

Guide to Integrating Service Provider Resources into the XSEDE Federation

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Version 1.4

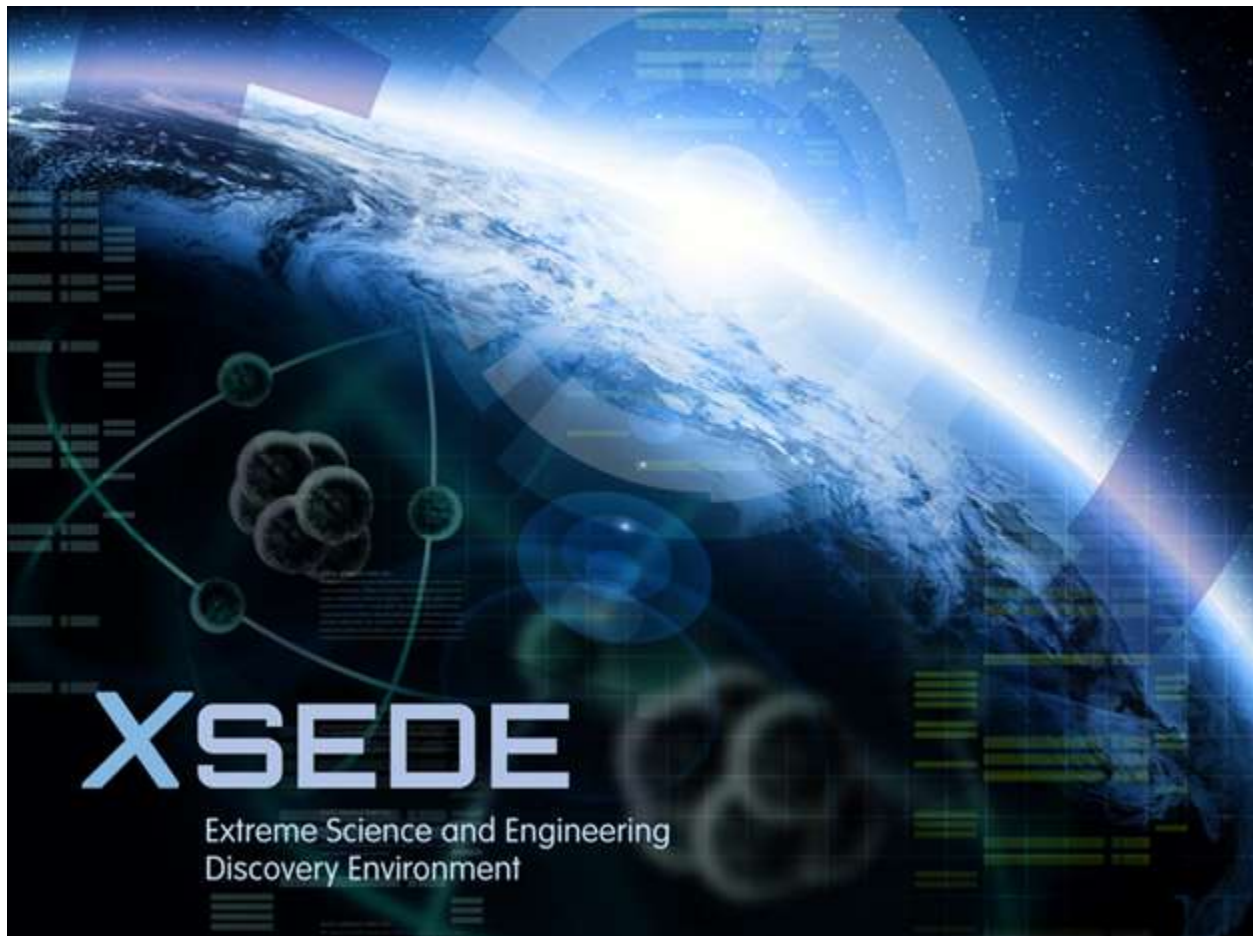


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A. Document History

Relevant Sections	Version	Date	Changes	Author
Entire document	1.0	Nov 2016	Initial version	V.Hazlewood
Entire document	1.1	Dec 2016	Additional information added based on review comments	V.Hazlewood. R. Payne, R. Knepper
D.10 Media Communication	1.1	Dec 2016	Added this section	C. Williamson
Entire Document	1.2	Dec 2016	Addressed all comments; Fixed table of contents	V.Hazlewood
Entire Document	1.21	Jan 2017	All comments/updates from SP Forum accepted	S. Brandt and others
Inserted section E	1.3	Feb 2017	Inserted timeline and timeline sample as requested	V. Hazlewood
Section E	1.4	10 Feb 2017	Inserted Figure 1	V. Hazlewood R. Payne

B. Document Scope

This document describes the integration activities for integrating resources as a Service Provider (SP) into the XSEDE Federation.

C. Integrating Resources as a Service Provider into the XSEDE Federation

The following describes the integration activities for integrating a resource as a Service Provider (SP) into the XSEDE Federation. SPs are projects or organizations that provide cyberinfrastructure (CI) software, services and/or other capabilities to the science and engineering research community. In the United States academic community, there is a rich diversity of SPs, spanning from centers that are funded by NSF to operate large-scale resources for the national research community, to universities that provide resources and services to their local researchers.

Once an organization becomes a member of the XSEDE Federation, coordination, notification and discussions should begin between XSEDE and the new SP prior to the start of the SP resource allocation (for an allocated Level 1 and Level 2 resource) or prior to an agreed upon start date (for an unallocated Level 2 or Level 3 SP). Information needs to be published in the XSEDE allocations system, website and/or portal prior to any allocation award, therefore, discussions should begin more than one quarter prior to start of allocation awards on the new allocated SP, or one month prior to the start date for an unallocated SP. Once SP negotiations are complete, for allocated SPs, notification of availability should be posted a quarter in advance of the next allocations meeting.

Note that starting SP integration into the XSEDE Federation starts with contacting the XSEDE SP coordinator in the XSEDE XCRI group as the first step. For any questions regarding this Guide or any integration issues please contact the XCRI Manager, Richard Knepper, or the XSEDE SP Coordinator, Victor Hazlewood. Contact Rich at rknepper@iu.edu or Victor at victor@utk.edu.

There are three points at which an SP will coordinate with XSEDE for integration into the XSEDE Federation:

- Upon entry into the XSEDE Federation with a Letter of Intent and integration coordination.
- Annually at the SP checklist review. (See the XSEDE Service Provider Checklist for more details or <https://software.xsede.org/use-case-components-sp>)
- Upon exit of the XSEDE Federation

The following sections describe in more detail the XSEDE Federation integration activities for SPs.

D. Integration Details

The following describes SP integration activities that generally apply to all allocated SPs that participate in the XSEDE Federation and activities that are optional for unallocated SPs.

Required activities for allocated Level 1 and Level 2 SPs are described in the SP Checklist document (<http://hdl.handle.net/2142/91024>) and SP Checklist website (<https://software.xsede.org/use-case-components-sp>).

The only required activities for unallocated Level 2 and Level 3 SPs are participation in the SP Forum, having one or more resource entries in the XSEDE Resource Description Repository (RDR) and

participation in XSEDE Information Services to list at least one software or service components that the SP wants listed in XSEDE information services.

D.1. SP Coordination

SPs can participate in many of the activities related to XSEDE. The XSEDE SP Coordinator is the contact for questions, comments or feedback regarding participation in the XSEDE Federation. All SP management and staff should be made aware of the SP Coordinator and participate in an SP review upon entry into the XSEDE Federation, annually, and upon exit from the XSEDE Federation. The SP Coordinator works with SP staff and SP management to review all of the integration components of an SP by performing an SP checklist review. This review goes over all of the XSEDE organization, integration points, software and services and provides a two-way communications mechanism for SP integration into the XSEDE Federation. Results of SP checklist reviews are documented at <https://software.xsede.org/use-case-components-sp> which provides information about the SP level and integration points and their status based on the checklist review.

D.2. Allocations Process Integration

As part of funded activities SPs that are to participate in the XSEDE allocations process need to coordinate with the XSEDE Resource Allocation Service (RAS) team. This involves identifying a person at the SP that will coordinate allocation issues, getting the necessary resource information listed in the XSEDE User Portal and XSEDE Resource Allocation Service (XRAS) web-based application and participation in the quarterly XSEDE Resource Allocation Committee (XRAC) meetings. XSEDE SP resources are allocated on a quarterly basis, usually for periods not exceeding one year. See the XSEDE allocations information page at <https://www.xsede.org/allocations>.

D.3. XRAS Allocations Integration

An XSEDE allocation provides access to computing, visualization, and/or storage resources as well as extended support services at XSEDE Service Provider (SP) sites. SPs that put up resources for allocation need to coordinate with XSEDE for integrating into the XSEDE resource allocation process. An allocation is requested by, and can be allotted to, a researcher who serves as the principal investigator (PI) of an approved project. An account is the specific method through which an individual (or community, in the case of science gateways) logs in to a resource to utilize the allocation.

- **Computational Resources:** XSEDE SPs offer a variety of high-performance computing (HPC), cloud and high-throughput computing systems for allocation. Computing platforms include clusters, scalable-parallel systems, and shared-memory systems with various CPU, memory, communication, and storage configurations. The currently-available computational resources are listed at <https://www.xsede.org/resources>.
- **Visualization Resources:** SPs provide a variety of visualization resources and software services to the XSEDE user community. These systems provide a powerful way to interact with and analyze data at any scale. For complete information on available visualization resources see <https://www.xsede.org/visualization>.

- **Storage Resources:** Several XSEDE SPs host storage platforms providing services such as data management, data collections hosting, and large-scale persistent storage. XSEDE will provide storage allocations both in support of compute/visualization usage and storage independent of those compute/visualization allocations. As with compute and visualization allocations, storage allocation durations are one year with the option to renew for subsequent one-year periods. Data will be preserved for at least one quarter beyond the expiration of the storage allocation end date. Retention beyond one quarter will be at the discretion of the SP. Storage is allocated in GigaBytes (GB). Please see <https://www.xsede.org/storage> for more information about available XSEDE storage platforms.

Access to XSEDE allocated resources is requested by the PI through the XSEDE Resource Allocation System (XNAS). An overview of all available resources is shown on the <https://www.xsede.org/resources> webpage. Information about resources and their availability can be requested through the allocations process and is described in the XNAS environment. See the allocations overview at <https://portal.xsede.org/allocations-overview> and allocation submissions start at <https://portal.xsede.org/submit-request#/>

D.4. XSEDEnet Integration

XSEDEnet is the high-speed interconnect between the allocated SPs and other SPs that have agreed to optionally participate in XSEDEnet. Sites connect via Internet2's Advanced Layer 2 Service (AL2S) at 10 Gb/s or 100 Gb/s as is available at their organization or their organizations regional internet service provider. The connection between each XSEDE SP is a point-to-point VLAN with an automatic backup path in case there is a network outage along the primary path. XSEDEnet has perfSONAR performance monitoring hosts at each of the participating XSEDE SP sites. The monitoring hosts are running the perfSONAR pS-Performance Toolkit software and are usually attached at 10 Gb/s though some sites have 40 Gb/s perfSONAR connectivity. Generally, allocated SPs have been required to participate in XSEDEnet and other SPs can participate as requested or desired. XSEDEnet connection costs are the responsibility of the SP. Beginning in XSEDE2 (August 1, 2016), XSEDE no longer funds SPs to connect to XSEDEnet. Most regional internet service providers now provide Internet2's AL2S as part of their standard services so there may be minimal costs for an SP to connect.

D.5. XSEDE Ticket System Integration

All allocated SPs are required to participate in interfacing with XSEDE users and XSEDE staff via the XSEDE ticket system. The XSEDE ticket system is built on the RT ticket system and each allocated SP will have its own ticket queue with ticket routing information provided by the SP to the XSEDE Operations Center staff for routing of XSEDE tickets to ticket supporters. Unallocated SPs can have ticket queues in the XSEDE ticket system by request.

D.6. XSEDE Software and Services

XSEDE aims to be a connector of cyberinfrastructure resources, software, and services and is driven by user community requirements and use cases. SPs that participate in the XSEDE Federation are expected to run some components of the XSEDE software and services stack. The current XSEDE software and

services list is described in the XSEDE Service Provider Software and Services Baseline document (<http://hdl.handle.net/2142/85887>) and its companion XSEDE Software and Services Summary Table for Service Providers (<http://hdl.handle.net/2142/85886>). The XSEDE software and services stack is a comprehensive list of software and services that XSEDE has developed to provide a comprehensive national cyberinfrastructure environment for XSEDE users. The level of the SP in the XSEDE Federation will dictate what software and services the SP is required to run on their resource. SPs, depending on their level, are required to install, configure, and maintain a specific set of software and services and, in addition, there is a set of optional software and services. For information about the required and optional software and services and links to user, install and deployment guides see the website <https://software.xsede.org/use-case-components-sp>.

D.7. XSEDE User Portal Integration

The XSEDE User Portal (XUP), is the home on the web for XSEDE users. The XUP provides XSEDE users access to view and manage their accounts and allocations, as well as find information about and access the XSEDE services and resources. Some of the things that can be done on the XUP without logging in include:

- See XSEDE resource and service status
- View user news and upcoming events
- Find and register for training classes

Users can create an XUP account which will allow them to login to

- Submit, review and update allocation requests
- Monitor XSEDE resources
- View XSEDE allocation and usage information
- Reset an XUP account password
- access user documentation
- access training materials

Allocated SPs are required to participate in providing information for posting on the XSEDE website and XUP related to their SP and for the benefit of XSEDE users who may request access or be provided access to the SP resource. Allocated SPs need to provide User Guide content in the XSEDE format, provide usage monitoring information that is displayed in the XUP resource monitor page, and provide content for the SP resource Software Search capability.

D.8. XSEDE Extended Collaborative Support Services (ECSS) Integration

Through XSEDE's Extended Collaborative Support Service (ECSS) program, users have access to cyberinfrastructure experts with a variety of expertise related to XSEDE resources. ECSS experts, many with advanced degrees in domain areas, are available for collaborations lasting months to a year to help researchers fundamentally advance their use of XSEDE resources.

Expertise is available over a wide range of areas:

- performance analysis,
- petascale optimization,
- efficient use of accelerators,
- I/O optimization,
- data analytics
- visualization
- use of XSEDE by science gateways,
- workflows

ECSS can be requested along with compute and storage resources through the XSEDE allocation process. ECSS requests can also be added to existing allocations as supplements. Current ECSS projects can be found on the ECSS Project Page and more detailed video presentations on recent projects can be found on the ECSS Symposium site.

ECSS staff have a wide and deep knowledge of how to effectively use an extensive variety of high performance computing resources. However, when new and novel resources become available in XSEDE, the allocated SPs will be requested to provide training for the effective use of their resource. XSEDE ECSS staff will be relying on this training in order for ECSS staff to provide support to XSEDE allocated users. If the SP resource has funded scientific computing staff, this staff can be volunteered into the ECSS program for those researchers who get XSEDE allocations on that resource.

D.9. SP User Guide on the XSEDE Website and XSEDE User Portal

Allocated SPs are required to provide content for the SP User Guide which will be posted to and viewable on the XSEDE website and XUP. XSEDE has a SP user guide template for SPs to provide user guide content and this information is provided to the XSEDE User Interfaces and Online Information team for posting on the XSEDE website and XUP.

D.10.XSEDE Media Communications Coordination

The mission of XSEDE External Relations (ER) is to properly market and communicate the value and importance of the XSEDE project to all identified stakeholders through a creative and strategic communications methodology. XSEDE service providers are encouraged to work with the ER team to help raise awareness for available resources, science impact, collaboration success stories, and other announcements of interest to key stakeholders including users and the media. SP can share XSEDE related announcements and story ideas by emailing them to er@xsede.org.

Upon joining the XSEDE Federation as an SP, the ER team will work with a designated member of the SP's organization to prepare an announcement regarding the partnership and services provided. The appropriate messaging, media outlets, and distribution channels for the announcement will be determined by a collaboration of the SP and XSEDE. Each party will provide the other with a courtesy 24-hour review period on planned announcements. This 24-hour review period may be waived under emergency circumstances.

D.11.XSEDE Working Group and Mailing List participation

For either allocated or unallocated SPs, XSEDE has a number of working groups and related mailing lists for broad engagement with the national cyberinfrastructure community. The following table shows the working groups, XSEDE affiliated groups and mailing lists, and an SP should participate in those that are required by their SP level affiliation and/or interest in participating in the community.

Working Group (WG) or Org	SP L1 Required	SP L2 Allocated	SP L2/L3 Unallocated	Meeting frequency	Mailing list	Contact
Security incident response	Yes	Yes	Optional	Weekly	incident-discuss@xsede.org	Jim Marsteller
Security WG	Yes	Yes	Optional	Monthly	ops-security@xsede.org	Adam Slagell
XRAS	Yes	Yes	Optional	Biweekly	ras-accounting@xsede.org	Amy Schuele
SP Software	Yes	Yes	Optional	Monthly	sp-software@xsede.org	JP Navarro
Networking	Yes	Yes	Optional	Biweekly	ops-network@xsede.org	Tim Boerner
SP Forum	Yes	Yes	Yes	Biweekly	sp-forum@xsede.org	SP Forum Chair
Campus Champions	Optional	Optional	Optional	Monthly	campuschampions@xsede.org	Campus Champion Coordinator
Level 3 SPs	Optional	Optional	Suggested	Monthly	level3-sp@xsede.org	SP Forum L3 Chair
Gateways	Optional	Optional	Optional	Biweekly	gateways@xsede.org	Marlon Pierce

D.12. Education, Training and Outreach

XSEDE provides a comprehensive set of education, training and outreach activities that SPs can participate in. The following describes these activities.

D.12.1. Training

XSEDE offers training classes to teach users how to maximize their productivity and impact in using XSEDE services. SPs will be requested to provide this training for the effective use of their resource. The training classes focus on systems and software supported by the XSEDE Service Providers, covering programming principles and techniques for using resources and services effectively. Training classes are offered in high performance computing, visualization, data management, distributed and grid computing, science gateways, and more. The public can review the XSEDE Training Course Listing (see <https://www.xsede.org/training1>) and browse the current Course Calendar for a list of upcoming training courses at XSEDE sites. XSEDE also maintains a list of online training materials of relevance to XSEDE users. Training is available in person at numerous sites around the country and via real-time webcast. Many of the webcasts are available as well as self-paced tutorials and may be accessed at any time from any location. The Training Calendar is accessible from the XSEDE website and the XSEDE User Portal. Those interested may register for training sessions via the XSEDE User Portal.

The list of online training materials will be expanded as new materials are developed by XSEDE and the SPs; suggestions for additions can also be submitted via the [feedback form](#).

XSEDE's Community Engagement and Enrichment (CEE) goals are to:

- Provide a continuum of learning resources and services designed to address the needs and requirements of researchers, educators, developers, integrators, and students utilizing advanced digital resources. This includes providing professional development for the XSEDE team members.
- Improve support, operations, capabilities, interfaces, procedures, and policies by maintaining persistent, personal contact with the community.
- Enable the discovery, understanding, and effective utilization of XSEDE's powerful capabilities and services. User Interfaces & Online Information (UII) has immediate impact on XSEDE users from day one, providing them with an information rich website, the XSEDE User Portal, and a uniform set of user documentation.
- Promote and facilitate the effective participation of a diverse national community of campuses in the application of advanced digital resources and services to accelerate discovery, enhance education, and foster scholarly achievement.

D.12.2. Education

To reach broad national audiences, the TEOS team works with campuses and organizations to help instill digital services into the practices of faculty, staff and students. Activities with colleges and departments include: providing support for incorporation of computational science resources and methods into the curriculum; recruiting and training Campus Champions to raise local awareness of digital services; helping campuses and organizations to enhance their cyberinfrastructure resources; and visiting sites to provide digital services needed by institutional personnel.

To deeply engage the community in sustained use of computational services, the TEOS team also works closely with individuals to understand and address their particular needs and challenges. These individuals may be faculty, researchers, students, IT staff, or administrators. Deep engagement activities include training, workshops, internships, fellowships, and consulting sessions designed to address the unique needs, perspectives, and practices of diverse communities.

The XSEDE and TEOS teams conduct regular visits to campuses, businesses, and other organizations to address a range of digital resources and services. The visits may address a number of topics including computational science education, Campus Champions, Cyberinfrastructure Days, workshops, training, Campus Bridging software deployment and pilots, and consulting on digital services. Additional details about these topics are covered in the sections below. We welcome inquiries about these and other topics of interest to your organization.

XSEDE's Education team has led the development and articulation of a set of core competencies for undergraduate and graduate computational science programs that can provide a guide for faculty who wish to develop courses and curricular materials at their own institutions. With the rapid pace of technology change, these core competencies continue to evolve with valuable input and feedback from the computational science and engineering community. The XSEDE Education team is working with

higher education institutions across the country to create computational science certificate and degree programs across all STEM fields. XSEDE's TEOS team members visit interested campuses to engage administrators, faculty, staff and students in the design and development of computational science courses and materials. The team also offers live and synchronous workshops and "boot-camps" for faculty to learn more about computational science and engineering technologies and methods, and for assisting faculty with curriculum development. A peer-reviewed repository provides high-quality training and education materials to the community. The XSEDE Education team encourages community members to share their own proven contributions with others as well.

D.12.3. Outreach

XSEDE's Outreach team focuses on recruiting and empowering a diverse scientific, academic, and industrial workforce capable of advancing scientific discovery using XSEDE services. The Outreach efforts include student engagement programs and provide meaningful opportunities for undergraduate and graduate students to explore extreme digital environments. Particular emphasis is placed on recruiting women, minorities and people with disabilities. The outreach team provides under-represented faculty, staff and students with training and support that empowers them to become proficient users of XSEDE resources and services.

XSEDE's Outreach team includes a Speaker's Bureau for conferences, workshops, institutes, and campuses seeking an XSEDE representative to share information about XSEDE's resources and services. The Outreach team also staffs exhibits at numerous events across the country to provide one-on-one information and assistance to help people get connected to XSEDE. XSEDE Outreach staff welcome requests for XSEDE presentations, workshops, and exhibits.

The XSEDE Campus Champions Program works with campuses across the country to identify representatives willing to raise local campus awareness of XSEDE and to assist local researchers, educators, students and staff with accessing XSEDE resources and services. Campus Champions receive enhanced training on and access to XSEDE's resources. They are a community of peers who assist one another in helping local campus personnel select the most appropriate digital resources to advance their individual research and educational goals. More than 125 campuses across the country—from two-year colleges to PhD-granting institutions—currently host a Campus Champion. The XSEDE Campus Champions program team welcomes inquiries from campuses seeking to become involved.

D.13.SP Forum Participation

Service Providers are projects or organizations that provide cyberinfrastructure services to the science and engineering research community. . The Service Provider Forum is intended to facilitate this ecosystem of Service Providers, thereby advancing the science and engineering researchers that rely on these cyberinfrastructure services.

The Service Provider (SP) Forum provides:

- An open forum for discussion of topics of interest to the SP community.
- A formal communication channel between the SP Forum members and the XSEDE project

The Service Provider Forum was originally proposed as part of the governance structure for the XSEDE project, which recognized the need for a forum to serve as the formal interface point between the XSEDE project and the group of autonomous SPs. In this context, the SP Forum is the forum for interaction between XSEDE and SPs, discussing and mutually resolving issues where the interests of SPs and XSEDE overlap (e.g. networking, operations, security, allocations, accounting, user support, documentation, software environments, etc.). The SP Forum charter, membership and governance structures reflect the mutual relationships and responsibilities in this crucial governance body that must constructively support the XSEDE-SP interactions.

While the initial motivation to create the Service Provider Forum was to facilitate the interface between the XSEDE project and those SPs with which it coordinates/integrates, the original members of the SP Forum recognized that this body could have a broader role beyond just the interface to XSEDE. In particular, the SP Forum includes a large number of members with considerable expertise and experience in operating diverse cyberinfrastructure resources and services. The SP Forum could itself become an active element in the national cyberinfrastructure ecosystem, with its members sharing best practices, leveraging mutual experiences with various technologies and systems, or coordinating training or outreach activities. This forms the basis for the SP Forum's other purpose – to be an open forum for discussion of topics of interest to the SP community, whether or not these are directly related to XSEDE.

SPs that join the XSEDE Federation are asked to actively participate in the Service Provider Forum. Joining the XSEDE Federation and Service Provider Forum are done simultaneously with a Letter of Intent to join. Upon acceptance by XSEDE and the SP Forum via notification by the SP Forum Chair, an SP joins the SP Forum.

D.14.Feedback to XSEDE

XSEDE wants feedback from the SPs on XSEDE policy, processes, procedures, use cases, and any other aspects of the XSEDE project. This feedback can be given directly to the SP Coordinator or submitted as a help desk ticket to the XSEDE ticket system (help@xsede.org) with the term “feedback” in the subject. All feedback is taken and sent to the XSEDE group for which the feedback is related. Feedback can also be submitted by going to the [XSEDE Help Desk](#) page and clicking the Feedback tab on the right hand side of the page.

E. Timeline Overview and Sample Timeline

The following tables provide an SP integration timeline overview and a sample timeline with dates. Table 1 is the SP integration timeline overview and Table 2 is an SP integration timeline sample.

Timeframe	Item or task
(Start)	NSF awards an SP or a non-NSF funded SP decides to allocate resources to XSEDE
Approximately 6 months prior to production start date of allocated resource	SP applies for XSEDE Federation membership at appropriate SP level
Two weeks after XSEDE Federation membership submission	XSEDE and SP Forum notify acceptance of XSEDE Federation membership; XSEDE SP Coordinator notified
3.5 to 6 months prior to production start date	Start SP integration discussion and tasks
3.5 months prior to production start date	Integration in XRAS complete and system listed for allocation requests in XRAS
Within 3 months prior to production start date	Integration meetings, discussions and work to fulfill non-XRAS integration tasks
SP Production Start Date	XSEDE Integration complete and SP production starts

Table 2: SP Integration Timeline Overview

Date	Items or Tasks
October 1, 2015	NSF awards an SP or a non-NSF funded SP decides to allocate resources to XSEDE
January 4, 2016	SP applies for XSEDE Federation membership at appropriate SP level
January 18, 2016	XSEDE and SP Forum notify acceptance of XSEDE Federation membership; XSEDE SP Coordinator notified
January 19, 2016 to June 14, 2016	Start SP integration discussion and tasks <ul style="list-style-type: none"> • SP entry in RDR • SP-side XRAS & Allocations process integration

	<ul style="list-style-type: none"> • XSEDE-side XRAS & Allocations process integration • SP information on XSEDE website • SP User Guide on XSEDE website
June 15, 2016	<p>Integration in XRAS complete and system listed for allocation requests in XRAS</p> <ul style="list-style-type: none"> • XSEDEnet integration • XSEDE ticket system integration • XSEDE Software and Services installation • XSEDE User Portal integration • ECSS Integration • XSEDE media communication coordination (if any) • XSEDE Working group and mailing list participation • XSEDE training and educational activities integration • SP Forum participation coordination
June 16, 2016 to October 2, 2016	Integration meetings and discussions to fulfill non-XRAS integration tasks
October 3, 2016	XSEDE Integration complete and SP production starts

Table 2: SP Integration Timeline Sample

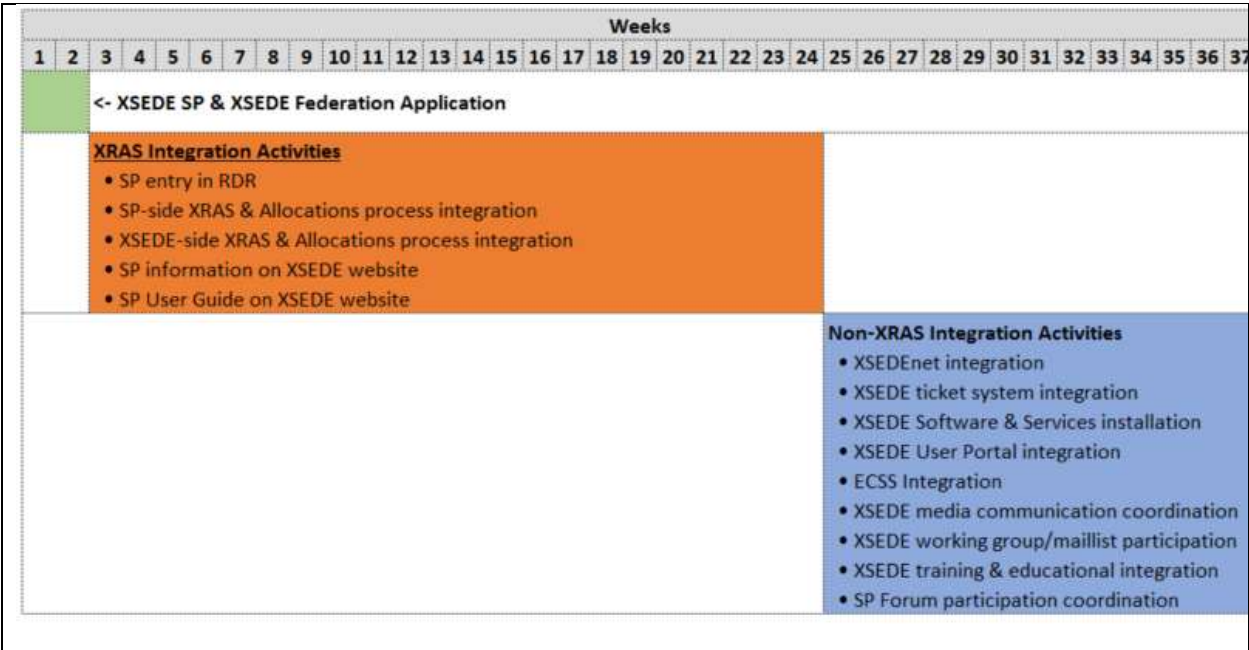


Figure 1: SP integration activities timeline by weeks

F. Useful Links for Service Providers

Locations where SP resource information, XSEDE software and services and other information is viewable and in some cases modifiable by the SP includes the following:

Item	URL
Resource Description Repository (RDR)	https://rdr.xsede.org/
XSEDE User Portal (XUP)	https://portal.xsede.org/
Information Services	http://info.xsede.org/
XSEDE Community Software Repository (XCSR)	https://software.xsede.org/
SP Checklist document	http://hdl.handle.net/2142/91024
SP Checklist website	https://software.xsede.org/use-case-components-sp
Allocation and usage resource for staff	https://xupapps.tacc.utexas.edu/staff_queries/
XSEDE Feedback form	Go to https://portal.xsede.org/help-desk and click “Feedback” on the right hand side of the page
XSEDE Forum website	new website under construction