



# **Addenda to the Broadband Network Services Agreement between Virginia Tech and Sprint**

This addenda is being entered into pursuant to section 5.16 of the Broadband Network Services Agreement between Virginia Tech and Sprint dated June 12, 1996. The services contained in this addenda are in addition to and support the existing services contained in the Broadband Network Services Agreement.

## **Appendix A**

### **Definition of NET.WORK.VIRGINIA Backbone**

The NET.WORK.VIRGINIA Backbone is a network service provided by Contractor to provide interLATA transport for network services provided under the Broadband Network Services Agreement between Virginia Tech and Sprint, dated June 12, 1996. Contractor may also be referred to as NET.WORK.VIRGINIA Backbone Provider.

### **Definition of NET.WORK.VIRGINIA Access Service and Access Service Provider**

The NET.WORK.VIRGINIA Access Service is a network service provided by a Local Exchange Carrier(s) (Access Service Provider) designated by Virginia Tech to provide local access and intraLATA transport for network services provided under the Broadband Network Services Agreement between Virginia Tech and Sprint, dated June 12, 1996.

### **Frame Relay to ATM Network Interworking (FRANI) and Frame Relay to ATM Service Interworking (FRASI)**

The NET.WORK.VIRGINIA Access Service Provider will provide Frame Relay ATM Network Interworking (FRANI) services and Frame Relay ATM Service Interworking (FRASI) services, in compliance with recognized industry standards, including Frame Relay Forum Standards (e.g.: FRF .5, .6 and 8) to Ordering Parties who wish to interwork the NET.WORK.VIRGINIA Access Service Provider's Frame Relay Services with NET.WORK.VIRGINIA Access Service Provider's ATM services. This service is intended to enable NET.WORK.VIRGINIA Access Service Provider's Frame Relay end users to connect, send and receive information transparently across the NET.WORK.VIRGINIA Backbone. Three interworking and transport functions are required for FRANI. One, Frame Relay frames are segmented into ATM cells. Two, the ATM cells are transported across the NET.WORK.VIRGINIA Backbone to the destination ATM/Frame Relay node. And three, the Frame Relay frame is reassembled from the segmented cells.

The interworking function will be performed in the NET.WORK.VIRGINIA Access Service Provider's Network from NET.WORK.VIRGINIA Access Service Provider's FRANI equipped offices. The end to end interworked Frame Relay service will consist of a Frame Relay Access Circuit with the appropriate interworked Permanent Virtual Circuit (PVC) and Committed Information Rate (CIR), procured from the NET.WORK.VIRGINIA Access Service Provider, a corresponding NET.WORK.VIRGINIA Backbone facility with a corresponding PVC, and a second Frame Relay to ATM Internetworked Access Circuit with an interworked PVC to complete the connection.

FRANI services will be provisioned across the NET.WORK.VIRGINIA Backbone via a single PVC. This PVC will be non-real time VBR (QoS). The sustained cell rate, (SCR), peak cell rate, (PCR), and Maximum Burst Size, (MBS) will be configured pursuant to recognized industry standards and specifications mutually agreed upon by Virginia Tech and Contractor.

In the case of Ordering Parties wishing to access the NET.WORK.VIRGINIA Backbone Internet gateway service, the NET.WORK.VIRGINIA Access Service Provider will provide Frame Relay ATM Service Interworking (FRASI) services, in compliance with recognized industry standards, to ordering entities. Corresponding PVCs required to support NET.WORK.VIRGINIA Backbone Internet services via FRASI will be provided by Contractor and by the NET.WORK.VIRGINIA Access Service Provider to provide quality of service (QoS) comparable to other Internet access services available from NET.WORK.VIRGINIA.

No PVC supporting FRANI or FRASI service will interconnect any given pair of interLATA ATM switches unless there is a requested, existing or other serving arrangement between those interLATA switches. The FRANI or FRASI PVC interconnecting any pair of ATM switches or LATAs will be created or reconfigured as necessary according to a mutually agreed upon schedule to meet the Ordering Party's requests for new or reconfigured service. Such maintenance of FRANI or FRASI PVC's will occur at intervals mutually agreeable to Virginia Tech and Contractor such that they will meet the delivery date requirements for service requests as specified in Section 8.5 of the Broadband Network Services Agreement between Virginia Tech and Sprint, dated June 12, 1996.

In the event that the performance on the FRANI or FRASI service and/or the resulting PVC's to be provisioned across the NET.WORK.VIRGINIA Backbone falls below the Ordering Parties' performance expectations, the Contractor will work with the Ordering Parties', Virginia Tech, and the Access Service Provider to formulate a solution to meet the Ordering Parties' expectations.

Access Carrier Extension Engineering Requirements:

Pursuant to the provisions of Section 8.1 of the Broadband Network Services Agreement, the NET.WORK.VIRGINIA Access Service Provider will provide connectivity to Contractor points of presence as specified in Section 8.1 (with the exception of changes related to the Reston and Bluefield POPs). Contractor will provide links between the NET.WORK.VIRGINIA Backbone ATM switches and these points of presence. These links and the associated interfaces on the Backbone ATM switches will be sized to match the access links provided by the NET.WORK.VIRGINIA Access Service Provider. The capacity allocated to Access Carrier Extension services to support FRANI and FRASI services will be provided in addition to the capacity allocated for Access Carrier Extension services provided to support ATM UNI access to NET.WORK.VIRGINIA services.

FRANI and FRASI service NET.WORK.VIRGINIA Backbone PVCs will be provisioned within Access Carrier Extensions using aggregated facilities, i.e., individual DS1, DS3, or other NET.WORK.VIRGINIA Backbone access ports purchased by Ordering Parties to support FRANI and FRASI services may be multiplexed onto higher bandwidth Access Carrier Extension links which may also be utilized to support other services including ATM connected UNI services.

The additional Access Carrier Extension Services provided by the Access Service Provider for the FRANI and FRASI service will be engineered to provide an acceptable and mutually agreed upon level of service by Virginia Tech, the Ordering Party, and the Contractor. In the event that the performance on the FRANI or FRASI service and/or the resulting PVC's to be provisioned across the NET.WORK.VIRGINIA Backbone falls below the Ordering Parties' performance expectations, the Contractor will work with the Ordering Parties', Virginia Tech, and the Access Service Provider to formulate a solution to meet the Ordering Parties' expectations.

Ordering Party FRANI and FRASI InterLATA Network Charges:

As mentioned above, for Ordering Parties to utilize FRANI, the service will be provisioned with the following components: Frame relay subscriber circuit with interworking services provided by the Access Service Provider, PVC connections provided by Contractor and by the NET.WORK.VIRGINIA Access Service Provider, CIR settings provided by the NET.WORK.VIRGINIA Access Service Provider, and NET.WORK.VIRGINIA Backbone access ports provided by the Contractor.

For those Frame Relay ATM Network Interworking (FRANI) services which require ATM Adaptation and interconnection to a NET.WORK.VIRGINIA location via PVC, the Ordering Party is required to purchase a minimum of one (1) DS-1 port per respective LATA from the NET.WORK.VIRGINIA Backbone provider; Ordering Parties will not be required to purchase NET.WORK.VIRGINIA Backbone ports within LATAs where they have no ATM Adaptation and interconnection to the NET.WORK.VIRGINIA. A total of up to twenty four (24) 56K Frame Relay UNIs, or equivalent access bandwidth, can be terminated within that LATA, to access the aforementioned DS-1 interLATA port. If the number grows beyond twenty four (24) per LATA, an additional DS-1 port must be purchased from the Contractor for each group of twenty four (24) 56K circuits. Each DS1 Frame Relay UNI, which requires ATM adaptation and interconnection to the NET.WORK.VIRGINIA Backbone, requires a DS1 NET.WORK.VIRGINIA Backbone port. For FRANI services operating at DS-1 and higher capacities, the Ordering Party is required to purchase a NET.WORK.VIRGINIA Backbone port equal to the capacity of the corresponding Frame Relay access service. Upon placing a NET.WORK.VIRGINIA service order, the ordering party is responsible for identifying all locations utilizing the Network Virginia Connection and for notifying the Contractor of any changes to the list of locations.

Example: Should an Ordering Party wish to subscribe to FRANI at the DS1 level of service, the Ordering Party would require one (1) DS-1 Frame Relay to ATM Network Interworking (FRANI) circuit with adaptation and interconnection to the ATM Network for InterLATA access. At a minimum the following items are procured from the NET.WORK.VIRGINIA Access Service Provider: DS-1 Frame Relay to ATM Network Interworking (FRANI) UNI; an interworked PVC; and an appropriate CIR at the corresponding rate. Also a corresponding NET.WORK.VIRGINIA Backbone port at DS-1 level of service must be procured from the NET.WORK.VIRGINIA Backbone provider. The charges for these components added together represent the total access fee to access the network. Assuming the Ordering Party requires one (1) DS-1 to enter and desires to exit the network at the same level of service, a second DS-1 FRANI UNI, with identical and corresponding components and charges, are required to complete the network connection.

FRANI and FRASI services will be available from all NET.WORK.VIRGINIA Backbone facilities provided by the Contractor.

FRANI and FRASI customers will, at no extra charge, have access to all services and facilities, including the SprintLink Internet gateway, provided under the Broadband Network Services Agreement between Virginia Tech and Sprint, June 12, 1996. However, locations which are hubbed behind a FRANI, FRASI, ATM or other NET.WORK.VIRGINIA connection which require primary DNS service from the Contractor will be required to pay an extra fee for this service (identified in Appendix B). Contractor will provide secondary DNS services with no additional fees. IP address space will be provided by Contractor for use by hubbed locations at no additional fee but all requests for IP addresses must be placed by the Ordering Party and the Ordering Party will be responsible for managing those addresses. The Contractor will not process requests for registration for top level domain names for hubbed locations. The Contractor will not provide Newsfeed services to hubbed locations. Ordering Party will be responsible for coordinating all fault resolution and network management issues for hubbed locations.

FRANI and FRASI services will be made available upon the successful conclusion of the FRANI and FRASI pilot and acceptance testing to be conducted by Virginia Tech.

**Appendix B**  
**Pricing for Modification #2**

Prices for FRANI and FRASI NET.WORK.VIRGINIA Backbone transport services provided by Contractor under the terms of this Agreement will be equivalent to the prices for service as prescribed in Table B-1, Appendix B of the Broadband Network Services Agreement between Virginia Tech and Sprint, June 12, 1996. Any subsequent price modifications which affect the prices in Table B-1 will also affect the price for FRANI and FRASI transport services.

Current monthly prices are as follows:

DS1 Port	\$ 650
DS3 Port	\$1,537
OC3 Port	\$5,023

**Price Example:**

An Ordering Party purchases fifteen (15) Frame Relay access lines within a single LATA from the NET.WORK.VIRGINIA Access Service Provider each at 56Kbps line speed. The Ordering Party wishes to employ FRANI and/or FRASI services to provide transport across the NET.WORK.VIRGINIA Backbone for all fifteen Frame Relay access lines. The Ordering Party will order a single DS1 port from the Contractor at \$650

per month which will provide transport across the NET.WORK.VIRGINIA Backbone for the fifteen FRANI or FRASI adapted Frame Relay access lines.

Optional Primary DNS Services for Hubbed Locations

These fees are applicable only to locations which gain access to the NET.WORK.VIRGINIA SprintLink gateway through a hubbed NET.WORK.VIRGINIA connection. Ordering Parties which connect directly to NET.WORK.VIRGINIA using FRANI, FRASI, ATM, or other connection method involving payment to Contractor of a port fee (above) will not be required to pay these fees. Primary DNS service for hubbed locations are optional. This optional service must be ordered on behalf of hubbed sites by the Ordering Party. The Ordering Party will be billed by Contractor for these services.

Current monthly prices are as follows:

Primary DNS (per site)	\$60
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Price Example:

An Ordering Party purchases a DS1 NET.WORK.VIRGINIA connection and hubs twelve additional sites using a private network. The Ordering Party and each of the twelve additional sites wishes to utilize the SprintLink gateway and each wishes to subscribe to Primary DNS service. The Ordering Party pays the NET.WORK.VIRGINIA port fee of \$650 per month to the Contractor. The Ordering Party also pays to Contractor the optional fee for Primary DNS service for the twelve hubbed sites totaling \$60 x 12 or \$720 per month. The total fees due Contractor for these services equal \$1,370 per month.