COM}%G!<%?%Y!<%9!&COM}>pJs=hM}$NI8=`2=$K$*$1$kF08~

:#0f9@ @u0f7r0l 0pMU??M}

El5~Bg3X M}3XIt >pJs2J3X2J

{imai,asai,mary}@is.s.u-tokyo.ac.jp

35MW

6aG/!"<R2q$N>pJs2=$,5^B.$K?J$`Cf!"COM}>pJs%7%9%F%` (GIS) $,!"$=$N1~MQ$N9-5H$=$1$r;Y$($k>pJs$=Q$N?JJb$Khj!"$*$*$$$KCmL\$r=8aF$$$k!#%+!<%J%S%2!<%7%g%s%7%9%F%`$NIa5Z$J$I$rDL$7$F GIS $,$^$9$^$9B?$/$N>lLL$G;H$o$1$k$h$&$K$J$k$K$D$l$F!"3FCO$GC_@Q$5$l$F$$$kKDBg$JNL$NCOM}%G!<%?$N6&M-!"Aj8_MxMQ$N=EMW@-$bBg$-$/$J$C$F$-$F$$$k!#$=$s$JCf!" GIS $NIa5Z$K$O7g$+$;$J$$COM}%G!<%?$NI8=`2=$, ISO $G;O$^CF$$$k!#$3$3GO!"$=$NF08~$r>pJs5;=Q$H$N4XO"$r8+J,$i2r@b$9$k!#

1 O8aK

6aG/!"%3%s%T%e!<%?!<5;=Q!"FC$K%G!<%?%Y!<%95;=Q$NH/E8$H!"$=lKH<$&KDBg$J%G!<%?$NC_@Q$Khj!"<R2q$N>pJs2=$,5^B.$K?J$s$G$$$k!#J+GbCOM}>pJs%7%9%F%` (GIS) $O!"CO?^%G!<%?$rEE;R>pJs2=9k3HKh$j!"MM!9$JE}7W%G!<%?Ey$HCO?^$H$rMF0W$KBP>H9k3H$,$G$-$kh&K9kbNG$"$j!"C1Jk6u4VE*$J8!:w!"I=<($P$+$jGJ$/!"<o!9$N2r@O$N5!G=$rIU2CG-kJ$I!"I}9-$$1~MQ$,4|BT$5lF$$$k!#6qBNE*KO!" GIS $N@0Hw$Khj!"9T@/LLGO;\@_4IM}!"7W2h:vDj;Y1g!"KI:R!"4D6-1F6AI>2A!"J!;cEy!"$^$?!"L14VGO%^!<%1%F%#%s%0!"8\5R4IM}Ey!"I}9-$$J,Ln$G6HL3$N8zN(2=!"9bEY2=$r<B8=$9k3H,4|BT5l$F$$$k!#

8=:_!" GIS $O9T@/$N8zN(2=!"?WB.2=Ey$N4QE@$+$i!"COJ}8x6&CDBN$rCf?4$K!">e2<?eF;Ey$N;\@_4IM}Ey$KMxMQ$5$l;O$a$F$$$k!#7+$7!"%f!<%6Kh$K GIS @0Hw$,$J5l$F$$$k?$a!"8_49@-$,$J$$$3$H!"9b$$@0Hw%3%9%HIiC4JI$NLdBj$,$"$k!# GIS $r9-$/Ia5Z!&3hMQ7F$$$/$?$aKO!" GIS $r8zN(E*$K@0Hw9kHHbK!"C/b,MxMQG-kh$&$KI8=`2=9k3H$,I,MWIT2D7g$G$"$k!#

GIS $N@0Hw$K8~1F!"9qFbGO:rG/ GIS 8&5f2q$,H/B-$7$?!#$^$?!"9q:]E*$K$b!"I8=`2=$K8~$1$?<o!9$NF0$-$,$"$k!#$3$3$G$O!"$=$l$i$NF0$-$rJs9p$9$k$H$H$b$K!"FC$K2f!9$N;22C$7$F$$$k ISO/TC211 !JCOM}>pJs$NI8=`2=!K$K$*$1$kCOM}%G!<%?$N9q:]I8=`:n@.$NF08~$K$D$$$F!"%G!<%?%Y!<%95;=QHN4XO"$b8+$J$,$i2r@b9k!#

On the Standardization of Geographic Databases and Geographic Information Systems by Hiroshi IMAI, Kenichi ASAI, and Mary INABA (Department of Information Science, University of Tokyo)

J*!"3N869F$O<g$K ISO/TC211 K*1kFbIt;qNA!"5Z$S 1996 G/ 9 7n 11 F|$K3+$+$1$? ISO/TC211 %;%_%J!<$N;qNA [1] rbHK:n@.5l$F$$$k!# ISO/TC211 $N354Q$K$D$$$F$O!"9qEZCOM}1!$N%[!<%`%Z!<%8 [2] $+$iF@k3H,G-$k!#

2 ISO/TC211 I8=`2=%W%m%8%'%/%H$N9=@.

COM}>pJs$NI8=`2=$K8~$1$F ISO $G$O!" 1994 G/ 4 7n $K%N%k%&%'!<$r5DD99q$H$9$k@lLg0Q0w2q$r@_N)$7$?!#F|K\$b:G=i$+$i8x<0%a%s%P!<$H$7$F;22C$7$F$$$k!#;22C9q$O8=:_!"9g7W 37%v9q$G$"$j!" 5 $D$NIt2q$K$o$+$l$F:n6H$r9T$J$C$F$$$k!#3F:n6HIt2q (Working Group, WG) $H$=$N:n6H9`L\$O0J2<NDLjG"$k!#$3N&$A!"F|K\$OE,9g@-$H%F%9%H!"5Z$SIJ<AI>2A<j=gNU$?$D$r<u$1;}CF$$$k!#

2.1 WG1: ;2>H%b%G%k

;2>H%b%G%k C4Ev%"%a%j%+!#COM}>pJs$NI8=`$r:n@.$9$k4D6-!"E,MQ$9$k4pK\6B'5Z$SI8=`$r9=C[9k?aNOHAH$_$r5-=R9k!#;2>H%b%G%k$O!"$3$NI8=`2=$KI,MW$JA4$F$N35G0$HMWAG$rDj5A$7=R$Y$k!#>pJs5;=QI8=`$NCf$G9=C[$5lkNG!";2>H%b%G%kOINh$&$JMQ!"J}K!O@!"5;=Q$+$i$bFHN)$HJk!#

35MW C4Ev%$%.%j%9!# ISO/TC211 I8=`BN7O$K4X$9$k35Mw!#

35G0%9%-!<%^8@8l C4Ev%N%k%&%'!<!#COM}>pJsNJ,LnK$*$1$k35G0%9%-!<%^$N3+H/$KMQ$$$k35G0%9%-!<%^8@8l!JCSL!K$N:NMQ!#

MQ8lK! C4Ev%9%&%'!<%G%s!# ISO/TC211 I8=`BN7O$K4XO"$9$kD4OB$NHl$?@lLgMQ8l=8!#

E,9g@-$H%F%9%H C4EvF|K\!#$3$NI8=`BN7O$X$NE,9g$r<gD%$9$k$?$a$KC#@.$9$Y$-4p=`$H%F%9%H$N9=@.!"35G05Z$SJ}K!!#

2.2 WG2: COM}>pJs%b%G%j%s%0

6u4V%5%V%9%-!<%^ C4Ev%$%.%j%9!#%*%V%8%'%/%H%?%$%W$N6u4VFC@-$rDj5A9k35G0%9%-!<%^$NDj5A!#

;~4V%5%V%9%-!<%^ C4Ev%"%a%j%+!#%*%V%8%'%/%H%?%$%W$N;~4VFC@-$rDj5A$9$k35G0%9%-!<%^$NDj5A!#

%"%W%j%1!<%7%g%s%9%-!<%^N?aN5,B' C4Ev%N%k%&%'!<!#%"%W%j%1!<%7%g%s!&%9%-!<%^N?aN5,B'$NDj5A!#$3$N5,B'$O!"COM}E*%*%V%8%'%/%H$NJ,N`86B'$H!"COM}E*%*%V%8%'%/%H$H%"%W%j%1!<%7%g%s!&%9%-!<%^$N

4X78$r4^$`!#

6u4V1i;;;R 8!:w!"Ld$$9go;!"4IM}!"=hM}N?aN

;;;R$NDj5A!#

2.3 WG3: COM}>pJs4IM}

%+%?%m%0:n@. C4Ev%"%a%j%+!#COM}E*%*%V%8%'%/%H!"B0
@-5Z$S4X78$N%+%?%m%0$N:n@.$NJ}K!O@$NDj5A$H!"C1
0l$N9q:]E*$JJ#?t8@8l%+%?%m%0$N@0Hw$H1?MQ@-$K4X
9k<B8=2DG=@-$N7hDj!#

B,CO;2>H7O B,CO;2>H7O$N5-=R$N$?$a$N%,%$%I%i%$%s$H
35G0%9%-!<%^$NDj5A!#$3$N:n6H$OFCDj$N9q:]E*$J;2
>H7OXN;2>H$r4^$`!#

4V@\;2>H7O C4Ev%$%.%j%9!#!J=;=jEy$N!K:BI8$r;}$?$J
$$4V@\E*$J6u4V;2>H7O$r5-=R9k$?$a$N35G0%9%-!<
%^$H%,%$%I%i%$%s$NDj5A!#

IJ<A C4Ev%"%a%j%+!#COM}%G!<%?$KE,MQ2DG=$JIJ<AN?
aN%9%-!<%^$NDj5A!#

IJ<AI>2A<j=g C4EvF|K\!#%G!<%?$NIJ<A$r;EMM2=!?I>2A
9k<jK!N?aN%,%$%I%i%$%s$N3+H/!#

%a%?%G!<%? C4Ev%"%a%j%+!#COM}>pJs5Z$S%5!]%S%9%5-
=R9k$?$a$KMW5a$5lk%9%-!]%^$NDj5A!#

2.4 WG4: COM}>pJs%5!<%S%9

B,0L%5!]%S%9 Global Positioning System (GPS) N?
aNI8=`%$%s%?!]%U%'%$%9!&%W%m%H%3%k$NDj5A!#

COM}>pJs$NIA2h C4Ev%N%k%&%'!<!#?M4VKhCFM}2r$G
$-$k7A<0GNCOM}>pJs$NIA2h$r5-=R9k%9%-!]%^$N
Dj5A$G!"%7%s%\%k$N5-=R5Z$S%"%W%j%1!]%7%g%s!&%9
%-!]%^XN%9%-!]%^$N<LA|$N$?$a$NJ}K!O@$r4^$`!#
3N:n6HKOCO?^3X$N%7%s%\%k$NI8=`2=$r4^$a$J
$$!#

%3!<%I2=K! C4Ev%N%k%&%'!<!#COM}>pJsKE,MQ9$k35G0
%9%-!<%^72$H8_49@-$N$"$k%3!<%I2=K!$NA*Br$H!"35
G0%9%-!<%^8@8l$H%3!<%I2=5,B'$N4V$N<LA|$NDj5A!#

%5!<%S%9 C4Ev%N%k%&%'!<!#COM}E*>pJsN?aK;Hol
$k%5!<%S%9%$%s%?!<%U%'%$%9$NDj5A$H<1JL!"5Z$S!"
%*!<%W%s%7%9%F%`4D6- (OSE) HN4X78$NDj5A!#

2.5 WG5: %W%m%U%!%$%kEy

%W%m%U%!%$%k C4Ev%+%J%@!#$3$NI8=`BN7O$K$*$$$F$W%m
%U%!%$%k / %W%m%@%/%H$rDj5A9kK"$?$CFN%,%$
%I%i%$%s$NDj5A!#

3 ISO/TC211 $N07$&HO0O

ISO/TC211 $G07$&BP>]$O!"COM}>pJs$NCfGb?tCMCO
M}>pJsNJ,LnK$*$1$kI8=`2=$G$"$k!#:G=*E*$JL\I8$O!"
CO5e>e$N0LCV$HD>@\$^$?$O4V@\$K4XO"IU1ilF$$$kBP
>]J*!&8=>]$K4X$9$k>pJs$N9=B$2=$5l?I8=`BN7O$r3NN)
9k3HG"$k!#$h$j6qBNE*$K$O!"COM}>pJs$K$D$$$F!"
%G!<%?4IM}N?aNJ}K!!"%D!<%k$*$h$S%5!<%S%9!JDj5A

$H5-=RK!$r4^$`!K$d!"0[$J$k%f!<%6!<!"%7%9%F%`$*hS
$N1=j$N4VGN?tCME*!?EE;RE*7ABVGN%G!<%?$N<hF@!"2C
9)!"2r@O!"%"%/%;%9!"I=8=$*$h$SJQ49$r5,Dj7F$$$/$3
HKJk!#

$3$3$GCm0U$7J/FO$$$1$J$$$N$O!"I8=`2=$Khj!"
4{B8$N%G!<%?%Y!<%9$NB?$/$,;HMQITG=HJC?$j!"I8
=`2=N?aKM>J,KBg-$J%3%9%H$rMW9kh&KJ
kN$O9%$^7/$J$$!"$H$$$&3HG"$k!#$3N?$a!"
ISO/TC211 GO!"<B:]$K%7%9%F%`$rI&:nkY$-$+!"
$"$k$$$O!"%G!<%?rI$&J]B8$9kY$-$+!"Ey$r5,Dj$9$k
NGOJ$/!"$=li$,!"$INh$&$J@:EY$G!"$INh$&$J
9`L\$G9=@.5l!"INh&$K99?7$5lF$$$k$+$JIr<(
$9!V%G!<%?$K4X9k%G!<%?!W9JoA!"%a%?!&%G!<%?$N
I8=`2=$rL\;X$7$F$$$k!#3lKh$j!"MxMQ<T$OCOM}%G!<
%?$r<+M3$K8!:w7F!"<+J,$NMQES$K;H$($k$+$I$&$+$rH=
CG$7!"I,MW$J>l9g$KMF0W$KMxMQG-kh$&$KJk!#

4 ?tCMCOM}>pJsI8=`2=$N;2>H%b%G%k

$3$3GO!"?tCMCOM}>pJs$NI8=`2=$N3KHJ$k;2>H%b
%G%k!JA4BNA|!KKD$$$F!"hj>\:Y$K=R$Y$F$$$/!#?tCM
COM}>pJs%7%9%F%`I8=`2=$N4pAC$O!"COM}>pJs$H>pJs5;=Q
(Information Technology, IT) NU$?$DG"$k!#COM}
>pJs$O!"6u4V$X$N;2>HEy$N$$$ofkCOM}E*$J>pJs$G!"%7
%9%F%`$N%G!<%?$NEZBfHJkbNG$"$k!#3liO!"=>
Mh$NCOM}%G!<%?$HBg$-$/0[Jk3HOJ$$$,!"<!$K=R$Y
$k>pJs5;=Q$H$N4XO"$r8+$F!";~4V$d4v2?%G!<%?JI!"$3
l^G"$^$j07olF3J+C?$9bEY$J%G!<%?$b4^$^$l
$F$$$k!#3lKBP7!">pJs5;=Q$OMM!9$JCOM}%G!<%?$N=h
M}!"E>Aw$d2r@O$NEZBfHJ$k5;=Q$G$"$k!#CfGb Open
System Environment (OSE) $O!"9-HO0O$G%G!<%?Nd
jHjr2DG=K9$kE@$d3F%b%8%e!<%k$N<B8=K!$r8BDj$7
$J$$E@$GBg5,LO$JCOM}>pJs%7%9%F%`$N9=C[$K$O7g$+$;$J
$$5;=QG"$k!#

4.1 COM}>pJs

?tCMCOM}>pJs$G07$&COM}%G!<%?$O!"0l8@$G$$$($PCO5e
>e$N0LCV$H4XO"7?MM!9$J;vJ*!&8=>]$G$"$k!#$=$NMQES
$O!"7z@_$d650i!"4D6-!"CO?^:n@.$K;O$^$j!"%^!<%1%F%#
%s%0$d<+A3;q8;$N4IM}!"E}7W!"M"AwJII}9-$$!#ISO
$G07$&COM}>pJs%G!<%?OBg-$/#7$D$KJ,$1il$k!#0J
2<!"$=$l$>$lKD$$$F=RYF$$$/!#

6u4V$N;2>H 6u4V$N;2>HK!OU$?$D$KJ,$1il$k!#$R
HD$O:BI8<4$d0^EY!&7PEYEy$r;H$C$?D>@\E*$JbNG"
$k!#$3li$O!";vJ*$N0LCV$N?t3XE*$JOHAH$rDs6!$9kb
NG!"%3%s%T%e!<%?GN=hM}$KE,$7$F$$$k!#0[Jk:BI8
7O$O!"$=$N4V$NJQ49K!$rDj5A$7F*1PAj8_$KMxMQ2DG=
J?$a!"Bg5,LO$J%7%9%F%`$N9=C[$K$bE,$7$F$$$k!#
b&RHDO:BI87O$r;H$o$J$$$bNG!"=;=jEyKh$k
;2>HG"$k!#$3li$O!"<B:]$K2f!9$,COM}>pJs%7%9%F%`
$r;H$&>eGO=EMWG"$k!#$3li$O:BI87O$GI=9N$,I,

$:$7$bMF0W$GOJ$$$N$G!"COM}>pJs%7%9%F%`$O:BI87O$K hk;2>HHHbK!":BI87O$r;HoJ$$;2>HbG$-$kY- G"$k!#

4v2?!&0LAj>pJs COM}%G!<%?$O!"E@!"@~!"LL!"D>J}BN$J IN4v2?E*>pJs$d0LAj>pJs$r;}CF$$$k!#3liN>pJs $O!"=>Mh!"%3%a%s%H$H7FIUM?5l!"$=$N%G!<%?$r;H$& ?M4V$@$1$,IU?oE*$KMxMQ7F$-$?!#7+$7!"6aG/$N>pJs 5;=Q$NH/E8$Khj!"3liN>pJs$O5!3#=hM}$GI}9-$$MQ ES$K;H$(kh$&$KJCF-$?!# ISO GO3liN>p b7%9%F%`$N4pAC$H7FCOM}%G!<%?NRHD$K2C$(!"%3 %s%T%e!<%?Kh$k%G!<%?2r@O$KMxMQG-kh$&$K7F$$ $k!#

CO@* 3l$O!"COM}%G!<%?FCM-$N9`L\$G$"$k!#?t3XE*$K $OI=$;$J$$EZCON"j5$^!"COI=$N5/Iz$d?<$5JI$N>u BV$r$"$io9!#

%a?%G!<%? %a?%G!<%?$O!"COM}%G!<%?$KFCM-$H$$$($o 1GOJ$$$,!"$=$NCOM}%G!<%?K*1k=EMW@-$,CmL\$5 lF$$$k!#%a?%G!<%?$O!"%G!<%?$K4X9kMM!9$J%G!<%? $rJ];}$7F*$j!"$=$NFbMF$O%G!<%?$N9=B$$d@:EY!" J}K!!"F|;~JIB?4tKo$?$k!#COM}%G!<%?$O!"$$$m$$$m $J?M$KhC$FJL!9$K:nilk3H,IaDLG"k?$a!"%a %?%G!<%?$O$=$liN6&M-K*$$$F$OHs>o$K=EMWG"$k!# %a?%G!<%?$K$D$$$F$O!" 5 @a$G5i$K>\$7$/=R$Y$k!#

IJ<A %G!<%?$r;H$&$?$aKO!"$=$NIJ<A$,=EMW$J%]%$%s %H$KJk!#IJ<A$rM?$(k3HG!"ITE,@Z$J%G!<%?$N;HMQ rKI0$3$H$,$G$-$kh&KJ$k!#

;~4V ;~4V$b;vJ*$KB0$9$k@-<ANRHDG"$k!#$3$l KO!"$=$NJ*$,G-$?;~4V$d>CLG7?;~4V$JIN=V4V$r I=$9P+jGJ/!"hjJ#;($J0\F0>pJs$JIb4^sG$$ $k!#;~4V$r7C+$j07$&3H$G!"%j%"%k%?%$%`=hM}$d0\ F0BN$N=hM}$,2DG=$HJk!#

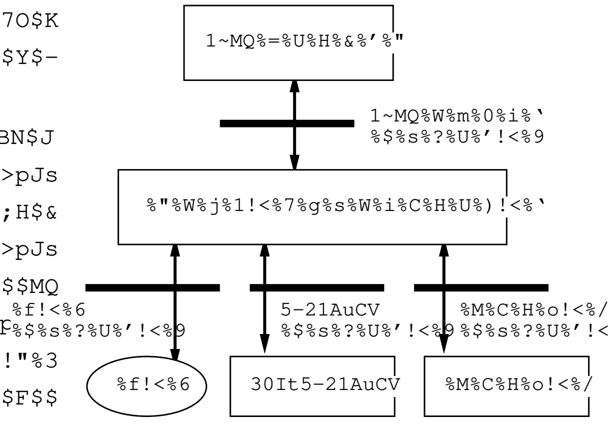
I=8=K! =>Mh!"COM}%G!<%?$OCO?^$H7FI=8=5lF- $?!#$7$+$7!"%3%s%T%e!<%?$NIa5Z$Khj!"COM}>pJs$NI= 8=K!$K$b$$$m$$$mJbN,9M$($ilkh&KJCF$- $?!#I8=`$G$O!"I=8=K!$rRHDK8BDj7F7^$&$3HO 7J$$$,!"3$?^$J$I0BA4@-$,=EMWJJ,LnG$O0lDj$NI=8= K!$rDs0F$9$k!#

4.2 %*!<%W%s!&%7%9%F%`$H>pJs5;=Q

?tCMCOM}>pJs$NI8=`2=$K$*$$$F$N$b$&$R$H$D$N=EMW$J MWAG$O>pJs5;=Q$G$"$k!#$J$+$G$b!"COM}>pJs$NI8=`2=$G $O Open System Environment (OSE) $,CmL\$5lF$$ $k!# OSE $N4pK\E*$J9M$($J}$O!"30It$H$N%$%s%?%U%'!< %9$r5,Dj$9k3HG!"Aj8_KdjHjN2DG=$J4D6-$r <B8=9k!"$H$$$&bNG"$k!#?^ 1$K OSE %b%G%k$r<($9!#

%$%s%?%U%'!<%9$K$O<!$N#4D,$"$k!#

i) ?M4VHN4V$N%$%s%?%U%'!<%9
ii) 30It5-21AuCVHN%$%s%?%U%'!<%9



?^ 1: OSE %b%G%k

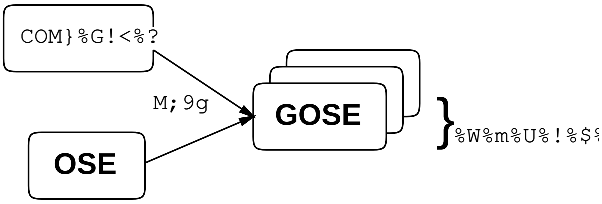
iii) %M%C%H%o!<%/HN%$%s%?%U%'!<%9
iv) 1~MQ%W%m%0%i%`:n@.N?aN%$%s%?%U%'!<%9

i) $O!"?M4V$,%7%9%F%`$r;H$&;~$KMQ$$$i$l$k%$%s%? %U%'!<%9$G$"$k!#$3$l$rDj$a$k$3$H$G!"$$$D$G$bF1$8%$ %s%?%U%'!<%9$G%7%9%F%`$r;H$&3H$,2DG=$KJk!# ii) $O!"%O!<%I%G%#%9%/Ey$N30It5-21AuCVHN%$%s%?%U%'!< %9$G$"$k!#3lrDjak3HG!"JLNH3m$G:n$i$l $?%G!<%?$G$b!"%W%m%0%i%`B&$+$i$OF1$8J}K!$G%"%/%;%9 $9$k$3$H$,$G$-$k$h$&$K$J$k!# iii) $O%$%s%?%M%C%HEy$N %M%C%H%o!<%/$H$N%$%s%?%U%'!<%9$G$"$k!#$3$l$rDj$a$k $3$H$G!"COM}E*$KN%$l$?$H$3$m$G:n$i$l$?%G!<%?$r;H$C $F$N=hM}$,2DG=$H$J$k!#$^$?!"$3$l$O%G!<%?6&M-$K$bLr N)$D!#:G8e$N iv) $O!"1~MQ%W%m%0%i%`$HCOM}>pJs%7%9 %F%`$H$N4V$N%$%s%?%U%'!<%9$G$"$k!#$3$l$rDj$a$k$3$H $G!"1~MQ%W%m%0%i%`$O5-21AuCV$d%M%C%H%o!<%/HN%$%s %?%U%'!<%9$r9M$($k3HJ/:n@.9k3H$,2DG=$H$J $k!#

4.3 GOSE

0J>e=RYF$-$?COM}>pJs%7%9%F%`$N%U%?$D$N4pAC$r 9g$o$;$k$3$H$G!">pJs5;=Q$K4p$E$$$?COM}>pJs%7%9%F%` $r@_$k3H$,$G$-$k!#U?DrM;9g9kKEv?CF$O!" %G!<%?%Y!<%9$N35G0%9%-!<%^:n@.$N5;=Q$,;Hol$k!# =PMh>e$,C?%7%9%F%`$O!" Geographic Open System Environment $NF,J8;z$r<h$C$F GOSE $H8F$P$l$k!# $3$N9=@.$r?^ 2$K$7$a$9!# GOSE $O OSE $N9M$(J}$r 7Q>5$7$F$$$k$?$a!" OSE $NDs6!$9$kBg5,LOJ,;6%7%9%F %`4D6-b=N^^0z-7Q$$$G$$$k!#3lKh$j!" OSE $NMxE@$r@8$+$7J,$i!"COM}%G!<%?$H>pJs5;=Q$NM;9g$, <B8=5l$k!#

GOSE $OCOM}%G!<%?$H>pJs5;=QNU$?$D$+$iG-$F $$$k$?$a!"$=$NCf?HbBg-$/$U$?$D$KJ,$1il$k!#$R HD$O!"$h$j=>Mh$NCOM}%G!<%?$K6a$$COM}%G!<%?%9%-!< %^!"b&RHDO!">pJsE*<jK!$GCOM}%G!<%?$r=hM}$9 $kCOM}>pJs%5!<%S%9$G$"$k!#COM}%G!<%?%9%-!<%^KO!"



?^ 2: COM}>pJs%7%9%F%`I8=`$N;2>H%b%G%k

4.1 @a$G=R$Yil$?MWAG$,A4$FF~$lil$k!#0lJ}!"COM}>pJs%5!<%S%9KO!"COM}%G!<%?$r;H$C$?MM!9$J=hM}$,A4$F4^$^$l$k!#$3lK$O!"%G!<%?$NJQ99$rH<$o$J$$COM}%G!<%?4IM}$H!"%G!<%?$NJQ99$b>l9g$KhCFOH<$&COM}%G!<%?=hM}$,$"$k!#

$3$3$G=EMW$JNO!"COM}>pJs$N%5!<%S%9$r=EMWHHi($F$$$k3H!"FC$K!"%G!<%?=hM}$K2C$($F!"%G!<%?$N2r@O$r;kLn$KF~$l$F$$$kE@G"$k!#6qBNE*$K$O!"COM}>pJs%7%9%F%`$,I8=`$GDs6!9kY-5!G=H7$F!"=>Mh$N%G!<%?$N:n@.!">C5n!"JQ99!";2>H!"8!:wEy$K2C$($F!"?7$7$$>pJs$rF@$k$?$a$N%G!<%?$N2r@O$r2C$($F$$$k!#3l$O!"join rHkJIN=>Mh%G!<%?%Y!<%9$GMQ$$$ilF$-$?A:n$r1[$($?=hM}$r9M$($F$*$j!" Data Mining Ey$N2r@O$rL\;X7F$$$k!#$=$N>\:Y$O=R$Yil$F$$$J$$$,!"MxMQG-$k>pJs5;=Q$OA4$F<h$j9~sG$$$/HHbK!"?7$?$K3NN)5l$k>pJs5;=Q$b$9$0$K<h$j9~akh&$K9M$(il$F$$$k!#3N3H$O!"COM}>pJs%7%9%F%`<+BN$,>pJs5;=Q$N>e$K@.$jN)$C$F$$$k$H$H$b$K!">pJs5;=QH/E8$N$?$a$NBg$-$J%W%i%C%H%U%)!<%`$r:nCF$$$k$H$$$&3H$,$G$-$k!#

4.4 %W%m%U%!%$%k

ISO GDja$kI8=`$r!"$9$Y$F$NCOM}>pJs%7%9%F%`$GLVMeE*$K<B8=$9kN$OBgJQ$J3HG"$k!#Cf$K$O!"0lIt$N8Bil$?%G!<%?$N$_$r;HMQ9kh&$J%7%9%F%`$b9M$($i$l!"$=$N$h$&$J%7%9%F%`$^G,I8=`$rA4$F%5%]!<%H$9$k$N$O8=<BE*$G$O$J$$!#$3$N$h$&$J>uBV$KBP1~$9$k$?$a!"ISO $G$O OSE $N5;=Q$G$"$k%W%m%U%!%$%k$r<h$jF~$l$F$$$k!#%W%m%U%!%$%k$O!"Dj$a$i$l$?I8=`N&$A0lIt$J,N_$,<B8=$5l?bN$G!"FCDj$N1~MQ$K;H$olk!#%W%m%U%!%$%k$r;H$&$3HG!"I8=`$NDj$a$kHO0O$K$*$5$^$C$F$$$J$,$i!"$h$jFCDj$N1~MQ8~$1$N%7%9%F%`$r:n$k3H$,2DG=$KJk!#

5 %a%?%G!<%?

%a%?%G!<%?HO!"$"$k%G!<%?$NB0@-!J$=$N%G!<%?$N:nil$?F|;~!"@:EY!"@-<AEy!K$r<($9!V%G!<%?$K4X9k%G!<%?!WG"$j!"%G!<%?$NMxMQ2DG=@-$rH=CG$9k?a?CF$O=EMW$JLr3d$r2L$?$9!#=>Mh!"%a%?%G!<%?$KOI,MWJ>pJs$,=g<!%F%-%9%H$N7A$GJ]B8$5lF$-$?!#7+$7!"$3lG$O>pJs$N2aITB-$,@8$8kHHb$K!"8!:wEy$N%3%s%T%e!<%?=hM}KOMxMQ7K$/$$!#

%3%s%T%e!<%?$r;H$C$?$h$j9bEY$J=hM}$r2DG=$K9k$?$a!" ISO GO%a%?%G!<%?@lLg$N:n6HIt2q$r@_$1!"$=$NI8=`2=$KEv$?$C$F$$$k!#%a%?%G!<%?$NI8=`2=$O!"%a%?%G!<%?$NFCD'!"3HD%!"4X78!"$=7F<BAu$N#4$D$NItJ,$KJ,1ilk!#

5.1 %a%?%G!<%?$NFCD'

ISO GO!"07$&%a%?%G!<%?$r#9DKJ,N`$7$F$*$j!"$=$1$>$1$K$D$$$F6qBNE*$KI,MW$J%a%?%G!<%?9`L\$rDjaF$$$k!##9DNJ,N`$O0J2<$NDLjG$"$k!#

F1Dj>pJs %G!<%?KD$$$F$N4pAC>pJs!#%G!<%?$N354Q!"COM}E*HO0OEy$,5-$5lk!#

%G!<%?IJ<A>pJs %G!<%?$NIJ<A$K4X9k0lHLE*$JI>2A!#B0@-$N@:EY$d0LCV$N@:EY!"$^$?2hA|$NIJ<A$JIN5-=R$,F~$k!#

6u4V%G!<%?9=@.>pJs %G!<%?$N6u4V>pJs$NI=8=!#6u4V;2>H>pJs!"6u4V%*%V%8%'%/%H>pJs$r4^$`!#

6u4V%G!<%?;2>H>pJs %G!<%?$N:BI87O$H%3!<%I2=K!!#:BI8%7%9%F%`$NDj5A$,F~$k!#

<BBN!&B0@->pJs %G!<%?$NFbMF$K$D$$$F$N>pJs!#%G!<%?$N>\:Y$J5-=R$d354Q$,F~$k!#

G[I[>pJs %G!<%?$r<hF@$9$k:]$NG[I[<T$N>pJs!#I8=`$NH/Cm%W%m%;%9$d!"MxMQ2DG=;~4|$JI,F~$k!#

%a%?%G!<%?;2>H>pJs %a%?%G!<%?$N>pJs$H@UG$5!4X!#%a%?%G!<%?$NO"Mm@h$,F~$k!#

0zMQ>pJs %G!<%?$KIU2C$5lkY-;2>H>pJs!#

%3%s%?%/%H>pJs %G!<%?$NDs6!<T$X$NO"Mm>pJs!#

8D!9$N%a%?%G!<%?$O!"$=$NL>>N!"Dj5A$K2C$($F0J2<$NB0@-rDja$F$$$k!#

- $=$N%a%?%G!<%?9`L\$,!"I,?\$G$"$k$+!">r7o$D$-$GI,MWG"k+!"$"$k$$$OJ/Fb$h$$$N$+!#
- $=$N%a%?%G!<%?9`L\$,J#?t$"$CFbNI$$$+!"RHD7$+8=$lFO$$$1$J$$$+!#
- $=$N%a%?%G!<%?$N%G!<%?7?!#$3lK$O!"%F%-%9%H!"@0?t!"<B?t!"F|IU$,4^$^lk!#
- $=$N%a%?%G!<%?$N<h$jF@kCMNHO0O!#

3lirDjak3HKh$j!"%a%?%G!<%?$N>pJs$K4p$E$$$?%G!<%?$NC5:w!&8!:w$,2DG=HJ$k!#

5.2 %a%?%G!<%?$N3HD%

%a%?%G!<%?O=$N%G!<%?$K4X9k$"$ifk>pJs$r4^$`$?$a!"Hs>o$KB?<oB?MM$G$"$k!#=>CF!"FCDj$N%a%?%G!<%?$rDjaF7^$&$N$O!"5U$K%a%?%G!<%?$N3hMQHO0O$r8BDj7F7^$&$3HKJk!# ISO GO!"%a%?%G!<%?$r3HD%$9kKEv$?$CFN%,%$%I%i%$%srDjaF*$j!">-Mh$K$*$1$k%a%?%G!<%?$N3HD%$b9M$($F$$$k!#

5.3 %a%?%G!<%?$N4X78

3F%G!<%?$KIU?o$9$k%a%?%G!<%?$O!"$=$NbHHJ$k%G!<%?$N<oN`EyKhjINh$&$J%a%?%G!<%?$r;}$D$+

$,7h$^CF$/$k!#IN%G!<%?KO!"INh&$J%a%?%G!<%?$,B8:_9k$+!"$H$$$C$?4X78$r?^<(7F%f!<%6Ko$+$jd9$/I=<($7FdkH!"$=$N%G!<%?$,Bg$$$K;H$$$d9/Jk!# ISO GO!"$=$l$r HTML Ey$N%O%$%Q!<%F%-%9%H8@8l$r;HCF8+$;$k3H$r;kLn$KF~lF$$$k!#3l$O!"%a%?%G!<%?$N%3%s%T%e!<%?=hM}$r=u$1kbNGOJ$$$,!"3F%a%?%G!<%?$N4X78$r%f!<%6$,GD0.$9$k>e$GMWG$"$k!#

5.4 %a%?%G!<%?$N<BAu

%a%?%G!<%?$O35$7FNL,Hs>o$KB?$/JkNG!"$=$Au$K:]$7FO!"$=$NJ]B8K!N_Ji$:!"3F<o$N8!:w$BP1~!"Ds<(K!$JIr9M$($kI,MW$,$"$k!#$^$?!"$G!<%?NL$,B?$$$?$a!"J,;6$5$;$k3H$b9M$(J/FO$$$1$J$$!# ISO GO%$%s%?!<%M%C%H$H$N4XO"$r8+J,$i!"<B:]$N<BAu$r@)8B$7$J$$HO0O$G!"$3liKD$$$F5,Dj7F$$$k!#

6 $=$NB>$N ISO/TC211 I8=`2=

$3$3GO!">e$K=R$Yil$?ItJ,0J30$NCOM}>pJs$NI8=`2=$N$&$A!"FC$K>pJs5;=Q$H$N4XO"$,Bg$-$$ItJ,KD$$$F=RYk!#

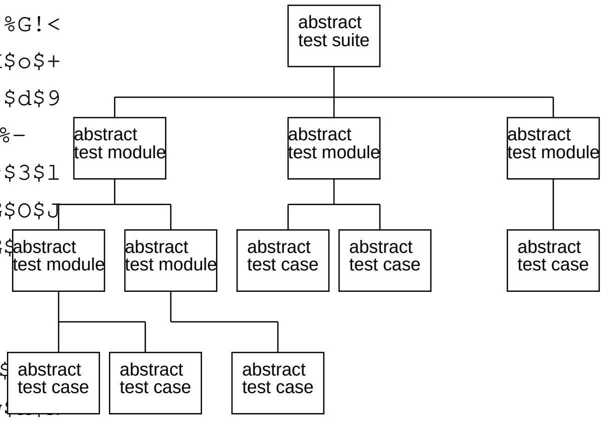
6.1 ;~4V<!85

=>Mh!"6u4V%G!<%?$O!J0^EY$H7PEYJI$N!K#2<!85:BI8!"$"$k$$$O$=$l$K9b$5$r2C$($?#3<!85:BI8$GI=5l!";~4V$K4X$9$k5-=R$O%3%a%s%HH7$F%a%?%G!<%?$K5-=R5lF-$?!#$3lO!"7zJ*Ey$,;~4V<4>e$G$"$^$jJQ2=$7$J$$;~KOBEEv$JJ}K!$G$"$k!#7+$7!"6aG/!" GPS $NH/E8$JIrDL8F!"0\F0$7$J$,$i!"%j%"%k%?%$%`$K!"7+b=$N;~$N>pJs$r<h$j$@$9!"JIHH$$$C$?MW5a$,@8$8$F$-$F$$$k!#3liKBP1~9k$?$a ISO GO!";~4V$rIU?oE*$J%G!<%?HO07o:$KFHN)$7$?<!85$H7F07$&$HHb$K!";~4V$r07$&@lLg$N:n6HIt2q$r@_$1$F;~4V$K4X78$9$k;v>]$r07$(kh$&$K9M$($F$$$k!#

MM!9$J;v>]$N6qBNE*$J;~4VFC@-$H7F$O!"%$%Y%s%H!"Dj>o>uBV!"9TF0$N#3$D$,$"2ilF$$$k!#$3$3$G!"%$%Y%s%H$O=V4VE*$J;v>]!"Dj>o>uBVO"$k4|4V$H4X78$9$k;v>]!"$=$7$F9TF0$Ohj0lHLE*$J;v>]$r<(7F$$$k!#0lHLE*$J9TF0$r5-=R9kNO$^$@$^$@Fq$7$$$?$a!"$3liJ,N`$,M-8z$KF/$/$+I&$+$OL$CN?t$G$"$k$,!";~4V$rFHN)7F07CF$$$k$?$a!";~4V$r9MN8$KF~l?2r@O=hM}$O;kLn$KF~lilF$$$k!#

6.2 35G0%9%-!<%^8@8l$H **Query** 8@8l

>eK"2?h&$JJ#;($J=hM}!&2r@O$r%f!<%6$d1~MQ%W%m%0%i%`$,MF0W$K9T$J$&$3$H$,$G$-$k$h$&$K$9$k$?$a$K$O!"$=$l$i$N=hM}!&2r@O$,MF0W$K5-=R2DG=$G$"$k$H$H$b$K!"=EMW$J=hM}$K$D$$$F$O8@8l%l%Y%k$G%5%]!<%H$9$k$Y$-$G$"$k!#I8=`GO!"%*%V%8%'%/%H;X8~JI:G@hC<$N>pJs5;=Q$r;HC?8@8l$r;H$&Y-$@$HL@3N$K@k8@$7F*$j!"$^$?!"$h$jNI$$8@8l$,3+H/$5l?;~O=lb<h$j9~$s$G$$$/Y-G"$k!"$H7F$$$k!#$^$?!"8@8l$N



?^ 3: E,9g@-$N%F%9%H$r9TJ&$?$a$N%F%9%H3,AX

5-=RG=NOHOJL$K!"J#;($J2r@OEy$b3NN)$5l?bN$O primitive H7$F<B9TG-$k3H$,K>$^$7$$!# ISO GO!"3liNMW5aKEz(k?aN@lLg$N:n6HIt2q!"6u4V;;R$r@_1F$$$k!#3lKh$j!"!V$3lH$=$l$N=E$J$jItJ,$OI3$+!W$J$I=>Mh$OJ#;($J%W%m%0%i%`$r=q$/$3HKhC$F<B8=$7F-$?6u4VE*$JLd$$9go;Ey$b!">-MhE*$K$O!"4JC1$K0lL?NaGG$-$kbN$rL\;X$7$F$$$k!#

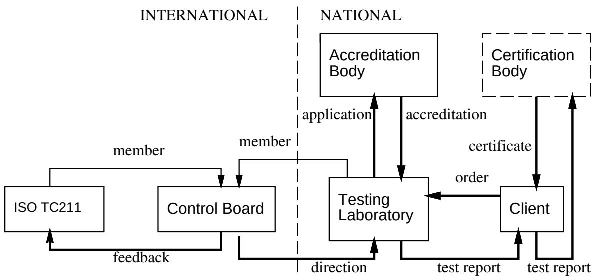
7 ISO/TC211 K*1kF|K\$NLr3d

ISO/TC211 K*$$$F!"F|K\$OE,9g@-$H%F%9%H!"5Z$SIJ<AI>2A<j=gNU$?$D$r<u$1;}CF$$$k!#E,9g@-$H%F%9%H$O!"$"$kCOM}>pJs%7%9%F%`$,M?$($i$l$?;~$K!"$=$l$, ISO I8=`$KE,9g$7$F$$$k$+$I$&$+$N%F%9%H<jB3$-$r5,Dj$9$k!#$3lK$O!"5,Dj$5lF$$$k%G!<%?9`L\$,$-$AsHB8:_9k$+!"$=li$O;XDj$5l?%U%)!<%^%C%H$GG[CV$5lF$$$k$+!"$H$$$C$?$3H,4^$^$lF/$k!#E,9g@-$H%F%9%H$O5!3#E*$K%F%9%HG-kbNrBP>]H7F*$j!"%G!<%?$NCf?H$,@5$7$$$+I&$+$K$D$$$F$O4pK\E*$K2?$b=R$Y$F$$$J$$!#7+$7!"COM}%G!<%?$H$$$&@-<A>e!"Ey9b@~$,8r$oCF$$$J$$$+!"JI5!3#=hM}$,4JC1$G$J$$$bNK$D$$$F$b!"L\;k8!::$H$$$&7A$G8!::$,9TJolk3H$b9MN8$KF~lF$$$k!#

hj6qBNE*$JE,9g@-$H%F%9%H$NFbMF$K$D$$$F$O!";29MJ88%[3] $r;2>H$5l?$$!#$3$3GO!"%F%9%HK*1k3,AX9=B$!J?^ 3!K!"5Z$S%F%9%H$r9T$J$&G'>Z5!4X$NBN@)$N?^!J?^ 4!K$r<(9KHIak!#

0lJ}!"IJ<AI>2A<j=g$O%G!<%?$N<A$,$INh$&$KDxEYG"k+!"$=$l$,<BCO$N>u67rIl@$1H?1G$7$F$$$kN+!"$rI>2A$9$k<jB3$-$r5,Dj$9$k!#$3Ai$OE,9g@-$H%F%9%HHO0[Jj!"hj%G!<%?$NCf?H$N@5$7$5$K6a$$ItJ,$rH=CG$9kbNG$"$k$H$$$&3H$,$G$-$k!#

3Nh&$K!"F|K\$OCOM}>pJs%7%9%F%`$N@5$7$$1?MQ$KI,MWIT2D7g$J$G!<%?$N%U%)!<%^%C%H$N@5$7$5$HCf?H$N@5$7$5$N%F%9%H<jB3$-$r<u$1;}$C$F$$$k!#F|K\$O!"3Nh&$J%F%9%H5;=Q$K$D$$$F$O0lDj$NI>2A$r<u$1F*$j!"CO



?^ 4: E,9g@-$N%F%9%H$r9TJ&5!4X$NBN@)

M}>pJs%7%9%F%`NJ,LnG$b9q:]E*$K9W8%9k3H$rK>$$1$F$$$k!#

8 $=$NB>$NCOM}>pJsI8=`2=$NF0$-

COM}>pJs$NI8=`2=$K$D$$$F$O!"ISO 0J30$K$b$$$/D+$NF0$-$,$"$k!#$3$3$G$O!"$3N&$A<g$K OGIS $H CEN KD$$$F4JC1$K?($1$k!#

8.1 OGIS

OGIS $O Open Geodata Interoperability Specification $NF,J8;z$rHC$?$bNG!"%"%a%j%+$G:n$ilF$$$k COM}%G!<%?$NI8=`$G$"$k[4]!# OGIS $O!"Cf?u$K>pJs5;=Q$H$NO"7H$r9M$($F$*$j!" ISO $NI8=`$H$+$J$j6a$$$bNKJC$F$$$k!#FC$K!"0[5!<o%3%s%T%e!<%?4V$G$N>pJs$NdjHjJIJ,;64D6-GNMxMQKNOrF~lF$*$j!"9b%l%Y%k$N%G!<%?=hM}!&2r@O$b;kLn$KF~$l$F$$$k!#

8.2 CEN

CEN $O%h!<%m%C%Q$G?JailF$$$k%U%i%s%9<gF3$N COM}>pJs$NI8=`2=%W%m%8%'%/%H$G$"$k!# ISO $d OGIS $HHf$Y!"%G!<%?$NI8=`2=KhjNO,Cm$,$lF*$j!"%G!<%?2r@O$d%5!<%S%9JIKO$"$^$j?($lil$F$$$J$$!#$=$N0UL#$G!"@N$N;fCO?^%G!<%?$NI8=`2=$K6a$$$H$$$&3H$,$G$-$k!#7+$7!"%G!<%?$N8_49@-EyKD$$$F$O>pJs5;=Q$r==J,$K0U<1$7F*$j!"$=$NE@$K$D$$$F$O ISO $d OGIS $H6&DL$7$F$$$k!#

8.3 $=$NB>$N4XO"$9$kF0$-

>e5-NU$?$D$NI8=`2=0J30$K$b4XO"$9$kF0$-H7$F0J2<$Nh&JbN,$"$k!#

ISO/TC184/SC4 35G0%9%-!<%^8@8l EXPRESS $r;H$C$?>pJs5;=Q$NI8=`2=!#$3$3GO!"FC$KE,9g@-$H%F%9%HKbNO$rF~$l$F$$$k!#

ISO/TC204 %$%s%F%j%8%'%s%HM"Aw%7%9%F%`$NI8=`2=!#

ISO/IEC JTC 1/SC 21 %^%k%A%a%G%#%"$r07$&%G!<%?%Y!<%98@8l SQL/MM $r;H$C$?!">pJs$N8!:w!&0\F0!&<h$j07$$$K$D$$$F$NI8=`2=!#

ISO/IEC on GII Global Information Infrastructure (GII) $NI8=`2=!#

9 $*$ojK

COM}%G!<%?%Y!<%9!&COM}>pJs=hM}$NIa5Z$K=EMW$JLr3d$r<($9I8=`2=$NF08~$K$D$$$F ISO/TC211 $N3hF0$rCf?4$K2r@b$7$?!#COM}>pJs$NI8=`2=$K$*$$$F$O>pJs5;=Q$H$NO"7H$,Hs>o$K=EMW$G$"$k3H$,G'<1$5lF$*$j!"<B:]!"9bEY$J>pJs5;=Q!&%G!<%?%Y!<%95;=Q$r;kLn$KF~l?I8=`2=$,$J5lh&H7$F$$$k!#3N3HO^$?!"9qEZCOM}1!$dB,NL6H3&Ey$+$i>pJs5;=QHN5;=Q6(NO$,5a$ail$F$$$k3H$+$ibo$+$k!#:#8e!"COM}%G!<%?%Y!<%9$NIa5Z$KHb$J$$!"COM}>pJs=hM}K*1k>pJs5;=Q$N=EMW@-$Q$^$9$^$9Bg$-$/JCF/$k!#FC$K%G!<%?%Y!<%95;=Q$H%G!<%?=hM}!&2r@O5;=Q$OCOM}>pJs=hM}$N=EMW$J4pAC5;=QKJkH;Wol$k!#

<U<-

K\8&5f$N0lIt$O!"J8It>J2J3X8&5fHq=EE@NN0h!V9bEY%G!<%?%Y!<%9!W$N1g=u$r<u1^7?!#$^$?!"K\869F$r=q$/K"$?$CFNEZBfHJCF$$$k8&5f3hF0KD$$$F$O!"F|:"$h$j ISO/TC211 $N9qFb3hF0$G!"FC$KE,9g@-$H%F%9%H$K4X$9$k%W%m%8%'%/%H%A!<%`$G$4=uNOD:$$$F$$$k ISO/TC211 9qFb0Q0w2qJ?0fM:I{0Q0wD9!"0pMUOBM:44;vD9$r;O$a$H$9$k%A!<%`3F0w$K<U0U$rI=7^$9!#

;29MJ88%

[1] F|K\B,NLD4::5;=Q6(2q, ISO/TC211 !JCOM}>pJs$NI8=`2=!K%;%_%J!<;qNA!" 1996 G/ 9 7n 11 F|!#

[2] 9qEZCOM}1!%[!<%`%Z!<%8 http://www.gsi-mc.go.jp/.

[3] F|K\B,NLD4::5;=Q6(2q, "ISO Standard 15046-5, Geographic Information/Geomatics, Conformance and Testing (Draft)," presented at Seoul ISO meeting, 1996.

[4] The OGIS Project Technical Committee, "The Open GIS Guide," *OGIS TC Document 96-001*, Open GIS Consortium, 1996. http://www.ogis.org/.