so the Takeback and Transfer (TNT) feature is enabled. Next, the call will be directed to the iBasis IVR platform. The figure below shows the flow of an inbound call to the iBasis platform:





The following table documents all of the inbound numbers and how they will map to the iBasis prompter:

Inbound Call	To	Hidden 800 Number	Assigned DNIS	Comments
800 433 3243	WorldCom ECR	N/A	iBasis VA 6500	800 4 FED AID to iBasis
800 801 0576	WorldCom ECR	N/A	iBasis VA 6501	FOTW to iBasis
800 256 7346	WorldCom ECR	N/A	iBasis VA 6502	Closed Schools to iBasis
800 848 0979	WorldCom ECR	N/A	iBasis VA 6503	LS to iBasis
800 557 7392	WorldCom ECR	N/A	iBasis VA 6504	LC to iBasis
888 758 9729	WorldCom ECR	N/A	iBasis VA 6505	Exam Entry to iBasis
800 726 5163	WorldCom ECR	N/A	iBasis VA 6506	School Services to iBasis
888 799 2474	WorldCom ECR	N/A	iBasis VA 6507	Lender Services to iBasis
888 758 9730	WorldCom ECR	N/A	iBasis VA 6508	Express Application to iBasis
800 621 3115	WorldCom ECR	N/A	iBasis VA 6509	DCSIC to iBasis
WorldCom ECR	iBasis	800 555 0001		Hidden 800 # to Connect existing #s

5.2 Routing a Call from iBasis to the Call Center

Once the call is in the iBasis IVR platform, the functional routing application will identify the call type using three pieces of information:

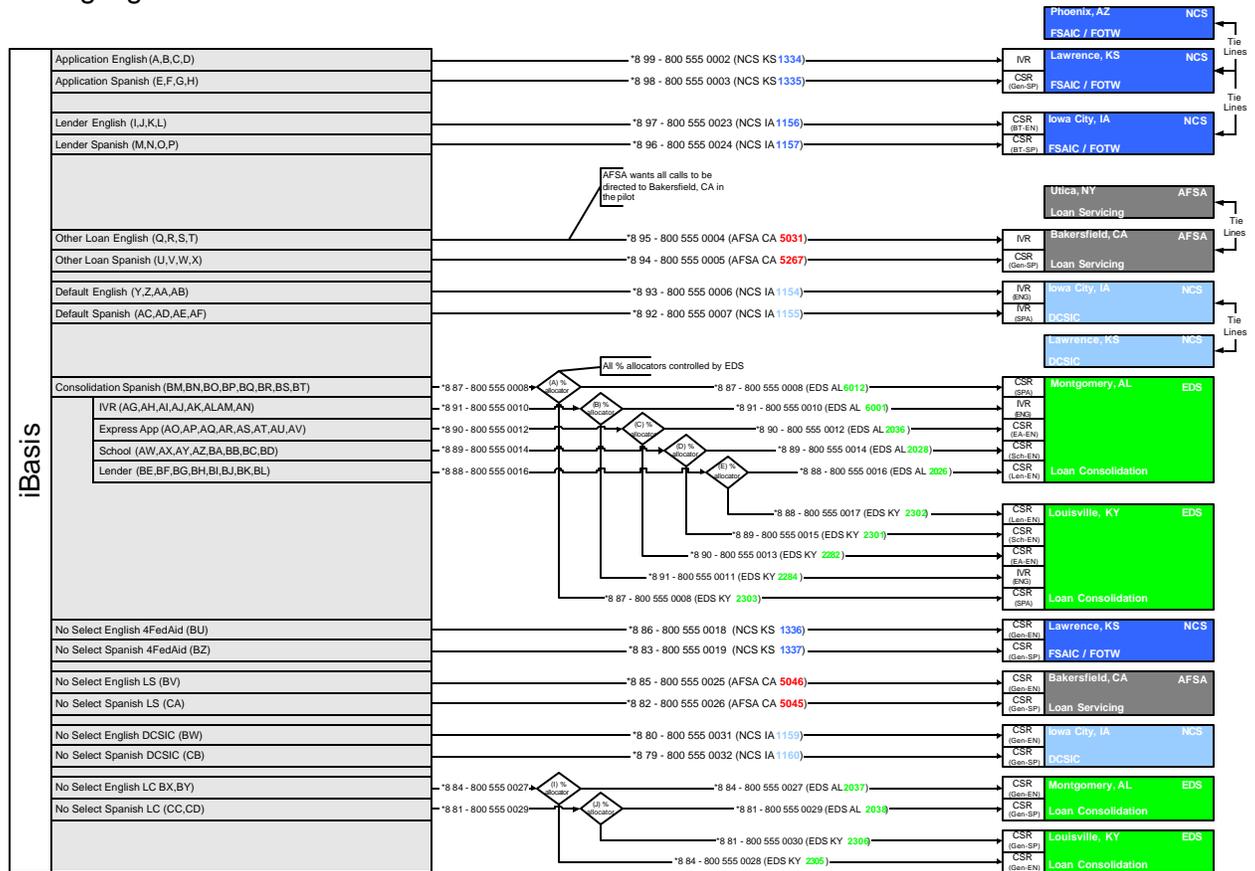
- Inbound DNIS (Dialed Number Identification Service)
- Language Selection (English or Spanish)
- Menu Option Selected (from the prompter options)

The call type will determine the end destination of the call. To reach the end destination, the application will perform a series of steps:

- Dial outbound code used to alert WorldCom ECR platform
- Transfer call to network and deliver to call center.



The figure below shows how the call types will be assigned and how the associated routing logic will be used to deliver the code to the center:



The following table provides an example of how the TNT code is assigned to the call during the routing process:

	Inbound DNIS	Language	Option Selected	Sub Menu	ID	TNT Code
1	800 433 3243 800 801 0576 800 256 7346	English	APPLICATION	N/A	A	*8 99
2			IVR	AG	*8 91	
3			IVR	AH	*8 91	
4			EXPRESS APP	AO	*8 90	
5			EXPRESS APP	AP	*8 90	
6			SCHOOL	AW	*8 89	
7			SCHOOL	AX	*8 89	
8			LENDER	BE	*8 88	
9			LENDER	BF	*8 88	
10		DEFAULT	N/A	Y	*8 93	
11		LENDER	N/A	I	*8 97	
12		NO SELECTION	N/A	BU	*8 86	
13		OTHER LOAN	N/A	Q	*8 95	
14		APPLICATION	N/A	E	*8 98	
15		CONSOIDATION	ALL SUB TYPES	BM	*8 87	
16		CONSOIDATION	ALL SUB TYPES	BN	*8 87	
17		DEFAULT	N/A	AC	*8 92	
18		LENDER	N/A	M	*8 96	
19		NO SELECTION	N/A	BZ	*8 83	
20	OTHER LOAN	N/A	U	*8 94		

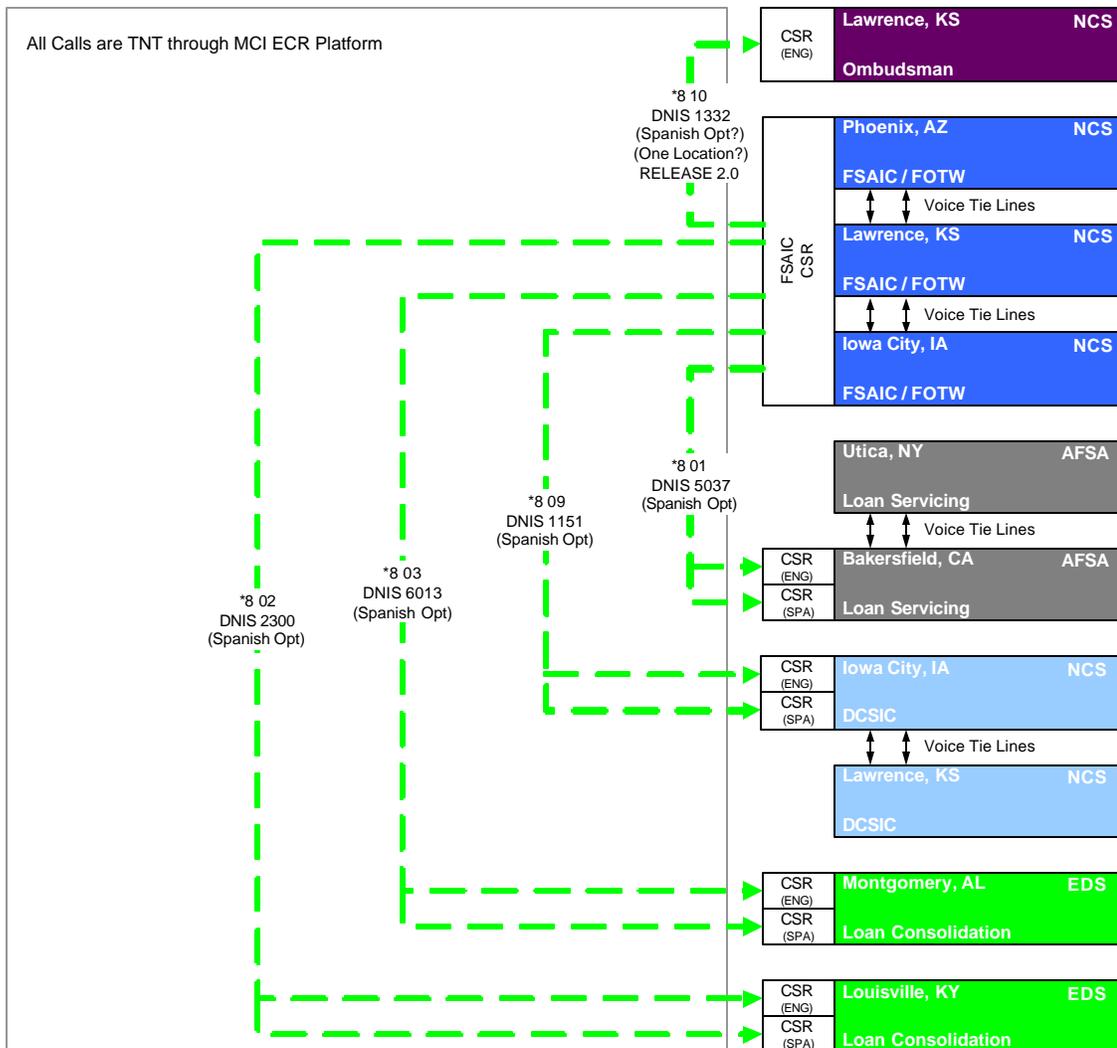


5.3 Warm Transfer Routing Logic

If a caller needs to speak with a representative from another call center, the caller will **not** have to hang up and dial a different number. Each of the call centers will be enabled to perform a warm transfer using the Takeback and Transfer (TNT) capability.

A warm transfer is defined as the capability to move a call from one center to another while the CSR remains on the phone with the caller (until the caller is connected to another CSR).

The diagram below shows how warm transfers will occur between FSAIC and the other call centers:





The following table provides the associated TNT codes that a CSR will use to perform warm transfers:

From	To	Hidden 800 Number	TNT Code	Comments
Any Call Center	LS CSR (NY)	800 848 0979	*8 01	Warm Transfer to LS
Any Call Center	LC CSR (KY)	866 420 6089	*8 02	Warm Transfer to LC (KY)
Any Call Center	LC CSR (AL)	334 206 6001	*8 03	Warm Transfer to LC (AL)
Any Call Center	LS - Sch CSR (NY)	866 331 4631	*8 04	Warm Transfer to LS - Sch
Any Call Center	LO CSR (KY)	866 331 4634	*8 05	Warm Transfer to LO
Any Call Center	Pell	866 331 4646	*8 06	Warm Transfer to Pell
Any Call Center	COD	866 331 4648	*8 07	Warm Transfer to COD
Any Call Center	FSAIC	800 555 0047	*8 08	Warm Transfer to FSAIC
Any Call Center	DCSIC	800 555 0048	*8 09	Warm Transfer to DCSIC
Any Call Center	OMB	800 555 0049	*8 10	Warm Transfer to Ombudsman



6.0 REPORTING DESIGN

Release 1.0 reporting will enable FSA, Modernization Partner, and Operating Partners to monitor and manage the following:

- Performance of the functional routing design and platform
- Voice network and telephony capacity
- Critical call center and customer service metrics

Note: Information about metrics and reporting procedures for the pilot are available in the Pilot Approach document (included in this binder).

6.1 Report Generation and Access

Reports that will be collected and analyzed in Release 1.0 include:

Name	Purpose	Frequency	Data Source
Service Level Report	Gauge the customer wait time	Daily, Weekly, and Monthly	Op Partner Avaya CMS reporting
Average Speed of Answer Report	Gauge the customer wait time	Daily, Weekly, and Monthly	Op Partner Avaya CMS reporting
SpeechPort Availability	Measure reliability of iBasis' SpeechPort platform	Daily, Weekly, and Monthly	iBasis
TNT Success Rate Report	Measure reliability of WorldCom's TNT feature	Daily, Weekly, and Monthly	WorldCom
Caller Error Report	Gauge the number of callers who make the wrong selection in the Main Menu	Daily, Weekly, and Monthly	Op Partner after-call codes and stroke tallies
No Selection Report	Monitor the number of callers who make no selection in Main Menu	Daily, Weekly, and Monthly	iBasis
Network Blockage Report	Monitor the WorldCom voice network capacity and reliability	Weekly and Monthly	WorldCom
Trunking and IVR Port Utilization Report	Monitor iBasis' telephony capacity	Weekly and Monthly	iBasis
Main Menu Customer Selection Report	Analyze customer choices and make menu improvements	Daily, Weekly, and Monthly	iBasis
Area Code and DNIS Utilization Report	Measure customer adoption rate of the single number	Daily, Weekly, and Monthly	WorldCom and iBasis



7.0 TECHNICAL ARCHITECTURE DESIGN

7.1 *Current Technical Architecture*

The current technical architecture that supports FSA customer servicing is actually multiple disparate technical architectures that rely on a few common network services such as call transmission/transport, toll free number routing and services, network prompting and Takeback and Transfer (TNT). Each Operating Partner (NCS Pearson, AFSA and EDS) leverages these common services and then maintains their own distinctive technical architecture for interactive voice response, call distribution, call transfers, operational reporting, and disaster recovery.

The current approach to the technical architecture has ramifications on the customer experience. In particular, the disparate technology and lack of uniform technical capability across the Operating Partners leads to an inconsistent customer experience.

The “One Number” Release will begin to standardize the technical architecture used by the Operating Partners. This new approach to technical architecture and the additional standardization delivered in subsequent releases will support FSA’s goal to provide a high-quality customer experience and the delivery of consistent answers.

7.2 *Impact of Release 1.0 on Current Technical Architecture*

The impact of Release 1.0 on the technical architecture that supports FSA customer servicing will be limited to consolidating and redirecting toll-free numbers to a centralized functional routing capability. The toll-free number consolidation, redirection of 800 numbers, and enabling of call transfer capability will be accomplished by placing orders with WorldCom, the 800 number network provider. The functional routing capability will be accomplished by having iBasis, the company that will provide the IVR hosting, build the functional routing capability on their IVR platform.

The impact of Release 1.0 on the Operating Partners will be limited to: 1) making changes to current capabilities that will be replaced and standardized by the functional routing; 2) adding support for warm transfers; 3) adding support for reporting on the number of calls transferred and default routed. The changes made in Release 1.0 by the Operating Partners to their technical architectures will:

- Eliminate certain announcements in the network, PBXs, and IVRs
- Eliminate network-based call prompting for each Operating Partner
- Add network capabilities that enable warm transfers (i.e., the ECR platform)
- Add speed-dial codes to the telephone switches / PBXs to support warm transfers
- Add “priority queues” to enable the efficient distribution of transferred calls
- Add new call termination points (VDNs) in the Operating Partner PBXs. This will enable reporting on the volume of calls transferred between centers and calls defaulted from the functional routing



7.3 Release 1.0 “To Be” Technical Architecture Design

The technical architecture design for Release 1.0 can be thought of as three logical groups of technical capability: 1) network services; 2) centralized functional routing; 3) Operating Partner technology. In the Release 1.0 “To Be” design, network services are consolidated and enhanced, centralized functional routing is introduced for the first time, and Operating Partner technology changes little.

7.3.1 Release 1.0 Network Services

The consolidation and redirection of the existing toll free numbers will be performed at the request of FSA through orders placed with WorldCom. The Release 1.0 team will rely on WorldCom to make the appropriate configuration changes needed to implement the design. Both WorldCom and the Release 1.0 team will conduct tests to ensure that the configuration is correct.

Network services will be enhanced by adding Takeback and Transfer capability to the NCS Pearson toll free numbers. This requires reconfiguration in the WorldCom network to migrate NCS Pearson to WorldCom’s Enterprise Call Routing (ECR) platform. This work will be performed at the request of FSA through orders placed with WorldCom. Both WorldCom and the Release 1.0 team will conduct tests to ensure that the migration successfully enables warm transfers.

7.3.2 Release 1.0 Centralized Functional Routing Capability

The centralized routing capability will be provided by iBasis. The capability is composed of both hardware and software, which together form their own technical architecture. The voice response unit hardware accepts calls from the various toll free numbers. The speech application software (i.e., routing application) then presents the caller with several functional options. Calls are routed to servicing centers based on logic contained in the functional routing application.

The functional routing application will be developed by iBasis based on this design document. The iBasis speech application software is called SpeechPort. It is an open application platform that uses the VoiceXML (VXML) standard to support application interoperability and portability.

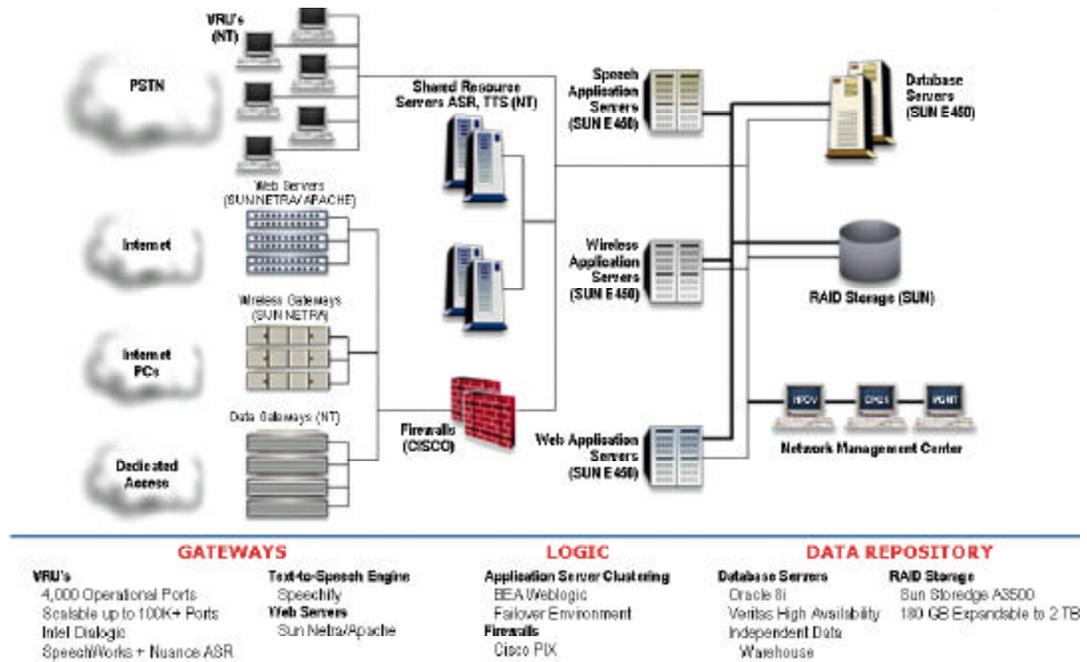
The key iBasis hardware and software components for Release 1.0 are:

- 192 non-blocking, non-dedicated VRU ports
- Intel Dialogic voice response units (VRUs) running on NT
- Automatic Speech Recognition Servers (ASR) running on NT
- Nuance and SpeechWorks ASR applications
- Speech Application Servers running on Sun E450s
- VXML compliant SpeechPort application



- Oracle 8i databases running on Sun StorEdge A3500s

The diagram below illustrates the overall iBasis architecture.



7.3.2.1 System Recovery Capability and Disaster Recovery

The iBasis technical architecture limits the impact of hardware and software outages by having designed system recovery and disaster recovery capability into the overall architecture.

System recovery is needed when hardware or software fails within an iBasis hosting center. To mitigate the impact of such failures iBasis uses multiple redundant pieces of hardware and software for any given application. To manage fail-over from an inoperative component to a working one, Veritas' VCS is used to monitor components and automatically trigger fail-over.

Disaster recovery is needed when an entire hosting center is taken out of commission. To prevent discontinuation of service due to disaster, iBasis has:

- Two fully redundant hosting centers (Ashburn, VA and Miami, FL)
- Completely diversified telecommunications facilities at both hosting centers. These are dual fiber network connections with no single point of failure.
- Back-up power supplies, including UPS for seven minutes at full power load, and auxiliary diesel generators for 48 hours of additional power



- Structural designs that account for fire suppression, earthquake, and flood

7.3.2.2 Port Capacity Estimates

The specification of 192 non-blocking ports is based on statistical modeling/traffic engineering performed by the Release 1.0 team and validated by iBasis. The number of ports determines the number of calls that can use the routing application at the same time. In order to be non-blocking, the number of ports must be sufficient to handle the number of incoming calls for the duration that the call uses the routing application. The statistical modeling was based on the following assumptions:

- Monthly call volume of 1.33 million
- Daily call volume of 60,606
- Hourly call volume of 5051 (assumes a 12-hour day)
- Per minute call volume of 84
- Average Speed of Answer in the application of 2.5 seconds or less
- Number of calls handled per second of 1.4
- Peak or busy hour factor of 25-30% additional calls
- An average of 35 seconds in the routing application per call

The capacity estimates were performed to ensure that iBasis would have enough free ports to service the call volume. Based on iBasis having 4000 operational ports, the existing port utilization, and the Release 1.0 modeling, it has been determined that sufficient port capacity exists to accommodate the functional routing application and port requirements for subsequent releases.

7.3.3 Operating Partner Technology

As noted in section 7.2, Release 1.0 will not require significant changes to the Operating Partners technical architecture design. All hardware that is currently in place at the servicing centers will remain in place. Furthermore, no additional hardware or software will be needed to participate in Release 1.0. The only changes needed have already been identified in section 7.2, but will be repeated below for completeness. The Operating Partners will need to:

- Eliminate certain announcements in the network, PBXs, and IVRs
- Eliminate network-based call prompting for each Operating Partner
- Add network capabilities that enable warm transfers (i.e., the ECR platform)
- Add speed-dial codes to the telephone switches / PBXs to support warm transfers
- Add "priority queues" to enable the efficient distribution of transferred calls
- Add new call termination points (VDNs) in the Operating Partner PBXs. This will enable reporting on the volume of calls transferred between centers and calls defaulted from the functional routing
- The specific design for these changes appears in sections 4 thru 6.



8.0 TRAINING AND CERTIFICATION

The Release 1.0 training team will work with Operating Partners to develop a Job Aid for CSRs. The final Job Aid will be available in mid-May for review, and sign off is required by May 22, 2002.

Topics to be addressed in the Job Aid include, but are not limited to:

- High-Level Overview of Consistent Answers
- Release 1.0 Changes: What's in the New Prompter?
- Diagnosing a Call: Knowing When and Where to Transfer
- New Procedures for Call Transfers (e.g., warm transfers vs. sending to the queue; transfer codes)

It is important that training be conducted during the scheduled period and not sooner, to avoid training "going stale."

Each CSR who completes the Job Aid successfully will be considered "Release 1.0 certified."