

CUBEãšã®DTMFãf¬ãf¼ã®è „ å®š

å†...å®¹

æl,è!

å‰ææææ»¶

è»¶

ä½ç”“ã®™ã,ã,³ãf³ãfãf¼ãfãf³ãf^

èj„è„æ³•

èfŒæ™-èªæ~Ž

CUBE ãšã,µãfãf¼ãf^ã®•ã,Œã,< DTMF ãfãf¬ãf¼æ-¹å¼

ã,ãfãf¼ãf^ã®•ã,Œã,ã,¤ãf³ãfãf³ãf‰ DTMF ãfãf¬ãf¼æ-¹å¼

ã,ãfãf¼ãf^ã®•ã,Œã,ã,çã,!ãf^ã,³ãf-ãfãf³ãf‰ DMTF ãfãf¬ãf¼æ-¹å¼

G711ã«ã,^ã,ã,¤ãf³ãfãf³ãf‰ã,³ãf¼ãf‡ã,£ã,³DMFã®ã,µãfãf¼ãf^

H323ãšã,µãfãf¼ãf^ã®•ã,Œã,< DTMFãfãf¬ãf¼æ-¹å¼

H.245 Alphanumeric

H.245 Signal

å‰æå‰æ»~ã®ãf†ãf¬ãf^ã,©ãfãf¼ã,¤ãf™ãf³ãf^i¼^NTEi¼‰oi¼šRFC2833

ã,ã,¹ã,³ç<‐è†^ã® RTP

SIP ã®ã,µãfãf¼ãf^ã®•ã,Œã,< DTMF ãfãf¬ãf¼æ-¹å¼

NTE - RFC2833

Unsolicited NOTIFYi¼^UNIi¼‰

Key Press Markup Languagei¼^KPMLi¼‰

æf...å ±i¼^INFOi¼‰

CUBE ãšã®DTMF ãfãf¬ãf¼ã®è „ å®š

H323 ã«å¬¾ã®™ã,< DTMF ãfãf¬ãf¼ã®è „ å®š

SIP ã«å¬¾ã®™ã,< DTMF ãfãf¬ãf¼ã®è „ å®š

DTMF ãfãf¬ãf¼ã®ãf‡ã,£ã,ãffãfãf‰ãfãfãf—ã®è „ å®š

DTMF ãfãf¬ãf¼ã®æœè „ ¼ã®Šã,^ã®³ãfãf©ãf-ãf«ã,·ãf¥ãf¼ãf†ã,£ãf³ã,°

H323ã®OOB DTMFãfãf¬ãf¼ã®æœè „ ¼

H.245 Alphanumeric æ©Ýèf½ã®ã,çãf‰ãfã,;ã,¤ã,³ãfjãf³ãf^

H.245 Alphanumeric ã®é€æ;jä³¶

H.245 Signal æ©Ýèf½ã®ã,çãf‰ãfã,;ã,¤ã,³ãfjãf³ãf^

H.245 Signal ã®é€æ;jä³¶

H323 ã®ã,¤ãf³ãfãf³ãf‰ DTMF ãfãf¬ãf¼ã®çC°è^

RFC2833æ©Ýèf½ã,ãf³ãf¼ãf^ã,çãf‰ãfã,;ã,¤ã,³ãfjãf³ãf^

SIP ã®OOB DTMF ãfãf¬ãf¼ã®æœè „ ¼

Unsolicited NOTIFYi¼^UNIi¼‰ã®ã,çãf‰ãfã,;ã,¤ã,³ãfjãf³ãf^ã®ä³¶

Unsolicited NOTIFYi¼^UNIi¼‰ã®é€æ;jä³¶

Key Press Markup Languagei¼^KPMLi¼‰ ãf‰ãfã,;ã,¤ã,³ãfjãf³ãf^ã®ä³¶

KPML ã®é€æ;jä³¶

DTMF ã,¤ãf³ã,;ãf¼ãf¬ãf¼ã,ãf³ã,°

CUBEãŒDTMFã®ãf^ãf©ã³ã,¹ã,³ãf¼ãf‡ã,£ãf³ã,°ãf^ã,½ãf¼ã,¹ã,'å;...è!ã®ã®™ã,å`å®^

ã,¤ãf³ãfãf³ãf‰G711ã®RFC2833é-“ã®DTMFã,¤ãf³ã,;ãf¼ãf¬ãf¼ã,ãf³ã,°

ã»-ã®DTMF ã,¤ãf³ã,;ãf¼ãf¬ãf¼ã,ãf³ã,°ã,³ãf—ã,;ãf§ãf³

MTPãf^ã,½ãf¼ã,¹ãŒUCUMã«å;...è!ã®ã®™ã,Œã,çŠ¶æ³

CUCM á♦ řá, µáf♦ áf%4áf^ á♦•á, CECT, MTP áf†áf♦ á,¤á, 1
ã,½áf•áf^ á, l, á, ¢MTP(CiscoIP Voice Media Streaming Application)
ã,½áf•áf^ á, l, á, ¢MTPi%4Cisco IOSáf™áf%4á, r%4%
ãf♦ áf%4áf%oá, ! á, řá, ¢ MTPi%4^PVDM2á€♦ Cisco NM-HDV2 á♦ řá, ^á♦ 3 NM-HD-1V/2V/2VEi%4%
ãf♦ áf%4áf%oá, ! á, řá, ¢ MTPi%4^PVDM3 á,'æ♦ è%4%oá♦—á♦ Ÿ Cisco 2900 á♦ řá, ^á♦ 3 3900
ã, áf»áf%4á, ° áf«áf%4á, ;%4%
ã,½áf•áf^ á, l, á, ¢MTPá♦ ¾á♦ Ÿá♦—áf♦ áf%4áf%oá, ! á, řá, ¢MTPá, 'ä½ç"” á♦™á, [á, +áf%4á, 1](#)
MTP á♦® CUCM áfjáf†á, ¢á, ¢ áfá, ½áf%4á, 1 á, ° áf«áf%4áf—i%4^MRGí%4%oá♦” áfjáf†á, ¢á, ¢
áfá, ½áf%4á, 1 á, ° áf«áf%4áf— áfá, 1 áf%4^MRGLi%4%oá♦®è€fæ...®ä°é ...
SCCP MTP áfjáf†á, »áf%4á,
CUCMá♦” CUBEé—“á♦®DTMFáf^áf~áf%4
CUBE á♦, á♦® CUCM SIP áf^áf©áf³á, —
CUBE á♦, á♦® CUCM H323 áf^áf©áf³á, —
CUBE á,ç./é♦ žá—¾ç§°áfšá, ¢áfáf%4áf%o
å—¾ç§°áfšá, ¢áfáf%4áf%oá♦®ä¾¢
DTMF áf^áf~áf%4á♦®áf♦ á, ¢á, ·á, ..áf%4á, ·áfšáf³
DTMF áf^áf~áf%4áf%4♦é€♦
é♦ žá—¾ç§°áfšá, ¢áfáf%4áf%oá♦®ä¾¢
DTMF áf^áf~áf%4á♦®áf♦ á, ¢á, ·á, ..áf%4á, ·áfšáf³
DTMF áf^áf~áf%4áf%4♦é€♦
ä½ç"” á♦™á, <DTMFáf^áf~áf%4æ—¹å%4♦
H.323á♦®å,, ¢å...^DTMFáf^áf~áf%4æ—¹å%4♦
SIP á♦®å,, ¢å...^DTMF áf^áf~áf%4æ—¹å%4♦
é—€€fæf...å ±

æ!, è! ?

á♦” á♦®áf%oá, áf¥áfjáf³áf^ á♦ řá♦—á€♦ Cisco Unified Border Elementi%4^CUBEi%4%oEnterprise á♦® Dual-Tone Multi-Frequencyi%4^DTMFi%4%oáf^áf~áf%4á♦®è ..å®šáf—áfá, »á, 1á, 'è—aé~žá♦—á♦ | á♦,, á♦¾á♦™á€,
 å%o♦æ♦?♦æ♦?♦;á»¶

è! ? á»¶

æ—¡á♦®é ...ç>®á♦«é—¢á♦™á, <çÝ¥è~á♦Œá♦, á, <á♦” á♦ŒæŽ ..å¥ ..á♦•á,Œá♦¾á♦™á€,

- DTMF áf^áf%4áf³á♦®åÝ°æœ—çš,, á♦çÝ¥è~
- Cisco®
IOSÉÝ¾å£°i%4^áf€á, ¢áf¤áf«áf^á, ¢á♦¤á♦®i%4%oá♦®è ..å®šá♦ řá, ^á♦¾á½ç"” æ—¹æ³•á♦«é—¢á♦™á
- CUBE á♦®è ..å®šá♦ řá, ^á♦¾á½ç"” æ—¹æ³•á♦«é—¢á♦™á, ¢åÝ°æœ—çš,, á♦¤áçÝ¥è~
- SIP á♦ řá, ^á♦³ H323
áf—áfáf^á, ³áf«á♦«á, ^á♦Œá♦ | á½ç"” á♦•á,Œá, ¢á, ·á, °áfŠáf³á, °á♦®åÝ°æœ—çš,, á♦¤áçÝ¥è~
- H323 á,,, SIP á♦¤á♦®áf†á, ® VoIP
áf—áfáf^á, ³áf«á♦®áf†á, °æ—¹æ³•á♦«é—¢á♦™á, ¢åÝ°æœ—çš,, á♦¤áçÝ¥è~

ä½ç”ã®™ã,«ã,³ãƒ³ãƒ®ãƒ¼ãƒ®ãƒ³ãƒ

ã®“ã®ãƒ‰ã,ãƒ¥ãƒ;ãƒ³ãƒ^ã®æf...å±ã®—ã€æ¬;ã®ã,½ãƒ•ãƒ^ã,|ã,§ã,çã®“ãƒ®ãƒ¼ãƒ‰ã,|ã,§ã,

- Cisco IOSã®§å•ä½œã®™ã,«Cisco Unified Border Elementã€,
- Cisco Unified Communications Manager 7.x»¥é™®ã€,

ã®“ã®ãƒ‰ã,ãƒ¥ãƒ;ãƒ³ãƒ^ã®æf...å±ã®—ã€ç‰¹å®šã®ãƒ©ãƒœç°åçƒã®«ã®,ã,«ãƒ‡ãƒ®ã,¤ã,1ã

è;”è;~æ³•

ãƒ‰ã,ãƒ¥ãƒ;ãƒ³ãƒ^è;”è;~ã®è;ç°ã®—ã€ã€žã,·ã,¹ã,³ãƒ†ã,~ãƒ<ã,«ãƒ«ãƒ†ã,£ãffãf—ã,¹ã®è;”è;~æ³•ã€ã,‘ã,ç...§ã—ã®|ã®ã®ã®ã®ã®„ã€,

èfŒæ™-èª¬æ~Ž

ã®“ã®ãƒ‰ã,ãƒ¥ãƒ;ãƒ³ãƒ^ã®§ã®—ã€CUBEã®§ã,µãƒ®ãƒ¼ãƒ^ã®•ã,Œã,«ã®•ã®¾ã®—ã®¾ã®„ã®Vo

CUBE ã®§ã,µãƒ®ãƒ¼ãƒ^ã®•ã,Œã,« DTMF ãƒªãƒ¬ãƒ¼æ-¹å¼

CUBEã®—ã€H.323ã®Šã,^ã®³Session Initiation

Protocol(SIP)ã,·ã,ºãfSãfãf³ã,ºãf—ãfãf^ã,³ãf«ç”ã®ã,¤ãf³ãf®ãf³ãf‰ã®Šã,^ã®³ã,çã,|ãf^ã,ºãf-ãf®ãf³

ã,µãf®ãf¼ãf^ã®•ã,Œã,«ã,¤ãf³ãf®ãf³ãf‰ DTMF ãƒªãƒ¬ãƒ¼æ-¹å¼

- G711ã®«ã,^ã,«ã,¤ãf³ãf®ãf³ãf‰ã,ºãf¼ãf†ã,£ã,ºDTMF
- RFC2833

ã,µãf®ãf¼ãf^ã®•ã,Œã,«ã,çã,|ãf^ã,ºãf-ãf®ãf³ãf‰ DMTF
ãƒªãƒ¬ãƒ¼æ-¹å¼

- H.245 Alphanumeric
- H.245 Signal
- SIP Unsolicited NOTIFY
- SIP KPML
- SIP INFO

G711ã®«ã,^ã,«ã,¤ãf³ãf®ãf³ãf‰ã,ºãf¼ãf†ã,£ã,ºDTMFã®ã,µã

é;”å£°ã,¤ãf³ãf®ãf³ãf‰ã,ºãf¼ãf†ã,£ã,ºã®¾ã®Ýã®—G711

DTMFã®—ã€é;”å£°ã,ºãf¼ãf†ã,£ã,ºã,¹ãf^ãfºãf¼ãf å,§ã®§ã®®å®—è;”ãf^ãf¼ãf³ã®è;»çé€ã,‘æŒ
IOSã®—ã€ã,ºæ-¹ã®ç”ã®ã,‰æ»-æ-¹ã®ç”ã®«å°é”ã®™ã,«ãf^ãf¼ãf³ã®ã,ºãf¼ãf†ã,£ã,ºãf^ãf¼ãf³ã®§ã®—ã®æ-¹ã®ç”ã®é;”ã®è;”ã®—ã®Ýã,§ã°æ,ºã®—ã®Ýã,§ã®™ã,«ã,ºã

ã,¤ãf³ãf®ãf³ãf‰ã,ºãf¼ãf†ã,£ã,º/G711 DTMF ã®—ã€ã®ã®©ã®® VoIP ã,·ã,ºãfSãfãf³ã,º

ãf—ãfãf^ã,³ãf«ã♦§ã,,ã,µãf♦ãf¼ãf^ã♦•ã,Œã€♦å¿...è|♦ã♦”ã♦™ã,<ã♦®ã♦”ã,“ãf³ãf%
ãf,,ãf¼ã,“ãf³ãf%
ã,³ãf¼ãf«ã♦»é♦©ç””ã♦™ã,
ã,³ãf¼ãf‡ãffã,“ã♦®ã♦”ã♦§ã♦™ã€,ä½žãf“ãffãf^ãf—ãf¼ãf^ï½^LBRï½%oã,³ãf¼ãf‡ãffã,“ã♦®
G711
ã♦,ã♦®ãf^ãf©ãf³ã,¹ã,³ãf¼ãf‡ã,£ãf³ã,°å‡|ç♦†ã♦”ã♦™ã♦”ã♦|ã€♦ãf^ãf¼ãf³ã,’æ°ã,♦ã,«å♦”èf½æ

æ³”i½sã♦”ã♦®DTMFãf^ãf—ãf¼æ-¹å½♦ã♦»ã♦§ã♦,ã♦”ã♦|è°—æ~žã♦™ã,
Telephony
Event(NTE/RFC2833)ã♦”å’½ã♦°ã,Œã,
RTPã,¹ãf^ãf^ãf¼ãf åt...ã♦§ã♦®DTMFã♦®è»çé€♦

H323ã♦§ã,µãf♦ãf¼ãf^ã♦•ã,Œã, DTMFãf^ãf—ãf¼æ-¹å½♦

H.245 Alphanumeric

DTMFãf‡ã,£ã,„ãffãf^ã♦”éÝ³å£°ã,¹ãf^ãf^ãf¼ãf ã♦»ã,%oå°†é»çã♦•ã,Œã€♦RTPãf♦ãfEãf♦ãf«ã,’ã»
H.245 ãf|ãf¼ã,¶å...¥åŠ»é€šçÝ¥ãfjaffã,»ãf¼ã,ã♦§è»çé€♦ã♦•ã,Œã♦¾ã♦™ã€,H.245
ã,·ã,°ãfSãf^ãf³ã,°
ã♦ãffãf♦ãf«ã♦”æjé ¼æ€§ã♦®é»~ã♦,ãf♦ãfEãf♦ãf«ã♦§ã♦,ã,§ã€♦DTMF
ãf^ãf¼ãf³ã,/è»çé€♦ã♦™ã,
ãf'ã,±ãffãf^ã♦®é...♦æjã♦Œæj♦è”½ã♦•ã,Œã♦¾ã♦™ã€,H.323
ãf♦ãf¼ã,ãfSãf^3 2 æ°—æ<ã♦§ã♦,ã,ã♦™ã♦”ã♦|ã♦®ã,·ã,¹ãftãf ã♦”ã€♦dtmf-relay h245-
alphanumeric
ã,³ãfžãf³ãf%oã,’ã,µãf♦ãf¼ãf^ã♦™ã,
å¿...è|♦ã♦Œã♦,ã,§ã♦¾ã♦™ã€,ã♦”ã—ã€♦dtmf-
relay h245-signal ã,³ãfžãf³ãf%oã♦®ã,µãf♦ãf¼ãf^ã♦”ã,·ãf—ã,·ãfSãf^ã♦§ã♦™ã€,

H.245 Signal

H.245

Alphanumericã♦»é;ä½½ã♦—ã♦”YOOBæ-¹å½♦ã♦§ã♦”ã€♦ãf^ãf¼ãf³ç¶™ç¶šæ™,é—æf...å ±ã,’æ,¡ã♦

å♦”å°å%oã♦æ»~ã♦”ãf^ãf—ãf^ãf,©ãf^ãf¼

ã,¤ãf™ãf³ãf^ï½^NTEï½%oï½§RFC2833

ã♦”ã♦®æ-¹å½♦ã♦§ã♦”ã€♦RFC 2833 ã♦®ã,»ã,·ãfSãf^3 3 ã♦»å¾”ã♦Eã♦|ã€♦DTMF
ãf^ãf¼ãf³ã,’ã”å€
ã,ã♦® RTP ãf'ã,±ãffãf^ã♦§è»çé€♦ã♦—ã♦¾ã♦™ã€,RFC 2833
ã♦§ã♦”ã€♦NTE RTP ãf'ã,±ãffãf^ã♦®å½çå½”ã,‘ã€♦”2 ã♦¤ã♦®ãf”ã,c
ã,“ãf³ãf%oãf♦ã,¤ãf³ãf^é—”ã♦® DTMF ãf‡ã,£ã,„ãffãf^ã€♦ãf•ãffã,“
ãf•ãf©ãffã,·ãf¥ã€♦ã♦§ã,^ã♦”ã—”ã♦®ãftãf—ãf•ã,©ãf^ãf¼
ã,¤ãf™ãf³ãf^ã♦®è»çé€♦ã♦»“æ½ç””ã♦™ã,·ã,“ã♦”ãf®ãf^ãf—”ã♦|ã♦,“ã♦¾ã♦™ã€,NTE
æ-¹å½♦ã,’ã”ç””ã♦™ã,·ã,“ã♦”ãf^ãf%oãf♦ã,¤ãf³ãf^ã♦”ã€♦DTMF ãf^ãf—ãf¼
ãf^ãf©ãf^ãf¼ã,’ã♦®ã,³ãf¼ãf^ã♦”ã♦”ã♦®ãf♦ã,‘ã,·ã,“ãf¼ã,·ãfSãf^3,‘å®”èjŒã♦—ã€♦RTP
NTE ãf'ã,±ãffãf^ã♦”ã,µãf♦ãf¼ãf^ã♦•ã,Œã,
NTE ãf‡ã,£ã,ãffãf^ãf
ã,¤ãf™ãf³ãf^ã♦®ãfSã,¤ãf^ãf¼ãf%o
ã,çã,¤ãf—å€¤ã,’æ±°å®”ã—ã♦¾ã♦™ã€,ã♦”ã♦®çmu♦æžœã€♦DTMFãf^ãf¼ãf³ã♦”ã€♦æ»—ã♦®

RFC2833/NTE DTMF æ„äf—äf¹/₄äf—ä€♦GW ä,·ä,°äfSäf³äf³ä,°
 äf—äfäf³ä,³äf«ä♦é-Cä,ä♦ä?♦ä€♦äf#ä,£ä,äffäf^ä♦Œ RTP ä,äf¹/₄äf#ä,£ä,ä
 äf^äf@äf•ä,£äffä,¬åt...ä♦®ä♦¿ä♦§è»é€♦ä♦•ä,Œä,<ä♦®ä♦§ä€♦ä,¤äf³äf♦äf³äf%oæ-¹å¹/₄ä♦ä♦
 RFC2833/NTEæ-¹å¹/₄ä♦ä♦—ä€♦éÝ³ä£°ä,¤äf³äf♦äf³äf%oä,äf¹/₄äf#ä,£ä,ä♦¾ä♦Ýä♦—G711
 RTPä,¹äfäf³äf¹/₄äfä,“æ..å♦Œä♦—ä♦ä?♦,ä,^ä♦†ä♦«æ³..æ,,♦ä♦—ä♦|ä♦ä?♦ä♦ä♦|ä♦.ä♦,ä€,ä¾4
 G711Ulaw/Alaw ä,³äf¹/₄äf#äffä,¬ä,ä½¿ç”“ä♦—ä♦|ä,“äf³äf%oäf,äf¹/₄
 ä,“äf³äf%oä♦§ä♦—ä♦‘æ,jä♦•ä,Œä,<ä€♦å♦~ä♦ä?♦ä,f—äf—äf¹/₄äf³ä,äf¹/₄äf#ä,£ä,ä
 äf^äf¹/₄äf³ä♦§ä♦,ä,<ä♦“ä♦“ä,“æ,,♦ä?♦ä?♦—ä♦¾ä♦™ä€,

H323ä,’ä½ç”ä?—ä?YNTEä?«é-çä?™ä,<ä?ä?ä?®ä»—ä?®ä°<ä®Yï¼š

- H.323 \rightarrow V4 \rightarrow RFC2833 \rightarrow Cisco
IOS \rightarrow TCS \rightarrow 2833 \rightarrow CEF \rightarrow NTE
 - CUCM \rightarrow H.323 ICT \rightarrow E \rightarrow | \rightarrow NTE \rightarrow Cisco

ñ,·ñ,¹ñ,³ç<¬è‡ªñ?® RTP

NTE - RFC2833

ã,¤ãf³ãf♦ãf³ãf%oRFC2833
NTEãfšã,¤ãfãf¹4ãf%oã,¿ã,¤ãf—ã♦”å±žæ€§ã♦”ã€♦SIPãf;ãffã,»ãf¹4ã,ã♦®æœ¬æ-‡ã,»ã,¬ã,·ãf§ãf³å†
Description
Protocol(SDP)ã,’ä½¿ç””ã♦™ã,<ã,³ãf¹4ãf«ã,»ãffãf^ã,¢ãffãf—æ™,ã♦«ã€♦2ã♦¤ã♦®ã,“ãf³ãf%oé—”ã♦§

Unsolicited NOTIFY's UNNED

„Ãœ“ãœ®æ-¹å¼ãœ§ãœ-“ã€œäƒjäffä,»äf¼ã,æœ-æ-#ãœ®äƒšä,¤äfƒäf¼äf%ooå†...ãœ®SIP
NOTIFYäƒjäffä,»äf¼ã,ãœ“ãœ—ãœ|äf#ä,£ä,äffäf”ãœŒOOBäœ§é€œä¿jäœ•ä,Œäœ³/4äœ™ä€,

Key Press Markup Language (KPML)

[RFC4730](#) ã«åÝ°ã¢¥ã¢„ã¢|ã¢äf#ã, Fã, äffäf^ã¢—ã¢Subscribe/NOTIFY
äfjäffä, »äf¼ã, åt...ã¢® XML ã,’ä½ç”“ã¢—ã¢Ý OOB
ã¢Ñè»çé€ã¢ä•ã, CÆã¢¾ã¢™ã¢€, ä, »ã¢«CUCMã¢¾ã¢Ýã¢—CMEã¢«ç™»éŒ²ã¢•ã, CÆã¢ÝSIPã, “ãj³æ

æf...å ±i^1/4^INFOi^1/4%o

ãf‡ã,£ã,,ãffãf^ã—ã€ç«—æœ«é—“ã§ã® OOB SIP INFO
ãfjãffã,»ãf¼ã,ã—ã|ãfãf—ãf¼ã•ã,Cæã¾ã™ã€,ã“ã®æ—¹ã¼ã§ã—è”å®šã—ã,
ã«ã,^ã,Sè‡å•ç„ã«å—ã’å...¥ã,Cæã,%oã,Cæã|é—çé€Fä»~ã‘ã,%oã,Cæã¾ã™ã€,

æ³·SIP INFOã—Unified CMã§ã—ã,µãfãf¼ãf^ã•ã,Cæã|ã,,ã¾ã>ã,“ã€,

æ³·ãšUNã “NTEã®ä,jæ—¹ã®æ—¹ã¼ã§ãCæfã,‘ã,·ã,“ãf¼ãf^ã•ã,Cæã,<å‘å—ã€C
IOSã—ãf€äf—ãf«ãf^ãf³ã,’å›é—ã—ã™ã,ã—ãYã,ã—ã«NTEã,^ã,Šã,,UNã,’å,ã—ã«é,æŠž
NTEäfã,±ãffãf^ã—æŠ’å^¶ã•ã,Cæã¾ã™ã€,ã¾ã¾ãYã€CUCM ã®å‘å—ã€UN
ã—ä»—ã®ä,^ãf—ã,·ãf§ãf³ãCé,æŠžã§ã—ã“ã—ã|ã,,ã,·ã—ã—ã€Cisco Call
Manageri¼CCMi¼%oã—UN ã,^ã,Šã,, KPMI
ã,’å,“ã—ã|é,æŠžã—ã¾ã™ã€,

CUBE ä,Šã§ã® DTMF åfåf—ãf¼ã®è”å®š

ãf‡ãf•ã,©ãf«ãf^ã§ã—ã€DTMFäfåf—ãf¼ã—H323äf€ã,¤ãf¤ãf«ãf”ã,Cæ—“SIPäf€ã,¤ãf¤ãf«ãf”ã,Cæ
INFOã,’é™¤ã—ãi¼%oã§ç„jåŠ¹ã—ã“ã—ã|ã,,ã¾ã¾ã™ã€,å,“ã,³ãf¼ãf«ãf—ãffã,“ã®ç€ä,

H323 å“ã—ã¾ã™ã, DTMF åfåf—ãf¼ã®è”å®š

<#root>

```
Router(config)#dial-peer voice 1 voip
Router(config-dial-peer)#

```

```
dtmf-relay
?
cisco-rtp      Cisco Proprietary RTP
h245-alphanumeric  DTMF Relay via H245 Alphanumeric IE
h245-signal    DTMF Relay via H245 Signal IE
rtp-nte        RTP Named Telephone Event RFC 2833
```

å—ä‡jå—ç“æœ«ã®è|ä»¶ã“å—æœä—ã|ã€äf€ã,¤ãf¤ãf«ãf”ã,Cæ—“ã“è¤‡æ•°ã®æ

<#root>

```
Router(config-dial-peer)#

```

```
dtmf-relay rtp-nte
?
cisco-rtp      Cisco Proprietary RTP
digit-drop     Digits to be passed out-of-band and in-band digits dropped
h245-alphanumeric  DTMF Relay via H245 Alphanumeric IE
h245-signal    DTMF Relay via H245 Signal IE
```

SIP à«å™ã, < DTMF àƒªãƒ¬ãƒ¼ã®è” å®š

<#root>

```
Router(config)#dial-peer voice 1 voip
Router(config-dial-peer)#
dtmf-relay
?
cisco-rtp      Cisco Proprietary RTP
h245-alphanumeric DTMF Relay via H245 Alphanumeric IE
h245-signal    DTMF Relay via H245 Signal IE

rtp-nte        RTP Named Telephone Event RFC 2833
sip-kpml       DTMF Relay via KPML over SIP SUBSCRIBE/NOTIFY
sip-NOTIFY     DTMF Relay via SIP NOTIFY messages
```

å♦—ä¿jå♦’ç«—æœ«ã®è!♦ä»¶ã♦«å¿œã♦~ã♦!ã€♦ãf€ã,¤ãf¤ãf«ãf'ã,çã♦"ã♦"ã♦«è¤‡æ•°ã♦®

<#root>

```
Router(config-dial-peer)#
dtmf-relay rtp-nte
?
cisco-rtp      Cisco Proprietary RTP
digit-drop     Digits to be passed out-of-band and in-band digits dropped
h245-alphanumeric DTMF Relay via H245 Alphanumeric IE
h245-signal    DTMF Relay via H245 Signal IE

sip-kpml       DTMF Relay via KPML over SIP SUBSCRIBE/NOTIFY
sip-NOTIFY     DTMF Relay via SIP NOTIFY messages
```

æ³·:SIP dtmf-

relay, ªf—ä, ·äf§äf³ä, ’ä½ç”“å♦—èf½ã♦«ã®™ã, <ã♦—ã€♦ãf€ã, ¤ãf¤ãf«ãf'ã, çã♦®ä, <ã♦ protocol sip, ³äfžäf³äf‰oä, ’è½åŠ ã♦—ä♦¾ã♦™ã€,

DTMF

ãƒªãƒ¬ãƒ¼ã®ãƒ‡ã, ãƒƒãƒ^ãƒ‰oãƒãffãƒ—ã♦®è” å®š

å♦Œã♦~ DTMF

ãƒ‡ã, ãƒã, ãƒƒãƒ^ã, 'ã€♦ã, ¤ãf³äf♦ãƒ³ãƒ‰oæ-¹å½ã♦~ã, çã, |ãf^ã, ªf-ãf♦ãf³ãƒ‰oæ-¹å½ã♦~ã, 'ã»<ã♦—ã♦ RTP-
NTEï¼‰oã♦<ã, %oã, çã, |ãf^ã, ªf-ãf♦ãf³ãƒ‰oæ-¹å½ã♦~ã, ¤ãf³ã, ;ãf½ãf~ãf½ã, ãf³ã, °ã♦™ã, <ã, ³äf½ãf«ã
relay rtp-nte digit-drop
ã, ³äfžäf³äf‰oã, ’ç♦€ä¿jãf€ã, ¤ãf¤ãf«ãf'ã, çã, Šã♦§ã€♦ã♦Šã, ^ã♦³ç>®çš, ã♦”ã♦™ã, <ã, çã, |ãf^ã, ªf-ãf♦ãf³ãƒ‰oæ-¹å½ã♦~ã, 'ã»<ã♦—ã♦

OOB

ã? „ ã,¤ãf³ãf♦ãf³ãf‰oã ¸é€♦ä¿jã♦•ã,Œã€♦å♦—ä¿jå♦’ç«—æœ«ã♦§ã♦—é‡♦è¤‡ãf‡ã,£ã,ãffãf^ã♦ç♦€ä¿jãf¬ãffã,ºã♦§digit-dropã,ºãf—ã,·ãf§ãf³ã♦Œè” ¸®šã♦•ã,Œã♦|ã♦„ã,ºå♦^ã€♦CUBEã♦—NTEãfã,±ãffãf^ã,’æŠ'å^¶ã♦ã?“ã?®å,³ã?«ç¤ºã?™ã,^ã?|ã?♦«ã€♦ãf‡ã,£ã,ãffãf^ãf‰oãfãffãf—ã,ºãf—ã,·ãf§ãf³ã?—ã€♦ã?“ã,Œã,‰oã?® DTMF
ãf?ãf¬ãf¼æ-¹å¼ã?®é—“ã?§ã?®ã,¤ãf³ã,¿ãf¼ãf¬ãf¼ã,ãf³ã,ºæ™,ã?«ã?®ã?¿ä½ç”“ã?§ã?♦ã?

| | Inbound-leg | Outbound-leg |
|------|-------------------|---------------------------------|
| H323 | rtp-nte (RFC2833) | h245-alphanumeric , h245-signal |
| SIP | rtp-nte (RFC2833) | sip-notify |

ã?Ýã?“ã?^ã?ºã€?RFC2833ã,’ä»<ã?—ã?|ãf‡ã,£ã,ãffãf^ã,’é€?ä¿jã?™ã,[SIP](#)ãf¬ãffã,ºã?®ç?€ä relay rtp-nte digit-dropã,³ãfžãf³ãf‰oã,’è” ¸®šã?—ã?|ã?„ã,‰oã€?ç?™oä¿jH.323å?—ã?§dtmf-relay h245-alphanumericã?¾ã?Ýã?—dtmlf-relay h245-signalã?®ã?„ã?šã,Œã?„ã,‘è” ¸®šã?—ã?¾ã?™ã€,ã?“ã,Œã?«ã,^ã,§ã€?CUBEã?§NTEãfã,±ãffã

è©³ç?°ã?«ã?¤ã?„ã?|ã?—ã€?ã€?[DTMF](#) ãf?ãf¬ãf¼ã?®ãf‡ã,£ã,ãffãf^ãf‰oãfãffãf—ã€?ã,’å?ç...§ã?—ã?|ã?„ã?ã?„ã?•ã?„ã€,

DTMF

ãf?ãf¬ãf¼ã?®æ¤œè”¹/₄ã?Šã,^ã?³ãf^ãf©ãf¬ãf«ã,·ãf¥ãf¼ãf‡ã

H323ã?®OOB DTMFãf?ãf¬ãf¼ã?®æ¤œè”¹/₄

H.245 Alphanumeric æ©Ýèf¹/₂ã?®ã,¢ãf‰oãf?ã,¿ã,¤ã,ºãf?ãf³ãf^

ã,·ãf³ãf‰oãf?ã,¤ãf³ãf^ã♦Œ H.245 Alphanumeric
æ©Ýèf¹/₂ã,’ã,¢ãf‰oãf?ã,¿ã,¤ã,ºã?—ã?|ã?„ã,„ã?„ã?©ã?|ã?„ã,‘æ¤œæÝ»ã?™ã,[ã?«ã?—ã€?deb](#)
h245 asn1 ã,’ä½ç”“ã?—ã?|ã€?H.245 Terminal Capability
Seti¹/₄^TCS¹/₄‰oãf?ãffã,»ãf¼ã,å†...ã?„ã,‰oã?“ã?®è;Œã,’è|[ã?¤ã?‘ã?¾ã?™ã€,](#)

capability receiveUserInputCapability : basicString : NULL

H.245 Alphanumeric ã?®é€?ä¿jä¾<

æ¬;ã?®ä¾ã?§ã?—ã€?H245 Alphanumeric æ-¹å¼ã?ã,’ä½ç”“ã?™ã,[ãf‡ã,£ã,ãffãf^](#) 1
ã,’ã€?debug h245 asn1
ã,’ä½çã?£ã?|é€?ä¿jã?™ã,[ã,“ãf³ãf‰oãf?ã,¤ãf³ãf^ã,’ç¤ºã?—ã?|ã?„ã?¾ã?™ã€,](#)

<#root>

```

000510: Sep 28 19:02:02.716: H245 MSC OUTGOING PDU ::=
    value MultimediaSystemControlMessage ::= indication : userInput :
alphanumeric
:
"1â€œ

```

H.245 Signal æ©Ÿèf½ã♦®ã,çãf‰oãf♦ã,¿ã,¤ã,ºãfjãf³ãf^

ã, "ãf³ãf‰oãf♦ã,¤ãf³ãf^ã♦ŒH.245æ¡jå♦·æ©Ÿèf½ã,'ã,çãf‰oãf♦ã,¿ã,¤ã,ºãf—ã♦|ã♦,,ã,ã♦[æ](#)©ã♦
h245 asn1ã,'ã½ç"''ã♦™ã,<H.245 Terminal Capability
Set(TCS)ãfjãffã,»ãf¼ã,å†...ã♦§ã♦"ã♦®è;Œã,'æŽçã♦—ã♦¾ã♦™ã€,

```
capability receiveUserInputCapability : dtmf : NULL
```

H.245 Signal ã♦®é€♦ä¿jä¾<

ã♦"ã,Œã♦—ã€♦H245 Signal æ-¹ã¼ã,'ã½ç"''ã♦—ã♦|ã€♦100 msec
ã♦®æœŸé—"ã♦§ãf‡ã,£ã,ãffãf^ 1
ã,'é€♦ä¿jã♦™ã,<ã, "ãf³ãf‰oãf♦ã,¤ãf³ãf^ã♦®ä¾<ã♦§ã♦™ã€,2
ã♦¤ã♦®ãfjãffã,»ãf¼ã,ã♦Œã♦,ã,§ã€♦æœ€å^♦ã♦®ãfjãffã,»ãf¼ã,ã♦—æœŸé—"ã♦Œ 4s
ã♦§ãf€ã,¤ãf¤ãf«ã♦•ã,Œã,ãff‡ã,£ã,ãffãf^ã,'ç¤ºã♦—ã♦|ã♦,,ã♦¾ã♦™ã€,ã♦Ýã♦ã♦—ã♦—ã♦2
ç•ãç>®ã♦®ã,·ã,ºãf§ãf«ï¼^signalUpdateï¼‰oã♦—ã€♦ãf‡ã,£ã,ãffãf^ã♦®æœŸé—"ã♦®å€¤ã,'
100msec ã♦«æ›'æ-°ã♦—ã♦¾ã♦™ã€,

<#root>

```

000555: Sep 28 19:12:05.364: H245 MSC OUTGOING PDU ::=
    value MultimediaSystemControlMessage ::= indication : userInput :
signal
:
{
    signalType "1"
    duration 4000
}
000558: Sep 28 19:12:05.368: H245 MSC OUTGOING PDU ::=
    value MultimediaSystemControlMessage ::= indication : userInput :
signalUpdate
:
{
duration 100

```

```

rtp
{
    logicalChannelNumber 2
}

```

H323 æ®ã,¤ãf³ãf♦ãf³ãf‰ DTMF ãfªãf¬ãf¼ã♦®ç¢ºèª?

H.323

V5ã,’æŒ♦ã♦¤ã,“ãf³ãf‰ãf♦ã,¤ãf³ãf^ã♦—ã€♦TerminalCapabilitySet(TCS)ãf;ãffã,»ãf¼ã,å†...ã♦®æ

RFC2833æ©Ýèf½ã,µf♦ãf¼ãf^ã,¢ãf‰ãf♦ã,¿ã,¤ã,ºãf;ãf³ãf^

ã,“ãf³ãf‰ãf♦ã,¤ãf³ãf^ã♦ŒRFC2833æ©Ýèf½ã,’ã,¢ãf‰ãf♦ã,¿ã,¤ã,ºãf;ãf³ãf^
h245 asn1ã,’ä½¿ç”“ã♦™ã,<H.245

TCSãf;ãffã,»ãf¼ã,å†...ã♦®æñé€ ã,’æžçã♦—ã♦¾ã♦™i¼^ã♦“ã♦®ä¾ã♦ñã♦—ã€♦ãfšã,¤ã

<#root>

```

capabilityTableEntryNumber 34
    capability receiveRTPAudioTelephonyEventCapability :
    {

```

dynamicRTPPayloadType 101

 audioTelephoneEvent

 "0-16"

}

SIP æ® OOB DTMF ãfªãf¬ãf¼ã♦®æ¤œèº¼

Unsolicited NOTIFYi¼^UNi¼‰ã♦®ã,¢ãf‰ãf♦ã,¿ã,¤ã,ºãf;ãf³ãf^ã♦®ä¾<

ã,“ãf³ãf‰ãf♦ã,¤ãf³ãf^ã♦Œ Unsolicited

NOTIFYi¼^UNi¼‰æ©Ýèf½ã,’ã,¢ãf‰ãf♦ã,¿ã,¤ã,ºãf;ãf³ãf^ã♦—ã♦|ã,¤ã,ºãf;ãf³ãf^ã♦—ã♦|ã,¤ã,ºãf;ãf³ãf^ã♦—ã♦|ã,¤ã,ºãf;ãf³ãf^ã♦“ã♦®è;Œã,’INVITE
ccsip messages ã,’ä½¿ç”“ã♦—ã♦|ã,¤ã,ºãf;ãf³ãf^ã♦“ã♦®è;Œã,’INVITE
ãf;ãffã,»ãf¼ã,ã♦®å†...éƒ“ã♦¾ã♦Ýã♦—INVITE

ã♦,ã♦®å¿œç”ãf;ãffã,»ãf¼ã,ã♦®å†...éƒ“i¼^ã♦,ã,¤ã,ºãf;ãf³ãf^ã♦®ä,¡æ-¹i¼‰ã♦<ã,‰øè|<ã,¤ã,ºãf;ãf³ãf^ã♦—ã♦|ã,¤ã,ºãf;ãf³ãf^ã♦“ã♦®è;Œã,’INVITE

<#root>

INVITE sip:9999@192.168.106.66:5060 SIP/2.0

Call-Info: <sip:192.168.106.50:5060>;method=

NOTIFY ;Event=telephone-event;Duration=2000

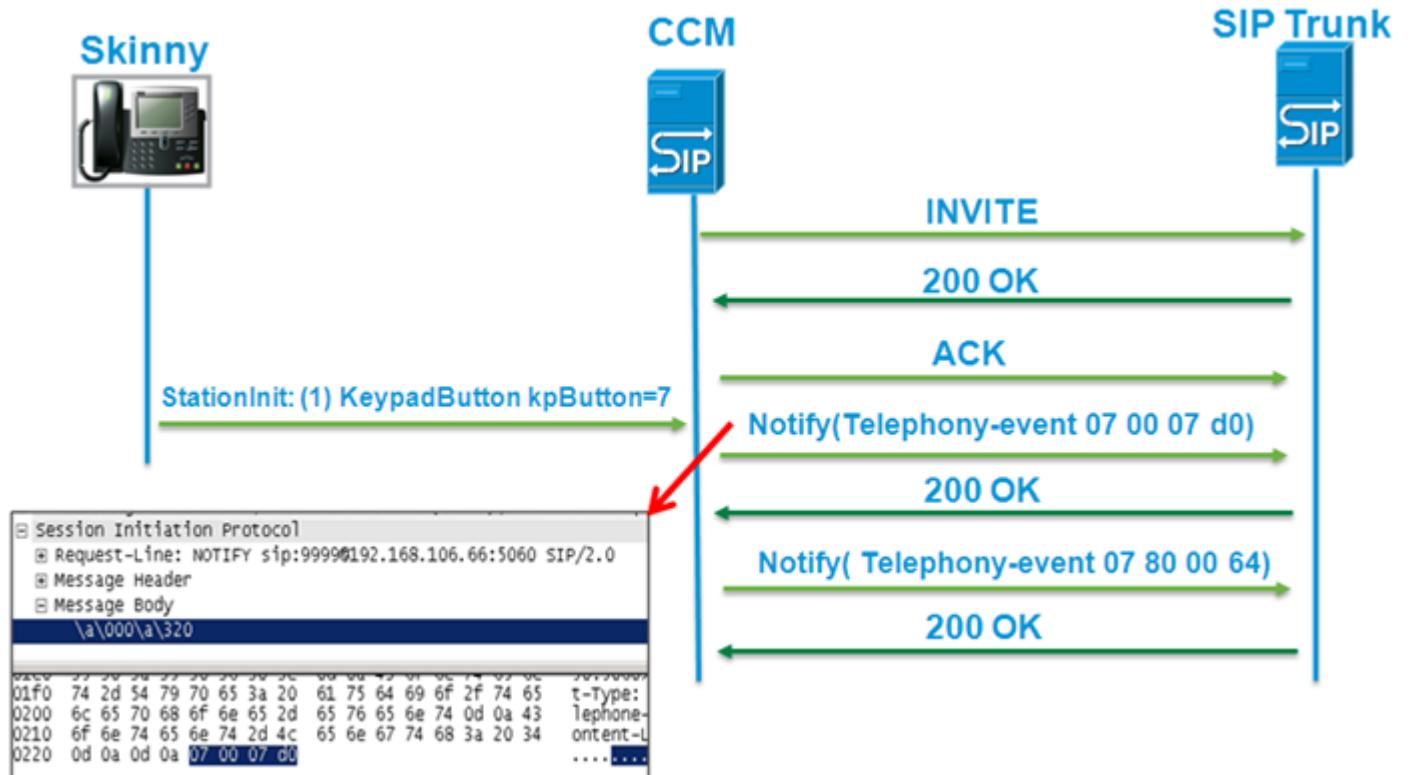
â€œ

Unsolicited NOTIFY via UNi interface

UNi interface (Skinny) → CCM → SIP Trunk

CCSIP messages, e.g., NOTIFY, INVITE, etc.

CCSIP all, e.g., NOTIFY, INVITE, etc.



debug ccsip all

CCSIP messages, e.g., NOTIFY, INVITE, etc.

<#root>

```

001738: Oct  9 15:37:24.577: // -1/xxxxxxxxxxxx/SIP/Msg/sipDisplayBinaryData&colon;
  Sending: Binary Message Body
001739: Oct  9 15:37:24.577: Content-Type: audio/telephone-event

```

07

00 07 D0

```

001756: Oct  9 15:37:24.577: // -1/xxxxxxxxxxxx/SIP/Msg/ccsipDisplayMsg:
  Sent:
  NOTIFY sip:9999@192.168.106.66:5060 SIP/2.0
  Via: SIP/2.0/UDP 192.168.106.50:5060;branch=z9hG4bK10E8E5C
  From: <sip:2010@192.168.105.189>;tag=557BFE8-9EE
  To: <sip:9999@192.168.106.66>;tag=cuecebad539
  Call-ID: 87C4CAE-115E11E2-8184AAE4-EF882E8F@192.168.253.1
  CSeq: 106 NOTIFY
  Event: telephone-event

```

Subscription-State: active
 Contact: <sip:192.168.106.50:5060>
 Content-Type: audio/telephone-event
 Content-Length: 4

001763: Oct 9 15:37:24.593: //0/000000000000/SIP/Msg/ccsipDisplayMsg:
 Received:
 SIP/2.0 200 Ok
 Via: SIP/2.0/UDP 192.168.106.50:5060;branch=z9hG4bK10E8E5C
 To: <sip:9999@192.168.106.66>;tag=cuecebad539
 From: <sip:2010@192.168.105.189>;tag=557BFE8-9EE
 Call-ID: 87C4CAE-115E11E2-8184AAE4-EF882E8F@192.168.253.1
 CSeq: 106 NOTIFY
 Content-Length: 0
 Allow-Events: refer
 Allow-Events: telephone-event
 Allow-Events: message-summary

Key Press Markup Language(KPML) Åººfå‘Šã♦®ä¾«

KPML æ©Ÿèf½ã♦—ã€♦Allow-Events SIP
 ãƒ~ãffãf€ãf½å†...ã♦«ãfã,¹ãf^ã♦•ã,Œã♦¾ã♦™ã€,KPMLãƒ‡ã,£ã,ãffãf^é€♦ã¿jã♦®å`å♦^ã€♦é€♦ã
 æ©Ÿèf½ã,’ã,çãf‰oãf♦ã,¿ã,¤ã,ºã♦™ã,<å^ã♦æœŸ INVITEã€,

<#root>

INVITE sip:95554445001@192.168.105.25:5060 SIP/2.0
Allow-Events:

kpml, telephone-event

å♦—ã¿jå♦‘ç«—æœ«ã♦—ã€♦KMPL
 ã,¤ãf™ãf³ãf^ã♦,ã♦®ã,µãf-ã,¹ã,—ãf^ãf—ã,·ãf§ãf³ã,'è|♦æ±,ã♦—ã♦¾ã♦™ã€,

<#root>

SUBSCRIBE

sip:2010@192.168.106.50:5060 SIP/2.0
Event:

kpml

Content-Type: application/

kpml-request+xml

ç™ºã¿jå♦‘ç«—æœ«ã♦—ã€♦NOTIFY

ã¢§å¿œç"ã—ã€¢çŠ¶æ...[æ](#),’ã,çã,—ãftã,£ãf—ã¢«è”å®šã¢—ã¢¾ã¢™ã€,

<#root>

NOTIFY

sip:192.168.105.25:5060 SIP/2.0

Event: kpml

Subscription-State:

active

KPML Tè»¢é€¢ã¢®ä¾«

ã,ãf—ã,‘ã,—ãfªãf—ã,·ãf§ãf³ã¢Œå®Ÿæ-½ã¢•ã,Œã¢Ÿã,%oã€¢ã,“ãf³ãf‰ãf¢ã,¤ãf³ãf^ã¢—ãftã,£ã,ãffã
ãf¡ãffã,»ãf¼ã,ã,’ä½¿ç”“ã¢—ã¢ | KPML ã,¤ãf™ãf³ãf^ã¢ “ã¢ ”ã,,ã¢« XML
ã¢«ã,^ã¢£ã¢ | é€¢ä¿jã¢§ã¢ã¢¾ã¢™ã€,é€¢ä¿jã¢•ã,Œã,<ãftã,£ã,ãffãf^ 1
ã¢®ä¾ã¢§ã¢™ã€,

<#root>

NOTIFY

sip:192.168.105.25:5060 SIP/2.0

Event:

kpml

```
<?xml version="1.0" encoding="UTF-8"?>
<kpml-response version="1.0" code="200" text="OK"
digits="1"
tag=""
dtmf
"/>
```

DTMF ã,¤ãf³ã,¿ãf¹/₄ãf~ãf¹/₄ã,ãf³ã,°

CUBE ã¢—ã€¢ç’,, 30 ã¢®ç•°ã¢ªã,[æ](#),’ã,¤ãf—ã¢® DTMF

ã,¤ãf³ã,¿ãf¹/₄ãf~ãf¹/₄ã,ãf³ã,°ã,µãf¢ãf¹/₄ãf^ã¢—ã¢¾ã¢™ã€,ã¢”ã,Œã¢—ã€¢ã,³ãf¹/₄ãf«ã¢®ç¢€ä¿jã¢
dtmf-relay

ã,³ãfžãf³ãf‰ã¢«åŸ°ã¢¥ã¢,,ã¢ |ã€¢ã¢•ã¢¾ã¢-ã¢¾ã¢ªãfªãf~ãf¹/₄æ-¹å¼¢é-”ã¢§ã¢®ã,¤ã

DTMFã,¤ãf³ã,¿ãf¹/₄ãf~ãf¹/₄ã,ãf³ã,°ã,µãf¢ãf¹/₄ãf^ã¢®è©³ç’°ã¢«ã¢¤ã¢,,ã¢ |ã¢—ã€¢ã€ŽCUBEè”å®šã,¬ã

CUBEã¢ŒDTMFã¢®ãf^ãf©ãf³ã,¹ã,³ãf¹/₄ãftã,£ãf³ã,°ãfªã,½ãf¹/

CUBE

ã♦~ã€♦ã♦"ã,Œã,%oã♦®ã,·ãfŠãf³ã,^ã♦§ã~ãfãf¼ã,«ãf«ã♦§ç™»éŒ²ã♦•ã,Œã♦!ã♦,,ã,<ãf³ã,½ãf¼ã

- RFC2833 ã♦~éÝ³å£°ã,¤ãf³ãf♦ãf³ãf%oã♦~ã♦®é~"ã♦®ã,¤ãf³ã,¿ãf¼ãf~ãf¼ã,ãf³ã,°
- ãf♦ãfãf¼ã,fãf®ã,¡ãf³ãf%o ã,³ãf¼ãf«ã♦®ã~Ýã,♦ã♦® OOB æ~¹å¼ã♦ã♦~RFC2833
ã♦®é~"ã♦®ã,¤ãf³ã,¿ãf¼ãf~ãf¼ã,ãf³ã,°

CUBE ã♦~ã€♦ãf~ãf©ãf³ã,¹ã,³ãf¼ãf€ã,'å¿...è|♦ã♦~ã♦>ã♦§ã~«ã€♦ãf~ãfãf¼ã,¹ãf«ãf¼
ã,³ãf¼ãf«ã,‘è;Œã♦tä»-ã♦®ã~¹ã♦|ã♦® DTMF

ãf³ãf~ãf~ãf¼æ~¹å¼ã♦ã♦®é~"ã♦§ã~®ã,¤ãf³ã,¿ãf¼ãf~ãf¼ã,ãf³ã,°ã♦Œã♦§ã~ã♦³/ã♦™ã€,

ã,¤ãf³ãf♦ãf³ãf%oG711ã♦~RFC2833é~"ã♦®DTMFã,¤ãf³ã,¿ãf¼ã

CUBE ã♦~ã€♦ã,¤ãf³ãf♦ãf³ãf%o G711 DTMF~¹åf~ãf¼ ã,^ãf¼ãf#ã,£ã,^ãf~ãf¼ãf³~¹å%oã♦~

RFC2833

ã♦~ã♦®é~"ã♦®ã,¤ãf³ã,¿ãf¼ãf~ãf¼ã,ãf³ã,°ã♦Œå♦~èf½ã♦§ã~™ã€,ã♦~Ýã,ã♦—ã€♦æ~jã♦®è|

- å½ç”~ã♦•ã,Œã,<ã,³ãf¼ãf#ãffã,~ã♦~G711 ã,~ãf³ãf%o ãf,ãf¼
ã,~ãf³ãf%oã♦§ã~ã♦~ã,Œã~ºã~ã,§ã~³/ã~ã,“ã€,LBRã,³ãf¼ãf#ãffã,~ã,‘å½ç”~ã♦™ã,ã♦~ã~
 - ã~"ã,Œã~«å¿œã~ã~ã~|ã~CUBE
ã♦§ã~ãf~ã,½ãf¼ã,¹ã~®ãf~ãf©ãf³ã,¹ã,³ãf¼ãf#ã,£ãf³ã,°ã~ç™»éŒ²ã~Œå~~èf½ã♦§ã~ã~
 - ã,¤ãf³ãf♦ãf³ãf%oãf~ãf¼ãf³ ãf~ã,°ã~®ãf€ã,¤ãf#ãf«ãf~ã,¢ã~«ã~ã€♦DTMF ãf³ãf~ãf¼
ã,³ãfzãf³ãf%oã~Œè~å®§ã~•ã,Œã~|ã~|ã~~ã~ã,§ã~³/ã~ã,“ã~®è|~ä»¶ã~æ~
- 16.12.xä»¥é™~ã~§ã~~ä,~è|~ä~«ã~ã,§ã~³/ã~—ã~~Ýã€,CUBEã~~ã~ç~€ä~j/ITSPäf€ã,
relay rtp-
nteã~Œè~å®§ã~•ã,Œã~|ã~„ã,<å~å~ã~§ã~„ã~ç~€ä~ãf~ãf©ãf³ã,¹ã,³ãf¼ãf€ã,'å~ç~„ã~«å~%o²ã,§å~
- RFC2833 ãf~ã,°ã~®ãf€ã,¤ãf#ãf«ãf~ã,¢ã~«ã~~ã~€~dtmf-relay rtp-nte
ã~Œè~å®§ã~•ã,Œã~|ã~„ã,<å~...è|~ä~Œã~ã,§ã~³/ã~™ã€,
 - ã,³ãf¼ãf«ã~«é~ç~ž~ä~—ã~|ã~„ã,<ãf€ã,¤ãf#ãf«ãf~ã,¢ã~§ã~~ã~€~ãf#ã,£ã,ãffãf~
ãf%oãf#ãffãf~ã~æ~%oå~§~ã~«ã~—ã~~ã~„ã~§ã~ã~ã~|ã~„ã~€,

ä»~ã~® DTMF ã,¤ãf³ã,¿ãf¼ãf~ãf¼ã,ãf³ã,° ã,~ãf~ã,~ãf§ãf³

ã~³/ã~~Ýã€~ç~%o¹å®§ã~®ã,³ãf¼ãf«ã,~ãfŠãf³ã,~ã~§ã~...è|~ä~«ã~ã,~å~~èf½æ~€§ã~Œã~ã,~è~ç~

<#root>

dtmf-interworking {

rtp-nte

|

standard

|

system

}

rtp-nte

Enables a delay between the dtmf-digit begin and dtmf-digit end events of RTP NTE packets.

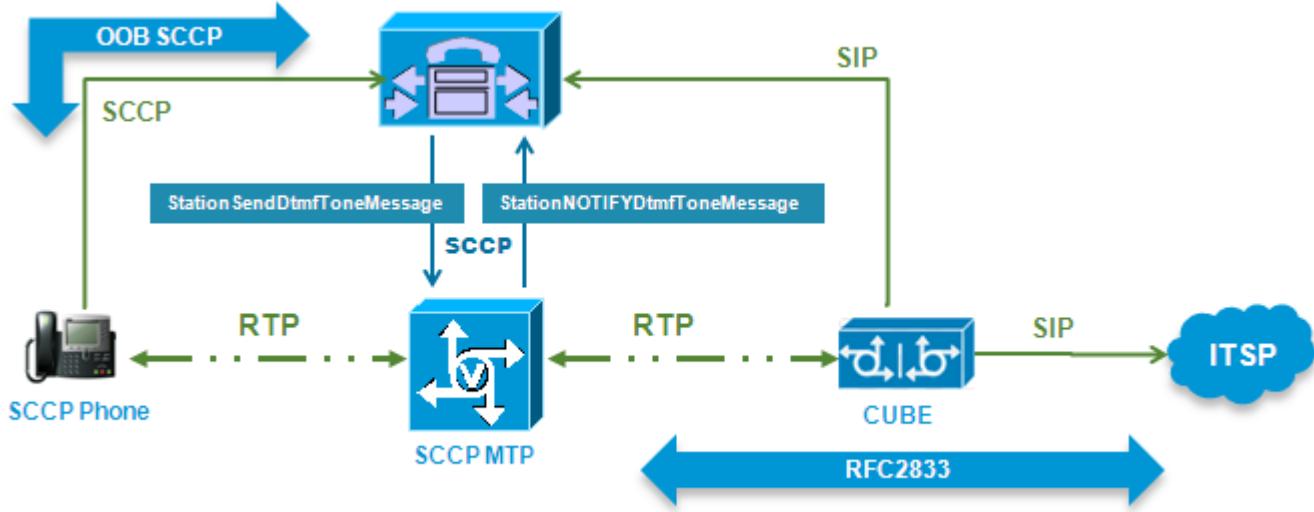
Standard

Generates RTP NTE packets that are RFC 4733 compliant.

System

Specifies the default global DTMF interworking configuration. This keyword is available only in dial peers.

MTPāfā, ¹/₂āf¹/4ā, ¹ā♦ŒCUCMā♦«å¿...è | ♦ä♦? „ ä♦?•ä,Œä,<çŠ¶æ³?



CUCM æ◊§ã,µæf◊æf¼æf^æ◊•ã,Œã,< MTP æf‡æf◊ã,¤ã,¹

Cisco IP Voice Media Streaming Application

Cisco IP Voice Media Streaming Application

ã, 'æœ‰oåŠíã «ã™ã, <ã “ã ”ã «ã, ^ã Fã | å®ÝèE...ã •ã, Cã, <ãf‡ãf ã, ã, 1ã Sã™ã€, ã, ãf³ã, ã, cãf—ãfã, ±ãf¼ã, ·ãf§ãf³ã “ã —ã | è”å®šã •ã, Cã, <ã ”ã€ ã ã ®ã, cãf—ãfã, ±ãf¼ã, ·ãf§ã, ãfžãf¼ãf‰oã «ç™»éC²ã •ã, Cã€ ã, µãf ãf¼ãf^ã™ã, < MTP ãfã, ½ãf¼ã, 1æ•°ã, ' CUCM
ã «çÝ¥ã, %oã »ã ¾ã™ã€, ã, ½ãf•ãf^ã, | ã, Sã, c MTP ãf‡ãf ã, ã, 1ã ”ã€ G.711
ã, 1ãf^ãf ãf¼ãf ã ã 'ã, 'ã, µãf ãf¼ãf^ã —ã ¾ã™ã€, CUCM
ã ®ãf‡ãf ã, ©ãf «ãf^è”å®šã Sã ”ã€ ã, ½ãf•ãf^ã, | ã, Sã, c MTP ã ”ã ”ã «ã€ æœ€å¤§
48 ã, ³ãf¼ãf ã, 'å†| ç†ã Sã ã ¾ã™ã€, ã, ãf¹¼ãf“ã, 1
ãf^ãf©ãf:ãf¹¼ã. :ã ®å¤‰æ’æ-¹æ³:ã «ã ã...ã ”ã ”ã€ ã€ ŽCisco Unified Communications

[Manager Administration](#)

ä“ä® MTP ä«ä, ^ä£ä | ä€ G.711 mu-law äSä, ^ä³ a-law ä€ G.729a ä€ G.729 ä€ G.729ab ä€ G.729b ä€ äŠä, ^ä³äƒä, ¹ä, ¹äf«äf¼ä®ä, ³äf¼äf†äffä, 1

„**ã€œãœ** ã€œ’ã€œ‰ãœ™ã€œ,ã€œ“ã€œ,Œãœ‰ãœ®å†...ã€œ®ãœ,éƒ”ã€œ®ãœ,³ãœf¼ãœ‡ãœffãœ,“ã€œ“ã€œCUCM
ã€œ«ã€œ“ãœ®Ýèƒ...ã€œ•ã€œ!ã€œ„ã€œ³/ã€œ>ãœ,“ã€œ,

af<af^{1/4}, ; è·å®šã? §ã? - æoe€å¤§ 1,000

Ã¢®å€å·¥ã, 'ãf^ãf^ãf%4ãf ã¢Œè "±å¢-ã¢•ã,Œã¢¾ã¢™ã€,ã¢"ã,Œã¢- 10 MB

ã♦®ãf^ãf©ãf•ã,£ãffã,¬ã,'ç"Ýæ^♦ã♦?™ã,< 500

Cisco ISR G2 Series
ASR 3000

āf«āf%ā,čā◆šā◆-ā€◆ā◆”ā,CĒā,^ā,Šā,,ā◆-ā,čā◆čā◆«ā◆šā◆◆ā◆”ā◆æ•°ā,’ā,μāf◆āf%āf^ā◆šā◆◆ā◆

ã

“ã® MTP ã“ã€ç”¼åfã™ã, < CPU

ã®ã,µã,¤ã,“ãf“ã,’æ¶è²»ã—ã³/4ã™ã€,æœ‰åš¹ã«ã•ã,Œã¥ã,»ãffã,·ãfSãf³æ•°ã,’ãfjãfcãCPU
CPU ã®ãfãf·ã,©ãf¼ãfžãf³ã,¹ã«ã½±é¥ã,‘ãŠã¼ã—ã€CPU
ä½ç”çž‡ã,‘ã½•ã,ã,Šã’ã,‘ã“èf½æ€SãŒã,ã,‘ã<ã,‰ãSã™ã€,

ãfãf¼ãf‰ã, |ã,§ã,¢ MTPï¼^PVDM2ã€Cisco NM-HDV2 ãŠã,^ã³ NM-HD-1V/2V/2VEï¼‰

“ã®ãfãf¼ãf‰ã, |ã,§ã,¢ ã€PVDM-2 ãfçã,ãf¥ãf¼ãf«ã,’ä½ç”ã—ã| DSP
ã,’æãä¾ã—ã³/4ã™ã€,

ãfãf¼ãf‰ã, |ã,§ã,¢ MTPï¼^PVDM3 ã,’æè½‰ã—ã¥ Cisco 2900 ãŠã,^ã³ 3900 ã,·ãfãf¼ã,º ãf«ãf¼ã,¿ï¼‰

“ã,Œã,‰ã®ãf«ãf¼ã,‘ãSã“ã€ãfžã,¶ãf¼ãfœãf¼ãf‰ã,Šã® PVDM3 DSP
ã,’ãfã,¤ãftã,£ãf—ã«ã½ç”ã™ã,‘ã<ã€ã³/4ã¥ã“ãfžã,¶ãf¼ãfœãf¼ãf‰ã,Šã,,ã,µãf¼ãf“ã,
ãfçã,ãf¥ãf¼ãf«ã,Šã®ã,¢ãf€ãf—ã,‘ã«ã,^ã,‘ãf«ãf¼ã,º ã—ã³/4ã™ã€,

æ³: Cisco

IOSãSãfãf¼ãf‰ã, |ã,§ã,¢ MTPãfã,½ãf¼ã,¹ã,’è“å®šã™ã,‘ã‘ã€G.729ã³/4ã¥
MTP

ãf“ã,½ãf¼ã,¹ãŒä½ç”ã,æžœã¥ã•ã,Œã¥ã‘ã€ã³/4ã¥ã“ã½ç”ãSã“ã
ã“ãfãf¼ãf‰ã, |ã,§ã,¢ ãf“ãf©ãf³ã,¹ã,³ãf¼ãftã,£ãf³ã,º ãf“ã,½ãf¼ã,¹ã,’ MTP
ã—ã—ã“ã½ç”ãSã“ã³/4ã™ã€,

ã,½ãf•ãf^ã,|ã,§ã,¢ MTPã³/4ã¥ã“ãfãf¼ãf‰ã, |ã,§ã,¢ MTPã,‘ã

ãfãffãf^ãf“ãf¼ã,“ã“ã±é-ã™ã,‘ MTP ã®ã,¤ãf—ã“ã€ã,³ãf¼ãf“
ãf•ãfãf¼åt...ã®ã,“ãf³ãf‰ãfã,¤ãf³ãf^ã€ã,²ãf¼ãf^ã, |ã,§ã,¤ã€ã,‘ãSã,^ã“ãf³ãf©ãf³ã,“ãSã,µ

- ä½ç”ã“ã•ã,Œã,‘ã,³ãf¼ãftãffã,“ã®ãf•ãf—ã“ã€ã,³ãf¼ãf“
- ä½ç”ã“ã•ã,Œã,‘ã,³ãf¼ãftãffã,“ã®ãf“ã,±ãffãf“ã,µã,¤ã,ºï¼“ãf“ã,±ãffãf“åŒ-ï¼‰
- T.38 ãSã® FAX ä½ç”“ï¼“ã,³ãf¼ãftãffã,“ã®ãf“ã,¹ã,‘ãf«ãf¼
ã,µãf“ãf¼ãf“ãŒå¿...è|“ï¼‰

“ã,Œã,‰ã®ãfãf©ãfjãf¼ã,‘ã“ã¥ã“ã“ã€ãfãffãf^ãf“ãf¼ã,“ãSãå¿...è|“ã“ã“ã

è|“ã“ç¤ºã“ã™ã,“ã“tã“ã€ã“ã“ã³/4ã“ã—ã³/4ã“æ©¥èf½ãŒã€ã“ã“ã³/4ã“ã—ã³/4ã“
MTP

ã“ãSã,^ã“ãf^ãf©ãf³ã,¹ã,³ãf¼ãf“ã®ã,‘ã,¤ãf—ã“ã“ã,‘ãSã,µãf“ãf¼ãf^ã“ã“ã,Œã“ã³/4ã“ã™ã€,

| | | |
|------|----------------------------|--|
| Type | ã,µãf³ãf—ãf“ã,³ãf¼ãftãffã, | ã“ã“ã³/4ã“ã—ã³/4ã“ã“ã,³ãf¼ãftãffã,“ã“ã“ã³/4ã“ã—ã³/4ã“ã“ã,³ãf“ã,±ãffãf“ã,µã,¤ã,ºï¼“ãf“ã,±ãffãf“åŒ-ï¼‰ |
|------|----------------------------|--|

| | | | |
|---|-----|-----|-----|
| CUCM SW MTP | Yes | No | Yes |
| Cisco IOS HW MTP | Yes | No | No |
| Cisco IOS SW MTP | Yes | No | No |
| Cisco IOS Regular Xcoder | Yes | Yes | Yes |
| Cisco IOS Universal Xcoder | Yes | Yes | Yes |

MTP a♦® CUCM äfjäftä, fä, c äfää, ½äf¼ä, ¹
ä, °äf«äf¼äf—ï¼^MRGï¼‰ä♦ “äfjäftä, fä, c äfää, ½äf¼ä, ¹
ä, °äf«äf¼äf— äfää, ¹äf^ï¼^MRGLï¼‰ä♦®è€fæ...®ä°é ...

ãfjäf†ã,£ã,çãf^aã,½ãf^{1/4}ã,¹ã,’ä½œæ^—ã—ã€♦ãfjäf†ã,£ã,çãf^aã,½ãf^{1/4}ã,¹ã,ºãf«ãf^{1/4}ãf—(MRG)ã♦”ãfjäf†ã,
G711
ã,’ä½¿ç””ã—ã—ã♦|ã♦,,ã,<å ‘å ♦^ã♦§ã,,ã€♦æ¤œå‡°ã♦™ã,<æœ€å^—ã♦®ãf†ãf♦ã,¤ã,¹ã♦Œãf^ãf©ã
MTP ã♦”ã—ã♦|å‰%²ã,Šå½”ã♦|ã€♦ã♦ã,Œä»¥ã,Šã♦—ãf^aã,¹ãf^ã♦<ã,%º MTP
ãf^aã,½ãf^{1/4}ã,¹ã,’æ¤œç’çã♦—ã♦³/4ã♦>ã,“ã€,

ã¥ä®éžä¼¼ä®å•ä½œä˜ä€äf|äfçäfäf¼ä,µäf«ä®é€šå„ä®ä,jæ-1ä®äf^äf©äf³ä,¹ä,³äf
ä˜ä¾äšä€ä,€æ-1ä®äf¬ä,ºäŒ G711
ä§ä,ä,<ä,³äf¼äf«ä§é€šå„ä®äf^äf©äf³ä,¹ä,³äf¼äf€ä,'ä½¿ç"”ä—ä¾ä™äŒä€ä,³äf¼äf
G711
ä,³äf¼äf‡äffä,˜ä,'ä½¿ç"”ä™ä<ä®>å...^ä«è»çé€ä•ä,Œä,<ä”å¤±æ•—ä™ä<ä”äŒä“äŒä, CUCM
äŒç¾åœ”ä®äf^äf©äf³ä,¹ä,³äf¼äf€ä,'è§£æ”¾äŒ>äšä€ä,³äf¼äf«äŒè»çé€äæ™,äŒ«å^ä

—“**æ** ◊ **®**å[•]æ½œæ,’åžé◊¿æ™æ,**<æ**◊Yæ,**◊æ**◊**®**åf™æ,æf[•]æf—æf©æ,—æftæ,æf,æ◊—æ€◊1æ◊¤æ◊**®**MRG

SCCP MTP $\tilde{a}f;\tilde{a}ff\tilde{a}$, » $\tilde{a}f^{1/4}\tilde{a}$,

- StationCapabilitiesRes
 - StationUpdateCapabilities
 - StationSubscribeDtmfPayloadReq
 - StationSubscribeDTMFPayloadErrv
 - StationSubscribeDtmfPayloadRes
 - StationUnsubscribeDtmfPayloadErr
 - StationNOTIFYDtmfToneMessage
 - StationSendDtmfToneMessage
 - StationUnsubscribeDtmfPayloadReq
 - StationUnsubscribeDtmfPayloadRes

CUCMã¢ “CUBEé–“ã¢®DTMFãƒªãƒ¬ãƒ¼

CUBE **CUCM SIP**

CUBE ãšãš ã€ DTMF ã« Unsolicited
 Notify ï¼^UNï¼‰æ-½ï¼‰ã,'½ç”“ã™ã,<ã”ã,,ãšãšãšãš-¾ã™ã€,UN
 æ-½ï¼‰ãšã€ DTMF ãƒ^ãƒ½ãƒ³ã,’è”ã™ãƒtã,ã,¹ãƒ^ã,’ãƒjãffã,»ãƒ½ã,æœ-½”ã«å«ã,€
 SIP Notify ãƒjãffã,»ãƒ½ã,ã,’é€ã”æ-¾ã™ã€,ã”ã®æ-½ï¼‰ãš Unified CM
 ãšã,,ã,µãšãƒ½ãƒ½ã•ã,Œãš|ãšãšã€sip-kpml
 ãŒæœ‰ãšï¼‰ãšãš,ã”ãšã“ã½ç”“ãšãšãšãšãš-¾ã™ã€,DTMF

āf^aāf-āf¼æ-¹å¼?ā?..ā?—ā?

— „æ®šæ—æ¾æ™æ€, æ“æ®æ-¹æ¼æ—æ·æ, ¹æ, ³ç<-è‡ªæ®æ,, æ®æ§æ, æ, <ç, ¹æ«æ³” æ, æ

NTE

ãf^aãf¬ãf^{1/4}å°,ç”·ã?«è“å®šã?•ã,CÆã?Ý

CUBEÆñ€◊š◊¾æ◊ÿ◊-æ½◊-‰◊<æ◊®◊š◊,◊æ◊ƒ◊æ◊,◊æ◊ƒ◊ÿ◊æ◊-æ◊ƒ◊æ◊,◊æ◊é◊™◊æ◊Œ◊æ◊,◊æ◊,◊

CUBE ã€? NTE

— „ ãf%ãf^ã — ã?^aã? „ã, „ ãf^ãf%oãf?ã, ãf^ãf^ã „ã?®éšä; jæ™, ã?«ã?— ã€? CUCM

ã?®è! ã»¶ã€?ã, 'ã?c...§ã?—ã?|ã?ã?ã?ã?•ã?„ã?,

CUBE CUCM H323

CUCMãæH323ãæf©ãfã,ãæ®DTMFè»¢é€¢æ-1½ã,ã'åçš,,ã«é¢,æŠžã™ã,ãæÝã,ãæä,€ã DTMF ãæf-ãf-1½æ-1½ã,é¢©ç”“ã™ã,ã«ãæ-ã€¢ã“ãæ®ãfãf©ãfã,ãæ® CUBE
ãf€ã,¤ãf¤ãf«ãf”ã,çè”å®šãã,‰¤å®Ýè;Œãæfãæfãæf¾ã™ã€,

H323

ä»—ä♦®ä, "äf³äf%äf♦ä,¤äf³äf^ä♦«CUCMä♦ "å...±éëšä♦®ä,·ä,°äfŠäf^aäf³ä,°æ©Ýèf½ä♦Œä♦^aä♦,å
CUBEä♦,ä♦®ä,³äf½äf«ä,'çç°ç«ä♦™ä,<ä♦«ä♦-ä€♦MTPäf^aä,½äf½ä,¹ä♦Œå¿...è!♦ä♦§ä♦™ä€,ä♦Ý
Unified IP Phone

7960-TMNTE-[®] Alphanumeric,TMH323-TMMTP-TM

CUBE å•çš.,/é◊žå¬¾ç§°ãƒšã,¤ãƒãƒ¹¼ãƒ‰

Cisco IOS 15.1(1)T(CUBE)

1.4) ☎ Šã ☎ - ã€ ☎ SIPé-”ã,³ãf¼ãf<ã ☎ ®DTMF ☎ Šã, ^ã ☎ ³ã,³ãf¼ãf†ãffã, -ãfã, +ãffãf^c”” ã ☎ ®ãf€ã, ☗ãfŠã

ã◆”ã◆®æ©Ýèf½ã,’ä½ç’”ã◆™ã,ã◆”ã€◆CUBEã◆§éÝ³å£°/ãƒ“ãƒ‡ã,ºã,³ãƒ¼ãƒ‡ãffã,¬ã€◆NSEã€◆ã◆IOSã◆é◆™çš,ã◆ªç_”å›²ã,’äº°ç’,ã◆—ã€◆ä,jæ-¹ã◆®ã,³ãƒ¼ãƒ«ãƒ—ãffã,ºã◆§å◆Œã◆~ãƒšã,¤ãƒfã¼ã

a, ɿ a, ɿ a — a, a € a € a, ɿ a, a, ɿ a — a, ɿ a „ a, ɿ a

SIP aj—ajaj♦a, ♦aj€aj ¼a♦½a♦Ya♦ a, paJ ¼aJ‰oaj aj ¼aJ†a, E
z ft z f ^ z - z 1 z ^ z z ^ z z z 3 z z f 1 z z f ^ z f 1 / z z f 3 z z z ^ z z z f x z z z f z f 1 / z f 0 /

đaj + đaj \rightarrow a, đa, a \rightarrow a \rightarrow R, đ, đaj, đ, đaj \rightarrow ¼đaj \rightarrow ¼đ, đ, đ \rightarrow R, đ, đ, đaj \rightarrow ¼đaj %00

CUBEna®a, aJ%aj«aj¬ajJa, a a a a, aj-aj%oaj a, aJ-aj a a a®a, aJ·a, aJ%aSa, a a aœç

- á¾¢ç§ºã, "af³af‰oãf♦ã, ãaf³af a♦ a€♦NTE ã, ãaf™af³af a,,ã, ãf¹4af«
ãf-ãffã, °ã♦®ç‰º¹ã®šã♦®ã, ³af¹4af‡ãffã, "ã♦®ã€¢å♦Œã♦~ãfšã, ãfãf¹4af‰
ã, ;ã, ãf—ã, 'ã♦—ã♦'å...¥ã, œã♦Ýã, Šé€♦ä¿jã♦—ã♦Ýã, Šã♦—ã♦¾å♦™ã€,
• é♦žå—¾ç§ºã, "ãf³af‰oãf♦ã, ãaf³af³ãf^ã♦—ã€♦NTE ã, ãaf™af³af^ã,,ã, ³af¹4af«

ãf-ãffã, °ã ◈ ®ç‰‰ 1å®šã ◈ ®ã, ³ãf½ãftãffã, -ã ◈ ®ã€ ◈ ç•°ã ◈ °ã, <ãfšã, ãfãf½ãf‰‰
 ã, ã, ãf—ã, 'å ◈ —ã ◈ 'å...¥ã, ©ã ◈ Ÿã, Šé€ ◈ ä¿jã ◈ —ã ◈ Ÿã, Šã ◈ Šã ◈ ã ◈ ¾ã ◈ ™ã€,
 ã ◈ "ã ◈ ®ã, ³ãfžãf³ãf‰‰ ã ◈ -ã € ◈ é ◈ žå °¾ç‰‰ ãfšã, ãfãf½ãf‰‰ ã ◈ ®ä½ç" °ã, 'æŒ‡å®šã ◈ ™ã, <ã ◈ Ÿã, ◈
service voip enter sip è™®šãf¢ãf½ãf‰‰ ãfšã, °ãfãf½ãf ◈ ãf«ã ◈ «é ◈ ©ç" °ã ◈ ™ã, <ã ◈ **æŒ‡å®šã ◈ ™ã, <ã ◈ Ÿã, ◈ voice-class**
sip CLI ã, 'ä½ç" °ã ◈ —ã ◈ | ãf€ã, ãf¤ãf«ãf"ã, Cãf-ãf™ãf«ã ◈ Šé ◈ ©ç" °ã ◈ Šã ◈ Šã ◈ ¾ã ◈ ™

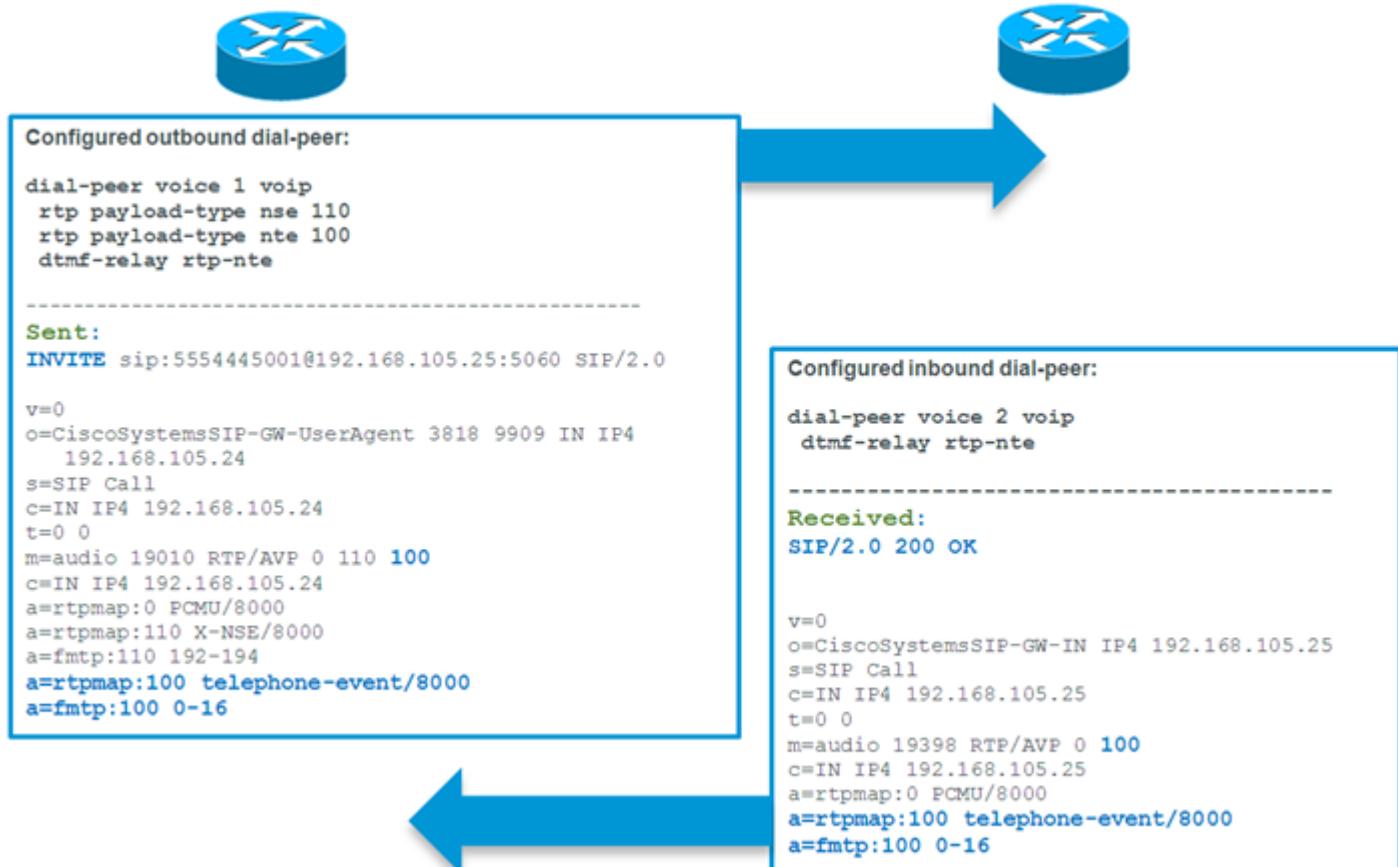
asymmetric payload {dtmf | dynamic-codecs | full | system}

å•çš,,/é ◈ žå °¾ç‰‰ ãfšã, ãfãf½ãf‰‰ ã ◈ ®è©³ç" °ã ◈ «ã ◈ ãf—ã ◈ | ã ◈ -ã € ◈ ãf‰‰ **ŒSIP**
 è“ã, ³ãf½ãf«ã ◈ ® DTMF ã ◈ "ã, ³ãf½ãftãffã, -ãfã, +ãfãfç" °ã ◈ ®å•çš,,ãfšã, ãfãf½ãf‰‰
 ã, ã, ãf—ã, ãf½ãf½ãf½ã, °ã € ◈ ã, 'å ◈ , ç...Šã ◈ —ã ◈ | ã ◈ ãf—ã ◈ | ã ◈ •ã ◈ , ã,

å °¾ç‰‰ ãfšã, ãfãf½ãf‰‰ ã ◈ ®ä¾<

æ-|ã ◈ ®ä¾<ã ◈ -ã € ◈ å °¾ç‰‰ ãfšã, ãfãf½ãf‰‰ ãf—ã, 'ã, ·ã, °ãf½ã, ·ãfšãf³ã ◈ ®å 'å ◈ ^ã ◈ ®SDPã ◈ ®è| °ç‰‰
voip rtp session named event ã, %‰ã ◈ ®å‡°åŠã, 'ç‰‰ ã ◈ —ã ◈ | ã ◈ „ã ◈ ¾ã ◈ ™ã€, Cisco
 IOS ã, 'ä½å^¶ã ◈ ™ã, <ã ◈ Ÿã, ãf—ã, «ä½ç" °ã ◈ •ã, ©ã, <è °ã ®šã ◈ Šã ◈ -ã € ◈ rtp payload-type
 nte, ³ãfžãf³ãf‰‰ ã, 'ä½ç" °ã ◈ ™ã, <NTE ã, ãf™ãf³ãf—ã ◈ «å °¾ã ◈ —ã ◈ | ç" °ã ◈ ã, <ãfšã, ãfãf½ãf‰‰ ã, ã, ãf—

DTMF ãf—ãf½ãf ◈ ®ãf—ã, 'ã, ·ã, °ãf½ã, ·ãfšãf³



DTMF äf^aäf⁻äf^{1/4}ä^{1/4}♦é€♦



```
s=DSPL d=VoIP payload 0x64 ssrc 0x6AFC8F9C sequence 0x3F9F timestamp 0x1FEC6DD4
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSPL d=VoIP payload 0x64 ssrc 0x6AFC8F9C sequence 0x3FA0 timestamp 0x1FEC6DD4
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSPL d=VoIP payload 0x64 ssrc 0x6AFC8F9C sequence 0x3FA1 timestamp 0x1FEC6DD4
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSPL d=VoIP payload 0x64 ssrc 0x6AFC8F9C sequence 0x3FA2 timestamp 0x1FEC6DD4
Pt:100 Evt:1 Pkt:04 01 90 <Snd>>
s=DSPL d=VoIP payload 0x64 ssrc 0x6AFC8F9C sequence 0x3FA3 timestamp 0x1FEC6DD4
Pt:100 Evt:1 Pkt:84 03 20 <Snd>>
s=DSPL d=VoIP payload 0x64 ssrc 0x6AFC8F9C sequence 0x3FA4 timestamp 0x1FEC6DD4
Pt:100 Evt:1 Pkt:84 03 20 <Snd>>
s=DSPL d=VoIP payload 0x64 ssrc 0x6AFC8F9C sequence 0x3FA5 timestamp 0x1FEC6DD4
Pt:100 Evt:1 Pkt:84 03 20 <Snd>>
```

```
s=DSP d=VoIP payload 0x64 ssrc 0x7F26919 sequence 0x449F timestamp 0x9C3C18BD
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x64 ssrc 0x7F26919 sequence 0x44A0 timestamp 0x9C3C18BD
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x64 ssrc 0x7F26919 sequence 0x44A1 timestamp 0x9C3C18BD
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x64 ssrc 0x7F26919 sequence 0x44A2 timestamp 0x9C3C18BD
Pt:100 Evt:1 Pkt:04 01 90 <Snd>>
s=DSP d=VoIP payload 0x64 ssrc 0x7F26919 sequence 0x44A3 timestamp 0x9C3C18BD
Pt:100 Evt:1 Pkt:84 03 20 <Snd>>
s=DSP d=VoIP payload 0x64 ssrc 0x7F26919 sequence 0x44A4 timestamp 0x9C3C18BD
Pt:100 Evt:1 Pkt:84 03 20 <Snd>>
s=DSP d=VoIP payload 0x64 ssrc 0x7F26919 sequence 0x44A5 timestamp 0x9C3C18BD
Pt:100 Evt:1 Pkt:84 03 20 <Snd>>
```

é♦žá‐¾ç§°ãƒšã,¤ãƒãƒ¼ãƒ‰oã♦®ã¾<

æ¬;ã?«ã€◊é◊žå¬¾ç§°ãƒšã,¤ãƒfã¼ãƒ%oãƒ◊ã,ã,·ã,“ãƒ¼ã,·ãƒšãƒã◊®å‘å◊^ã◊®SDPã◊®è;”ç¤ºä¾`voip rtp session named event`ã,³ãƒžãƒ³ãƒ%oã◊®å†°åŠ›ã,’ç¤ºã◊—ã◊¾ã◊™ã€,Cisco
IOSã◊\$NTEã,¤ãƒ™ãƒ³ãƒ˜ã◊«å¬¾ã◊—ã◊|ç°ã◊^ã,‹ãƒšã,¤ãƒfã¼ãƒ%oã,¿ã,¤ãƒ—ã,‘ä½¿ç”ã◊™ã,‹ã,^ã◊`payload-type nte`ã,³ãƒžãƒ³ãƒ%oã◊“voice-class sip asymmetric payload dtmf
CLIã,‘ä½¿ç”ã◊™ã,‹ã◊“ã◊“ã◊«æ³“æ,,?ã◊—ã◊|ã◊◊ã◊ã◊ã◊•ã◊„ã€,

DTMF ãf^aãf^bãf^c1/4ãf^d®ãf^eã, 'ã, .ã, "ãf^f1/4ã, .ãf^gsãf^h3



Configured outbound dial-peer:

```
dial-peer voice 1 voip
rtp payload-type nse 110
rtp payload-type nte 100
dtmf-relay rtp-nte

-----
Sent:
INVITE sip:5554445001@192.168.105.25:5060 SIP/2.0

v=0
o=CiscoSystemsSIP-GW-IN IP4 192.168.105.24
s=SIP Call
c=IN IP4 192.168.105.24
t=0 0
m=audio 19162 RTP/AVP 0 110 100
c=IN IP4 192.168.105.24
a=rtpmap:0 PCMU/8000
a=rtpmap:110 X-NSE/8000
a=fmtp:110 192-194
a=rtpmap:100 telephone-event/8000
a=fmtp:100 0-16
```



Configured inbound dial-peer:

```
dial-peer voice 2 voip
no modem passthrough
rtp payload-type nte 107
dtmf-relay rtp-nte
voice-class sip asymmetric payload dtmf
```

Received:
SIP/2.0 200 OK

```
v=0
o=CiscoSystemsSIP-GW-IN IP4 192.168.105.25
s=SIP Call
c=IN IP4 192.168.105.25
t=0 0
m=audio 19452 RTP/AVP 0 107
c=IN IP4 192.168.105.25
a=rtpmap:0 PCMU/8000
a=rtpmap:107 telephone-event/8000
a=fmtp:107 0-16
```

DTMF ☡äf¬äf¹¼ä¹¼♦é€♦



```
s=DSP d=VoIP payload 0x6B ssrc 0x6AFC6FAB sequence 0x9F46 timestamp 0xE4B93524
Pt:107 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x6AFC6FAB sequence 0x9F47 timestamp 0xE4B93524
Pt:107 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x6AFC6FAB sequence 0x9F48 timestamp 0xE4B93524
Pt:107 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x6AFC6FAB sequence 0x9F49 timestamp 0xE4B93524
Pt:107 Evt:1 Pkt:04 01 90 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x6AFC6FAB sequence 0x9F4A timestamp 0xE4B93524
Pt:107 Evt:1 Pkt:04 01 90 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x6AFC6FAB sequence 0x9F4B timestamp 0xE4B93524
Pt:107 Evt:1 Pkt:04 01 90 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x6AFC6FAB sequence 0x9F4C timestamp 0xE4B93524
Pt:107 Evt:1 Pkt:04 01 90 <Snd>>
```



```
s=DSP d=VoIP payload 0x6B ssrc 0x1906919 sequence 0x9F46 timestamp 0x9C36BAFD
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x1906919 sequence 0x9F47 timestamp 0x9C36BAFD
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x1906919 sequence 0x9F48 timestamp 0x9C36BAFD
Pt:100 Evt:1 Pkt:04 00 00 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x1906919 sequence 0x9F49 timestamp 0x9C36BAFD
Pt:100 Evt:1 Pkt:04 01 90 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x1906919 sequence 0x9F4A timestamp 0x9C36BAFD
Pt:100 Evt:1 Pkt:04 01 90 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x1906919 sequence 0x9F4B timestamp 0x9C36BAFD
Pt:100 Evt:1 Pkt:04 01 90 <Snd>>
s=DSP d=VoIP payload 0x6B ssrc 0x1906919 sequence 0x9F4C timestamp 0x9C36BAFD
Pt:100 Evt:1 Pkt:04 01 90 <Snd>>
```



ä½¿ç”“ã◆™ã, <DTMFãƒªãƒ¬ãƒ¼æ-¹å¼◆

ä½¿ç”“ã◆™ã, <DTMFãƒªãƒ¬ãƒ¼ã, 'é◆, æŠžã◆™ã, <å’å◆^ã◆^-ã€◆ã◆“ã, CEã, %oã◆®å¤‰æ°ã, 'è€fæ...®ã

- é—çé€£ã◆™ã, <ãƒ‡ãƒ◆ã, ²ã◆^ãƒ—ãƒ©ãffãƒ^ãƒ•ã, ®ãƒ¼ãƒ ã€,
- é—çä, ã◆™ã, < VoIP ãƒ—ãƒãƒ^ã, ³ãƒ.
- ãƒ;ãƒ‡ã, ã, ç ãƒ‘ã, ¹ã◆Šã, ^ã◆³ã, µãf◆ãƒ¼ãƒ^ã◆•ã, CEã, <ã, ³ãƒ¼ãƒ‡ãffã, -.
- ã, ãf◆ãƒ¼ãƒ^ã◆•ã, CEã, <ã◆¾ã◆Ýã◆^-å,, å...^ã◆•ã, CEã, < DTMF ãƒªãƒ¬ãƒ¼æ-¹å¼◆.

H.323ã◆®å,, å...^ DTMFãƒªãƒ¬ãƒ¼æ-¹å¼◆

H323ã◆®æœ>ã◆¾ã◆—ã◆, æ-¹æ³•ã◆^-ã€◆ã◆»ã◆¼ã◆™ã◆¹ã◆|ã◆®ã, ·ãfŠãƒã, °ã◆§H.245è<±æ...
ã◆Œé-çä, Žã◆—ã◆|ã◆, ã◆^ã◆, é™◆ã, Šã€◆RFC2833 ã,, ä½¿ç”“ã◆§ã◆?ã◆¾ã◆™ã€,

SIP ã◆®å,, å...^ DTMF ãƒªãƒ¬ãƒ¼æ-¹å¼◆

- ã, ãf¼ãf“ã, 'ãf—ãfãf◆ã, ²ãƒ€ãƒ¼ã◆, ã◆®SIPãƒ^ãƒ©ãƒ³ã, - ã€“
SIPãf—ãfãf◆ã, ²ãƒ€ãƒ¼ã◆, ã◆®SIPãƒ^ãƒ©ãƒ³ã, - ã◆Œé-çä, Žã◆—ã◆|ã◆, å’å◆^ã€◆ã◆¾ã◆
RFC2833ã, 'ä»<ã◆—ã◆Ýã, ²ãƒ³ãf◆ãƒ³ãf‰oã◆®ãƒ'ãƒ¼ãƒ†ã, £SIPãƒ‡ãf◆ã, ²ã◆¹ã◆¾ã◆Ýã◆^-IVRã, ·ã
- CUCM ã◆¾ã◆Ýã◆^-CME ã◆, ã◆® SIP ãƒ^ãƒ©ãƒ³ã, - i¼šRFC2833 ã◆ “ KPML
ã◆®ä, jæ-¹ã, 'æœ‰oãS¹ã◆«ã◆—ã◆¾ã◆™ã€,
- CUEã◆, ã◆®SIPãƒ^ãƒ©ãƒ³ã, - i¼šCUEã◆®ãƒ‡ãf◆ã, ©ãƒ«ãƒ^ã◆®æ-¹å¼◆ã◆^-UNã◆§ã◆™ã◆

é—çé€£æf...å ±

IP-to-IP ã, ²ãf¼ãf^ã, |ã, §ã, ²ã◆® Universal Voice Transcoding ã◆®ã, µãf◆ãƒ¼ãf^

DTMF å¤‰æ◆>

Unified Border Element ãƒ^ãf©ãƒ³ã, ¹ã, ³ãf¼ãf‡ã, fãf³ã, °ã◆®è”å®šã¾<

Cisco Unified Communications Manager

ã, 'ä½¿ç”“ã◆—ã◆Ýãf^ãf©ãƒ³ã, ¹ã, ³ãf¼ãf‡ã, fãf³ã, °ã◆Šã, ^ã◆³ãf;ãf‡ã, fã, ç
ã, ²ãf¼ãf^ãf◆ãf¼ã, ·ãfSãf³ãf◆ã, ²ãf³ãf^ã◆®è”å®š

Cisco Unified Border Element ä, Šã◆§ã◆® DTMF

ãƒªãf¬ãf¼ã◆®ãƒ‡ã, fã, ãffãf^ãf‰oãfãffãf—ã◆®è”å®š

SIP ãƒ^ãf©ãƒ³ã, -ã◆® MTP ã◆«é-çã◆™ã, <é!◆ä»¶

DTMF ãƒ^ãf¼ãf³ç”Ýæ^◆ç”“ SIP INFO æ-¹å¼◆

ãf;ãf‡ã, fã, ç ã, ;ãf¼ãfÝãf◆ãf¼ã, ·ãfSãf³ãf◆ã, ²ãf³ãf^ã, 'ä½¿ç”“ã◆™ã, < H.323 ãƒ^ãf©ãƒ³ã, -

CUBE 9.0 ãfãf¼ã, «ãf«ãf^ãf©ãƒ³ã, ¹ã, ³ãf¼ãf‡ã, fãf³ã, °ã, ²ãf³ã, ;ãf¼ãf•ã, §ã, ²ã, ¹¹/₄LTII¹/₄‰o

翻訳について

シスコは世界中のユーザにそれぞれの言語でサポート コンテンツを提供するために、機械と人による翻訳を組み合わせて、本ドキュメントを翻訳しています。ただし、最高度の機械翻訳であっても、専門家による翻訳のような正確性は確保されません。シスコは、これら翻訳の正確性について法的責任を負いません。原典である英語版（リンクからアクセス可能）もあわせて参照することを推奨します。