
ストレージ管理に求められるインターフェース仕様

- グリッドのリソースとしてストレージに求められた要素とは -

「The Storage Resource Manager Interface Specification Version 2.2」

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Standards For Storage Resource Management BOF

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**** CERN-European Organization for Nuclear Physics**

Focus and Goals 【グリッド協議会】第4回Grid Hotline of Proposed Working Group 2007年12月20日

- Grid architecture needs to include reservation & scheduling of:
 - Compute resources
 - Storage resources
 - Network resources
- Storage Resource Managers (SRMs) role in the data grid architecture
 - Shared storage resource allocation & scheduling
 - Especially important for data intensive applications
 - Often files are archived on a mass storage system (MSS)
- Goals
 - Develop a standard for Storage Resources on the Grid
 - Permit interoperation of various storage systems
 - Foster consensus for interoperation of multiple institutions
 - Permit multiple implementations of SRMs
 - Standard to be specified as a WSDL service

SRM functionality

- Manage space
 - Negotiate and assign space to users
 - Manage “lifetime” of spaces
- Manage files on behalf of a user
 - Pin files in storage till they are released
 - Manage “lifetime” of files
 - Manage action when pins expire (depends on file types)
- Manage file sharing
 - Policies on what should reside on a storage resource at any one time
 - Policies on what to evict when space is needed
- Get files from remote locations when necessary
 - Purpose: to simplify client’s task
- Manage multi-file requests
 - A brokering function: queue file requests, pre-stage when possible
- Provide grid access to/from mass storage systems
 - Examples: HPSS (LBNL, ORNL, BNL), Enstore (Fermi), JasMINE (Jlab), Castor (CERN), MSS (NCAR), ...

Relationship to other Grid Components

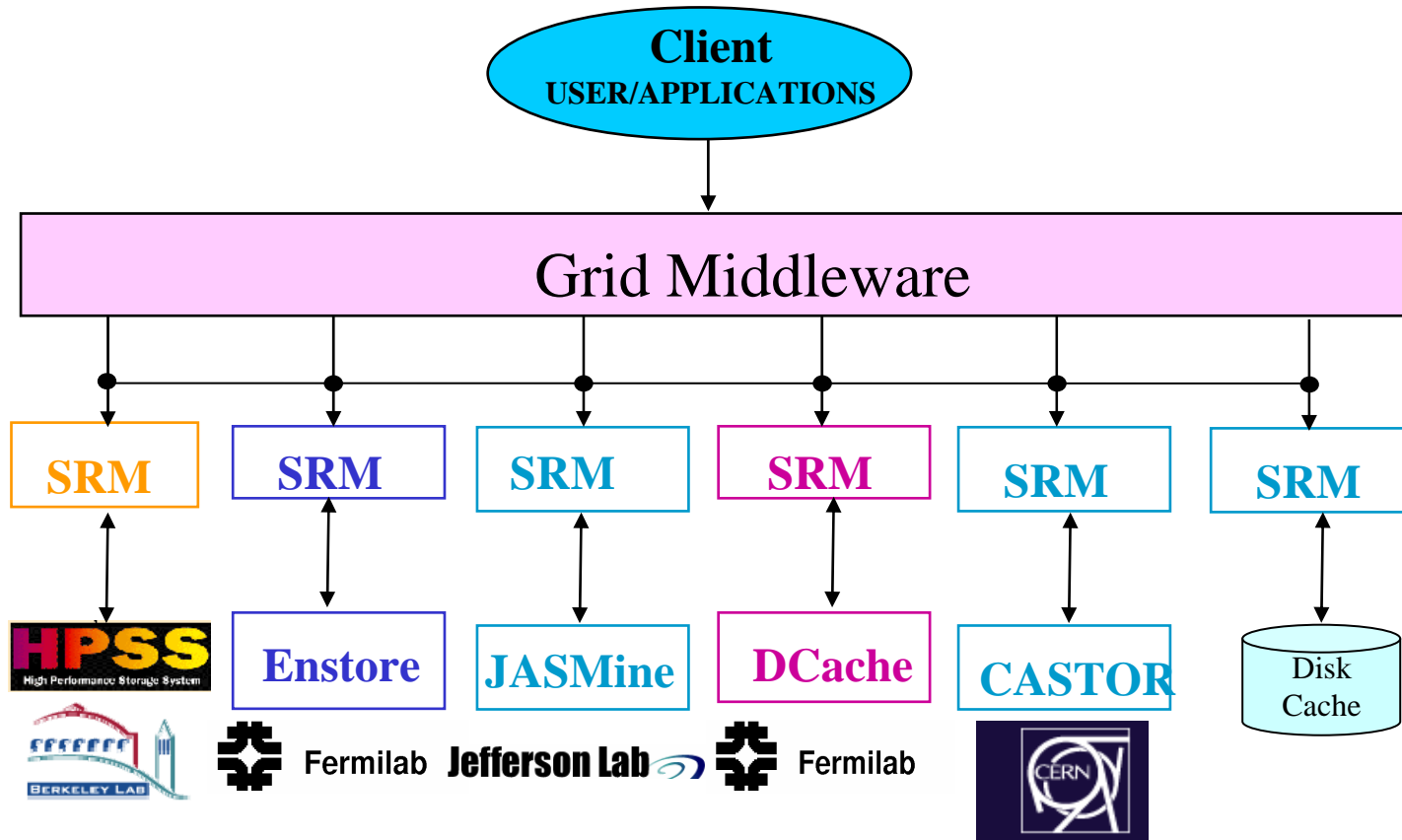
- Interaction
 - SRMs are components that Grid Planners need to interact with
 - SRMs are components that Grid Executors need to interact with
 - SRMs invoke Grid Transport services (e.g. GridFTP)
 - SRMs interact with Monitoring Tools regarding space usage
 - SRMs interact with Virtual Organization services (e.g. CAS)
- Related GGF activities
 - Data Replication (REP-WG) – SRM can provide dynamic space allocation for data replication
 - GridFTP WG – SRMs rely on an efficient transport services
 - Data Access and Integration Services (DAIS-WG) – standards for accessing database management systems

Milestones

- Build on existing on-going activity
 - Participants: LBNL, Fermilab, Jlab, EDG
 - Version 1.0 implemented and proved inter-operation
 - Version 2.0 in final design stages
- Expectations
 - Draft requirements document – December 2003
 - Draft standard proposal – April 2004
 - Experience with some implementations – August 2004
 - Final standard draft – December 2004
- GGF内の他のWGとの調整からGGF10でGrid Storage Management Working Group(GSM-WG)として発足
- 考え方は変わらないが、GGFでの活動はVersion 3.0仕様策定に向かう。

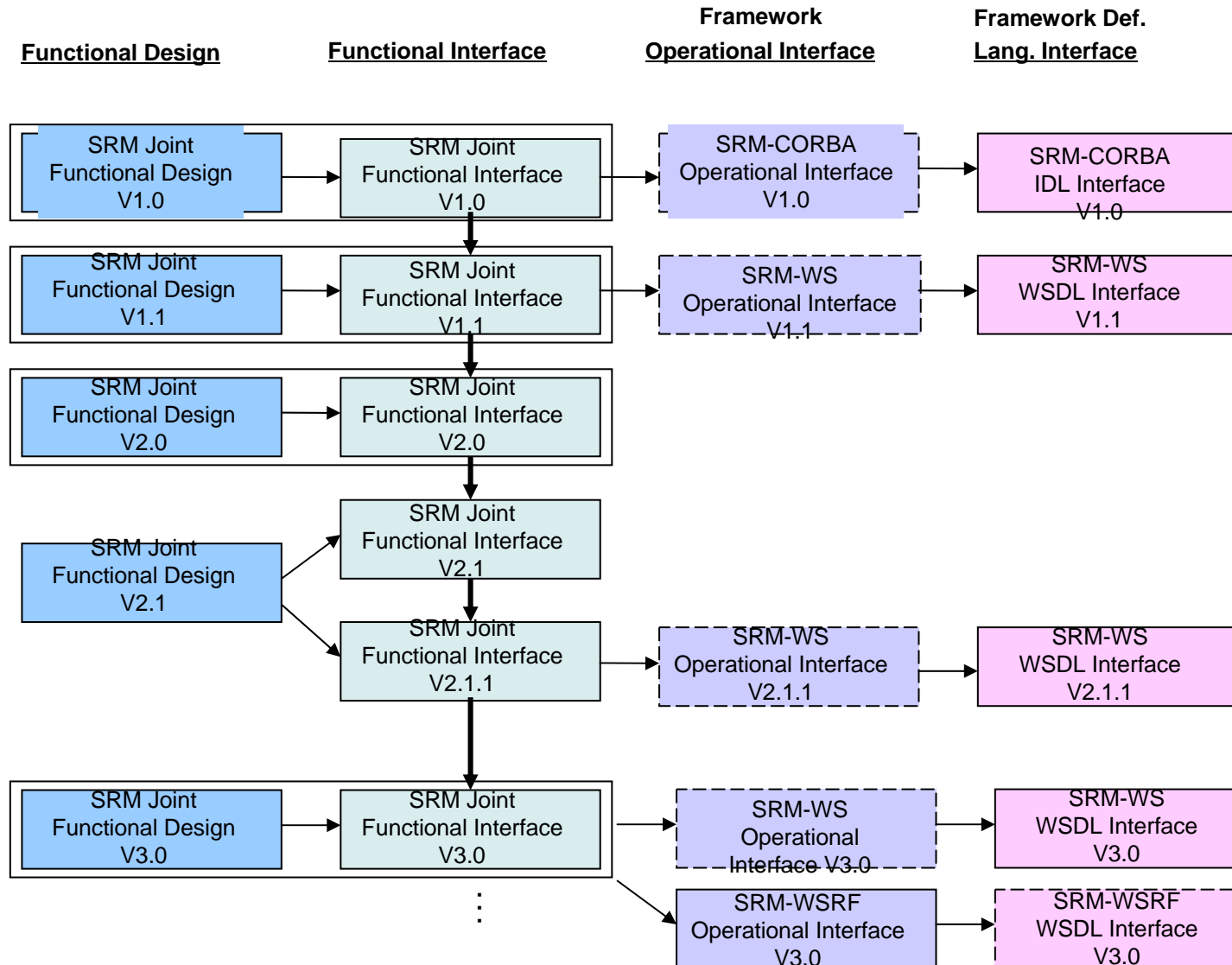
The value of an SRM standard in fostering interoperability of Grid storage resource

Uniformity of Interface → Compatibility of SRMs



History of Functional and Operational SRM specifications

GGF15から



File and Space Types in Features

2. Core Functions

- 2.1. srmAbortRequest
- 2.2. srmAbortRequestedFiles
- 2.3. srmChangeFileStorageType
- 2.4. srmChangeFileStorageTypeStatus
- 2.5. srmExtendFileLifetime
- 2.6. srmGetFeatures
- 2.7. srmGetRequestSummary
- 2.8. srmGetRequestTokens
- 2.9. srmGetSRMStorageInfo
- 2.10. srmGetTransferProtocols
- 2.11. srmLs
- 2.12. srmLsStatus
- 2.13. srmPrepareToGet
- 2.14. srmPrepareToPut
- 2.15. srmPutFileDone
- 2.16. srmPutRequestDone
- 2.17. srmReleaseFiles
- 2.18. srmRm
- 2.19. srmRmStatus
- 2.20. srmStatusOfGetRequest
- 2.21. srmStatusOfPutRequest

3. Advanced feature set 1 : Remote Access

- 3.1. srmRemoteCopy
- 3.2. srmStatusOfCopyRequest

4. Advanced feature set 2 : Space Management

- 4.1. srmCleanupFilesFromSpace
- 4.2. srmCompactSpace
- 4.3. srmGetSpaceMetaData
- 4.4. srmGetSpaceTokens
- 4.5. srmReleaseSpace
- 4.6. srmReserveSpace
- 4.7. srmUpdateSpace

5. Advanced feature set 3 : Directory Management

- 5.1. srmCp
- 5.2. srmCpStatus
- 5.3. srmMkdir
- 5.4. srmMkdirStatus
- 5.5. srmMv
- 5.6. srmMvStatus
- 5.7. srmRmdir

6. Advanced feature set 4 : Authorization

- 6.1. srmCheckPermission
- 6.2. srmReassignToUser
- 6.3. srmReassignToUserStatus
- 6.4. srmSetPermission

7. Advanced feature set 5 : Request Administration

- 7.1. srmResumeRequest
- 7.2. srmSuspendRequest

ほぼすべて必要と言うことで、Version 2.2に集約するとなる。

実験レポート・要求仕様例 (LCG)

Baseline Services report

- All experiments require SRM at all sites
- The WG has agreed a common "LCG-SRM" set of functions, that the experiments need:
 - LCG Service Challenge 3: v1.1
 - LCG Service Challenge 4: LCG-SRM
- LCG SRM functionality:

Prioritised List discussed at LCG SC3 workshop

In descending order:

- 1.Pin/Unpin functionality
- 2.Relative paths in SURLS
- 3.Permission functions: All experiments would like the permissions to be based on roles & DN's. SRM should be integrated with VOMS
- 4.Directory functions (with the exception of "mv")
- 5.Global space reservation: ReserveSpace, ReleaseSpace and UpdateSpace, though CompactSpace is not needed
- 6.srmGetProtocols is seen as useful but not mandatory
- 7.AbortRequest, SuspendRequest and resumeRequest not seen essential

First five seen as essential

ほぼすべて必要と言うことで、Version 2.2に集約するとなる。

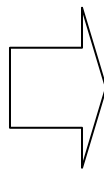
GSM-WGの機能・インタフェース仕様の表記法 (GGF13から)

{ } ... tuple
() ... list (ordered collection)
[] ... set (unordered collection)
... ... underline as mandatory (as opposed to optional)
::= ... definition operator
| ... choice operator (exclusive or)
// ... comment
italic ... recommended
String ... set of characters
Int ... number (オペレーショナル仕様ではlong unsigned longなどに)
Boolean ... true (1) or false (0)

Copy():

In: Source_SURLs,
Dest_SURLs

Out: RequestStatus



In: { Source_SURL,
Dest_SURL }[]
AuthorizationID
DesiredLifeTime
FileStorageType
OverwriteMode
Out: RequestStatusSummary
RequestID

GSM: Arguments why this is good

- Basic is 'simpler' to implement
- Can argue to have all methods in the same 'version'
- Can evolve each interface differently
- Can plug modules easier
- Can have different things implemented
- Easier integration

GSM: What benefits from WSRF?

- What does SRM spec benefit from adopting WSRF?
 - Being on the next generation standard for grid work
- What does SRM server/service implementation benefit from using WSRF?
 - Being able to use WSRF enabled MDS without any customizations on MDS
 - Just provide the WSRF interface, and MDS will be able to collect the information and display
- What does SRM client benefit from using WSRF-enabled SRM service?
 - On the cutting edge tech?
- What external services from WSRF?
 - External services from GT4 for SRM?
 - This is rather implementation related, rather than directly related to the spec
 - Resource repository with DB backend? -- no
 - Notification service? -- Yes

Version 2.2仕様 7.2基本概念

- ローカルサイトのポリシーに不干涉
- ファイルのピンニングとリリース
- スペースの予約とリリース
- 動的スペース管理
- ファイル名の抽象概念: SURL
- 転送ファイル名の一時割り当て: TURL
- ディレクトリ管理とディレクトリ構造に従ったアクセス制御
- 転送プロトコルのネゴシエーション
- P2Pリクエスト
- 複数ファイルの一括操作リクエスト
- 非同期オペレーションとアボート、サスペンド、レジューム
- ストレージのプロパティ
 - Retention Policy: REPLICIA, OUTPUT, CUSTODIAL
 - Access Latency: ONLINE, NEARLINE, OFFLINE

Version 2.2仕様

2. Space Management Functions

- **srmReserveSpace**: スペースの予約
- **srmStatusOfReserveSpaceRequest**: 非同期スペース予約のステータス参照
- **srmReleaseSpace**: スペースの開放
- **srmUpdateSpace**: スペース属性変更
- **srmGetSpaceMetaData**: スペースのメタデータ参照
- **srmChangeSpaceForFiles**: ファイルのスペース属性変更
- **srmStatusOfChangeSpaceForFilesRequest**: 非同期のファイルのスペース属性変更に対するステータス参照
- **srmExtendFileLifeTimeInSpace**: スペースのライフタイム延長
- **srmPurgeFromSpace**
- **srmGetSpaceTokens**: スペーストークンの取得

2.1. srmReserveSpace

- In:

string	authorizationID,
string	userSpaceTokenDescription,
TRetentionPolicyInfo	<u>retentionPolicyInfo</u> ,
unsigned long	desiredSizeOfTotalSpace,
unsigned long	<u>desiredSizeOfGuaranteedSpace</u> ,
int	desiredLifetimeOfReservedSpace,
unsigned long []	arrayOfExpectedFileSizes,
TExtraInfo[]	storageSystemInfo,
TTransferParameters	transferParameters

- Out:

TReturnStatus	<u>returnStatus</u> ,
string	requestToken,
int	estimatedProcessingTime,
TRetentionPolicyInfo	retentionPolicyInfo,
unsigned long	sizeOfTotalReservedSpace, // best effort
unsigned long	sizeOfGuaranteedReservedSpace,
int	lifetimeOfReservedSpace,
string	spaceToken

2.1. srmReserveSpace パラメタ型の詳細

- **1.3. Retention Policy**

```
enum TRetentionPolicy { REPLICA , OUTPUT , CUSTODIAL }
```

- **1.27. Extra Info**

```
typedef struct {  string          key,  
                  string          value  
  
} TExtraInfo
```

- **1.28. Transfer Parameters**

```
typedef struct {  TAccessPattern  accessPattern,  
                 TConnectionType connectionType,  
                 string[]       arrayOfClientNetworks  
                 string[]       arrayOfTransferProtocols  
  
} TTransferParameters
```

- **1.10. Access Pattern**

```
enum TAccessPattern { TRANSFER_MODE, PROCESSING_MODE }
```

- **1.11. Connection Type**

```
enum TConnectionType { WAN, LAN }
```

2.1.3. Return Status Code

- SRM_SUCCESS
- SRM_REQUEST_QUEUED
- SRM_REQUEST_INPROGRESS
- SRM_LOWER_SPACE_GRANTED
- SRM_AUTHENTICATION_FAILURE
- SRM_AUTHORIZATION_FAILURE
- SRM_INVALID_REQUEST
- SRM_NO_USER_SPACE
- SRM_NO_FREE_SPACE
- SRM_EXCEED_ALLOCATION
- SRM_INTERNAL_ERROR
- SRM_FAILURE
- SRM_NOT_SUPPORTED

2.2. srmStatusOfReserveSpaceRequest

2.2.1. Parameters

In:

string	authorizationID,
string	<u>requestToken</u>

Out:

TReturnStatus	<u>returnStatus</u> ,
int	estimatedProcessingTime,
TRetentionPolicyInfo	retentionPolicyInfo,
unsigned long	sizeOfTotalReservedSpace,
unsigned long	sizeOfGuaranteedReservedSpace,
int	lifetimeOfReservedSpace,
string	spaceToken

2.3. srmReleaseSpace

2.3.1. Parameters

In:

string	authorizationID,
string	<u>spaceToken</u> ,
TExtraInfo[]	storageSystemInfo,
Boolean	forceFileRelease

Out:

TReturnStatus	<u>returnStatus</u>
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2.4. srmUpdateSpace

2.4.1. Parameters

In:

string	authorizationID,
string	<u>spaceToken</u> ,
unsigned long	newSizeOfTotalSpaceDesired,
unsigned long	newSizeOfGuaranteedSpaceDesired,
int	newLifeTime,
TExtraInfo[]	storageSystemInfo

Out:

TReturnStatus	<u>returnStatus</u> ,
string	requestToken,
unsigned long	sizeOfTotalSpace, // best effort
unsigned long	sizeOfGuaranteedSpace,
int	lifetimeGranted

2.5. srmStatusOfUpdateSpaceRequest

2.5.1. Parameters

In:

string	authorizationID,
string	<u>requestToken</u>

Out:

TReturnStatus	<u>returnStatus,</u>	
unsigned long	sizeOfTotalSpace,	// best effort
unsigned long	sizeOfGuaranteedSpace,	
int	lifetimeGranted	

2.6. srmGetSpaceMetaData

2.6.1. Parameters

In:

string	authorizationID,
string[]	<u>arrayOfSpaceTokens</u>

Out:

TReturnStatus	<u>returnStatus,</u>
TMetaDataSpace[]	arrayOfSpaceDetails

1.25. Space MetaData

typedef struct { string	<u>spaceToken,</u>
TReturnStatus	status,
TRetentionPolicyInfo	retentionPolicyInfo,
string	owner,
unsigned long	totalSize, // best effort
unsigned long	guaranteedSize,
unsigned long	unusedSize,
int	lifetimeAssigned,
int	lifetimeLeft
} TMetaDataSpace	

2.7. srmChangeSpaceForFiles

2.7.1. Parameters

In:

string	authorizationID,
anyURI []	<u>arrayOfSURLs</u> ,
string	<u>targetSpaceToken</u> ,
TExtraInfo[]	storageSystemInfo

Out:

TReturnStatus	<u>returnStatus</u> ,
string	requestToken,
int	estimatedProcessingTime,
TSURLReturnStatus []	arrayOfFileStatuses

1.23. Return Status for SURL

typedef struct {anyURI	<u>surl</u> ,
TReturnStatus	<u>status</u>
} TSURLReturnStatus	

2.8. srmStatusOfChangeSpaceForFilesRequest

2.8.1. Parameters

In:

string	authorizationID,
string	<u>requestToken</u>

Out:

TReturnStatus	<u>returnStatus</u>
int	estimatedProcessingTime,
TSURLReturnStatus []	arrayOfFileStatuses

2.9. srmExtendFileLifeTimeInSpace

2.9.1. Parameters

In:

string	authorizationID,
string	spaceToken,
anyURI []	arrayOfSURLs,
int	newLifeTime

Out:

TReturnStatus	<u>returnStatus</u> ,
TSURLLifetimeReturnStatus []	arrayOfFileStatuses

1.37. Return Status for SURL

typedef struct {	anyURI	<u>surl</u> ,
	TReturnStatus	<u>status</u>
	int	fileLifetime,
	int	pinLifetime,
}	TSURLLifetimeReturnStatus	

2.10. srmPurgeFromSpace

2.10.1. Parameters

In:

string

anyURI []

string

TExtraInfo[]

authorizationID

arrayOfURLs

spaceToken,

storageSystemInfo

Out:

TReturnStatus

TSURLReturnStatus[]

returnStatus,

arrayOfFileStatuses

2.11. srmGetSpaceTokens

2.11.1. Parameters

In:

string	userSpaceTokenDescription,
string	authorizationID

Out:

TReturnStatus	<u>returnStatus</u>
string[]	arrayOfSpaceTokens

Version 2.2仕様(2)

Permission Functions

- **srmSetPermission**
- **srmCheckPermission**
- **srmGetPermission**

3.1. srmSetPermission

3.1.1. Parameters

In:

string	authorizationID,
anyURI	<u>SURL</u> ,
TPermissionType	<u>permissionType</u> ,
TPermissionMode	ownerPermission,
TUserPermission[]	arrayOfUserPermissions,
TGroupPermission[]	arrayOfGroupPermissions,
TPermissionMode	otherPermission,
TExtraInfo[]	storageSystemInfo

Out:

TReturnStatus	<u>returnStatus</u>
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1.5. Permission Mode

enum	TPermissionMode	{NONE, X, W, WX, R, RX, RW, RWX}
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1.6. Permission Type

enum	TPermissionType	{ADD, REMOVE, CHANGE}
------	-----------------	-----------------------

1.15. User Permission

```
typedef struct { string          userID,
                TPermissionMode mode
} TUserPermission
```

1.16. Group Permission

```
typedef struct { string          groupID,
                TPermissionMode mode
} TGroupPermission
```

3.2. srmCheckPermission

3.2.1. Parameters

In:

anyURI []	<u>arrayOfSURLs</u> ,
string	authorizationID,
TExtraInfo[]	storageSystemInfo

Out:

TReturnStatus	<u>returnStatus</u> ,
TSURLPermissionReturn[]	arrayOfPermissions

1.38. Return File Permissions

```
typedef struct { anyURI          url,
                 TReturnStatus   status,
                 TPermissionMode permission
} TSURLPermissionReturn
```

1.39. Return Permissions on SURL

```
typedef struct { anyURI          url, // both dir and file
                 TReturnStatus   status,
                 string          owner,
                 TPermissionMode ownerPermission,
                 TUserPermission[] arrayOfUserPermissions,
                 TGroupPermission[] arrayOfGroupPermissions,
                 TPermissionMode otherPermission
} TPermissionReturn
```

3.3. srmGetPermission

3.3.1. Parameters

In:

anyURI []

string

TExtraInfo[]

arrayOfURLs,

authorizationID,

storageSystemInfo

Out:

TReturnStatus

TPermissionReturn[]

returnStatus,

arrayOfPermissionReturns

Directory Functions

- **srmMkdir**
- **srmRmdir**
- **srmRm**
- **srmLs**
- **srmStatusOfLsRequest**
- **srmMv**

4.1. srmMkdir

4.1.1. Parameters

In:

string

anyURI

TExtraInfo[]

authorizationID,

SURL,

storageSystemInfo

Out:

TReturnStatus

returnStatus

4.2. srmRmdir

4.2.1. Parameters

In:

string	authorizationID,
anyURI	<u>SURL</u> ,
TExtraInfo[]	storageSystemInfo,
boolean	recursive // false by default

Out:

TReturnStatus	<u>returnStatus</u>
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4.3. srmRm

4.3.1. Parameters

In:

string

anyURI[]

TExtraInfo[]

authorizationID,

arrayOfSURLs,

storageSystemInfo

Out:

TReturnStatus

TSURLReturnStatus[]

returnStatus,

arrayOfFileStatuses

4.4. srmLs

4.4.1. Parameters

In:

string	authorizationID,
anyURI []	arrayOf <u>SURLs</u> ,
TExtraInfo[]	storageSystemInfo,
TFileStorageType	fileStorageType,
boolean	fullDetailedList,
boolean	allLevelRecursive,
int	numOfLevels,
int	offset,
int	count

Out:

TReturnStatus	<u>returnStatus</u>
string	requestToken
TMetaDataPathDetail[]	details

4.5. srmStatusOfLsRequest

4.5.1. Parameters

In:

```
string      authorizationID,
string      requestToken
int         offset,
int         count
```

Out:

```
TReturnStatus      returnStatus
TMetaDataPathDetail[] details
```

1.1. File Storage Type

```
enum TFileStorageType
    { VOLATILE, DURABLE, PERMANENT }
```

1.13. Retention Policy Info

```
typedef struct { TRetentionPolicy retentionPolicy,
                TAccessLatency  accessLatency
} TRetentionPolicyInfo
```

1.2. File Type

```
enum TFileType
    { FILE, DIRECTORY, LINK }
```

1.9. File Locality

```
enum TFileLocality
    { ONLINE, NEARLINE, ONLINE_AND_NEARLINE, LOST,
      NONE.UNAVAILABLE }
```

1.24. File MetaData

```
typedef struct { string    path, // absolute dir and file path
                TReturnStatus status,
                unsigned long size, // 0 if directory
                dateTime  createdAtTime,
                dateTime  lastModificationTime,
                TFileStorageType fileStorageType,
                TRetentionPolicyInfo retentionPolicyInfo,
                TFileLocality fileLocality,
                string[]    arrayOfSpaceTokens,
                TFileType   type, // Directory or File
                int         lifetimeAssigned,
                int         lifetimeLeft, // on the SURL
                TUserPermission ownerPermission,
                TGroupPermission groupPermission,
                TPermissionMode otherPermission,
                string        checkSumType,
                string        checkSumValue,
                TMetaDataPathDetail[] arrayOfSubPaths
                // optional recursive
            } TMetaDataPathDetail
```

4.6. srmMv

4.6.1. Parameters

In:

string	authorizationID,
anyURI	<u>fromSURL</u> ,
anyURI	<u>toSURL</u> ,
TExtraInfo[]	storageSystemInfo

Out:

TReturnStatus	<u>returnStatus</u>
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Data Transfer Functions

- **srmPrepareToGet**
- **srmStatusOfGetRequest**
- **srmPrepareToPut**
- **srmStatusOfPutRequest**
- **srmCopy**
- **srmStatusOfCopyRequest**
- **srmBringOnline**
- **srmStatusOfBringOnlineRequest**

- **srmReleaseFiles**
- **srmPutDone**

- **srmAbortRequest**
- **srmAbortFiles**
- **srmSuspendRequest**
- **srmResumeRequest**

- **srmGetRequestSummary**

- **srmExtendFileLifeTime**
- **srmGetRequestTokens**

5.1. srmPrepareToGet

5.1.1. Parameters

In:

string	authorizationID,
TGetFileRequest[]	<u>arrayOfFileRequests</u> ,
string	userRequestDescription,
TExtraInfo[]	storageSystemInfo,
TFileStorageType	desiredFileStorageType
int	desiredTotalRequestTime
int	desiredPinLifetime,
string	targetSpaceToken
TRetentionPolicyInfo	targetFileRetentionPolicyInfo
TTransferParameters	transferParameters

Out:

TReturnStatus	<u>returnStatus</u>
string	requestToken,
TGetRequestFileStatus[]	arrayOfFileStatuses
int	remainingTotalRequestTime

1.29. File Request for srmPrepareToGet

```
typedef struct { anyURI          sourceSURL,
                TDirOption      dirOption,
                } TGetFileRequest
```

1.26. Directory Option

```
typedef struct { Boolean      isSourceADirectory,
                Boolean      allLevelRecursive,      // default = false
                int           numOfLevels             // default = 1
                } TDirOption
```

5.2. srmStatusOfGetRequest

5.2.1. Parameters

In:

string	<u>requestToken</u> ,
string	authorizationID
anyURI []	arrayOfSourceURLs,

Out:

TReturnStatus	<u>returnStatus</u> ,
TGetRequestFileStatus[]	arrayOfFileStatuses
int	remainingTotalRequestTime

1.32. Return File Status for srmPrepareToGet

```
typedef struct { anyURI          sourceURL,
                 TReturnStatus  status,
                 unsigned long  fileSize,
                 int            estimatedWaitTime,
                 int            remainingPinTime,
                 anyURI         transferURL,
                 TExtraInfo[]   transferProtocolInfo
} TGetRequestFileStatus
```

5.3. srmBringOnline

5.3.1. Parameters

In:

string	authorizationID,
TGetFileRequest[]	<u>arrayOfFileRequests</u> ,
string	userRequestDescription,
TExtraInfo[]	storageSystemInfo,
TFileStorageType	desiredFileStorageType
int	desiredTotalRequestTime
int	desiredLifetime, // life time on online
string	targetSpaceToken,
TRetentionPolicyInfo	targetFileRetentionPolicyInfo,
TTransferParameters	transferParameters,
int	deferredStartTime

Out:

TReturnStatus	<u>returnStatus</u>
string	requestToken
TBringOnlineRequestFileStatus[]	arrayOfFileStatuses
int	remainingTotalRequestTime
int	remainingDeferredStartTime

1.33. Return File Status for srmBringOnline

```
typedef struct { anyURI          sourceSURL,
                TReturnStatus   status,
                unsigned long   fileSize,
                int              estimatedWaitTime,
                int              remainingPinTime,
                } TBringOnlineRequestFileStatus
```

5.4. srmStatusOfBringOnlineRequest

5.4.1. Parameters

In:

string

string

anyURI []

requestToken,

authorizationID

arrayOfSourceURLs,

Out:

TReturnStatus

TBringOnlineRequestFileStatus[]

int

int

returnStatus,

arrayOfFileStatuses

remainingTotalRequestTime

remainingDeferredStartTime

5.5.1. Parameters

In:

string	authorizationID,
TPutFileRequest[]	arrayOfFileRequests,
string	userRequestDescription,
TOverwriteMode	overwriteOption,
TExtraInfo[]	storageSystemInfo,
int	desiredTotalRequestTime
int	desiredPinLifetime, // on TURL
int	desiredFileLifetime, // on SURL
TFileStorageType	desiredFileStorageType,
string	targetSpaceToken
TRetentionPolicyInfo	targetFileRetentionPolicyInfo
TTransferParameters	transferParameters

Out:

TReturnStatus	<u>returnStatus</u>
string	requestToken,
TPutRequestFileStatus[]	arrayOfFileStatuses
int	remainingTotalRequestTime

1.30. File Request for srmPrepareToPut

```
typedef struct { anyURI          targetSURL , // local to SRM
                unsigned long    expectedFileSize
} TPutFileRequest
```

1.8. Overwrite Mode

```
enum TOverwriteMode {NEVER,
                    ALWAYS,WHEN_FILES_ARE_DIFFERENT}
```

5.6. srmStatusOfPutRequest

5.6.1. Parameters

In:

string	<u>requestToken</u> ,
string	authorizationID
anyURI []	arrayOfTargetSURLs,

Out:

TReturnStatus	<u>returnStatus</u> ,
TPutRequestFileStatus[]	arrayOfFileStatuses
int	remainingTotalRequestTime

1.34. Return File Status for srmPrepareToPut

```
typedef struct { anyURI          SURL,
                 TReturnStatus   status,
                 unsigned long   fileSize,
                 int             estimatedWaitTime,
                 int             remainingPinLifetime // on TURL
                 int             remainingFileLifetime // on SURL
                 anyURI          transferURL,
                 TExtraInfo[]    transferProtocolInfo
} TPutRequestFileStatus
```

5.7. srmCopy

5.7.1. Parameters

In:

string	authorizationID,
TCopyFileRequest[]	<u>arrayOfFileRequests</u> ,
string	userRequestDescription,
TOverwriteMode	overwriteOption,
int	desiredTotalRequestTime,
int	desiredTargetSURLLifeTime,
TFileStorageType	targetFileStorageType,
string	targetSpaceToken,
TRetentionPolicyInfo	targetFileRetentionPolicyInfo,
TExtraInfo[]	sourceStorageSystemInfo,
TExtraInfo[]	targetStorageSystemInfo

Out:

TReturnStatus	<u>returnStatus</u> ,
string	requestToken,
TCopyRequestFileStatus[]	arrayOfFileStatuses,
int	remainingTotalRequestTime

1.31. File Request for srmCopy

```
typedef struct {
    anyURI          sourceSURL,
    anyURI          targetSURL,
    TDirOption      dirOption
} TCopyFileRequest
```

5.8. srmStatusOfCopyRequest

5.8.1. Parameters

In:

string	<u>requestToken</u> ,
string	authorizationID,
anyURI []	arrayOfSourceURLs,
anyURI []	arrayOfTargetURLs,

Out:

TReturnStatus	<u>returnStatus</u> ,
TCopyRequestFileStatus[]	arrayOfFileStatuses,
int	remainingTotalRequestTime

1.35. Return File Status for srmCopy

typedef struct { anyURI	<u>sourceSURL</u> ,
anyURI	<u>targetSURL</u> ,
TReturnStatus	<u>status</u> ,
unsigned long	<u>fileSize</u> ,
int	estimatedWaitTime,
int	remainingFileLifetime // on target SURL
} TCopyRequestFileStatus	

5.9. srmReleaseFiles

5.9.1. Parameters

In:

string

string

anyURI []

Boolean

requestToken,

authorizationID,

arrayOfURLs₂

doRemove

Out:

TReturnStatus

TURLReturnStatus[]

returnStatus,

arrayOfFileStatuses

5.10. srmPutDone

5.10.1. Parameters

In:

string

requestToken,

string

authorizationID,

anyURI []

arrayOfURLs

Out:

TReturnStatus

returnStatus,

TURLReturnStatus[]

arrayOfFileStatuses

5.11. srmAbortRequest

5.11.1. Parameters

In:

string

requestToken,

string

authorizationID

Out:

TReturnStatus

returnStatus

5.12. srmAbortFiles

5.12.1. Parameters

In:

string

anyURI []

string

requestToken,

arrayOfSURLs,

authorizationID

Out:

TReturnStatus

TSURLReturnStatus[]

returnStatus,

arrayOfFileStatuses

5.13. srmSuspendRequest

5.13.1. Parameters

In:

string

requestToken

string

authorizationID

Out:

TReturnStatus

returnStatus

5.14. srmResumeRequest

5.14.1. Parameters

In:

string

requestToken,

string

authorizationID

Out:

TReturnStatus

returnStatus

5.15. srmGetRequestSummary

5.15.1. Parameters

In:

string []	<u>arrayOfRequestTokens</u> ,
string	authorizationID

Out:

TReturnStatus	<u>returnStatus</u>
TRequestSummary[]	arrayOfRequestSummaries

1.36. Request Summary

```
typedef struct {string          requestToken,
                    TReturnStatus status,
                    TRequestType  requestType,
                    int            totalNumFilesInRequest,
                    int            numOfCompletedFiles,
                    int            numOfWaitingFiles,
                    int            numOfFailedFiles
} TRequestSummary
```

1.7. Request Type

```
enum TRequestType
{ PREPARE_TO_GET, PREPARE_TO_PUT, COPY, BRING_ONLINE,
  RESERVE_SPACE, UPDATE_SPACE, CHANGE_SPACE_FOR_FILES, LS }
```

5.16. srmExtendFileLifeTime

5.16.1. Parameters

In:

string	authorizationID,
string	requestToken,
anyURI []	<u>arrayOfSURLs</u> ,
int	newFileLifetime,
int	newPinLifetime

Out:

TReturnStatus	<u>returnStatus</u> ,
TSURLLifetimeReturnStatus []	arrayOfFileStatuses

1.37. Return Status for SURL

```
typedef struct { anyURI          surl,
                 TReturnStatus  status
                 int            fileLifetime,
                 int            pinLifetime,
} TSURLLifetimeReturnStatus
```


-
- **srmGetTransferProtocols**
 - **srmPing**

6.1. srmGetTransferProtocols

6.1.1. Parameters

In:

string authorizationID,

Out:

TReturnStatus returnStatus,
TSupportedTransferProtocol[] protocolInfo

1.41. Supported File Transfer Protocol

```
typedef struct { string transferProtocol,  
                TExtraInfo[] attributes  
} TSupportedTransferProtocol
```

6.2. srmPing

6.2.1. Parameters

In:

string

authorizationID,

Out:

string

versionInfo

TExtraInfo[]

otherInfo

まとめ

- インタフェース仕様書をOGF標準とした。
- 各サイトのポリシーは記述されていない
- 各サイトのインプリメンテーションは記述されていない。
- 管理インタフェースは記述されていない。