Abbreviations  $\sim$ M\_15675 = coap\_version\_one  $\sim$ M 15676 = non confirmable  $\sim$ M 15677 = bounded by(token 15072)  $\sim$ M 15678 = CoAP POSTCode  $\sim$ M\_15679 = messageid\_15073  $\sim$ M 15680 = token 15072  $\sim$ M\_15683 = partial\_iv\_15063  $\sim$ M 15684 = IDir 15061  $\sim$ M 15685 = idcontext 15057  $\sim$ M\_15682 = aeadEncrypt(HKDF(msecret\_15059,msalt\_15058, (IDir\_15061,idcontext\_15057,AES\_CCM,label\_key), alg\_key\_length(AES\_CCM,label\_key)),aeadNonce(IDir\_15061, partial iv 15063,HKDF(msecret 15059,msalt 15058, (emptyId,idcontext\_15057,AES\_CCM,label\_iv),alg\_key\_length( AES\_CCM,label\_iv))),((CoAP\_GETCode,isLightBulbTurnedOn), msg\_lid\_15062),(encrypt0,oscore\_version\_one,AES\_CCM, IDir 15061, partial iv 15063))  $\sim$ X\_1 = (coap\_version\_one,non\_confirmable,a\_15053,a\_15054, a\_15055,a\_15056,(~M\_15683,~M\_15684,~M\_15685),~M\_15682) (coap\_version\_one,non\_confirmable,a\_15053,a\_15054, a\_15055,a\_15056,(partial\_iv\_15063,IDir\_15061,idcontext\_15057), aeadEncrypt(HKDF(msecret\_15059,msalt\_15058,(IDir\_15061, idcontext 15057,AES CCM,label key),alg key length( AES\_CCM,label\_key)),aeadNonce(IDir\_15061,partial\_iv\_15063, HKDF(msecret\_15059,msalt\_15058,(emptyId,idcontext\_15057, AES\_CCM,label\_iv),alg\_key\_length(AES\_CCM,label\_iv))), ((CoAP\_GETCode,isLightBulbTurnedOn),msg\_1id\_15062), A trace has been found. (encrypt0,oscore\_version\_one,AES\_CCM,IDir 15061, partial\_iv\_15063)))  $\sim$ X 2 = (coap version one,non confirmable,a 15053,a 15054, a 15055,a 15056,(~M 15683,~M 15684,~M 15685),~M 15682) (coap version one,non confirmable,a 15053,a 15054, a\_15055,a\_15056,(partial\_iv\_15063,IDir\_15061,idcontext\_15057), aeadEncrypt(HKDF(msecret 15059,msalt 15058,(IDir 15061, idcontext 15057,AES CCM,label key),alg key length( AES CCM, label key), aeadNonce(IDir 15061, partial iv 15063, HKDF(msecret 15059,msalt 15058,(emptyId,idcontext 15057, AES CCM, label iv), alg key length (AES CCM, label iv))), ((CoAP GETCode, is LightBulbTurnedOn), msg 1id 15062), (encrypt0,oscore version one,AES CCM,IDir 15061, partial\_iv\_15063)))  $\sim$ M 16493 = coap version one  $\sim$ M 16494 = non confirmable  $\sim$ M 16495 = bounded by(a 15056)  $\sim$ M 16496 = CoAP CHANGEDCode  $\sim$ M 16497 = responseId 16480  $\sim$ M 16498 = a 15056  $\sim$ M 16499 = empty  $\sim$ M\_16500 = aeadEncrypt(HKDF(msecret\_15059,msalt\_15058, (IDri\_15060,idcontext\_15057,AES\_CCM,label\_key), alg\_key\_length(AES\_CCM,label\_key)),aeadNonce(IDir\_15061, partial\_iv\_15063,HKDF(msecret\_15059,msalt\_15058, (emptyId,idcontext\_15057,AES\_CCM,label\_iv),alg\_key\_length( AES\_CCM,label\_iv))),(((CoAP\_GETCode,isLightBulbTurnedOn), CoAP\_CONTENTCode),msg\_2id\_16479),(encrypt0,oscore\_version\_one, AES CCM, IDir 15061, partial iv 15063)) Attacker ~X 2

{1}new IDir\_15061 {2}new IDri\_15060 {3}new msecret 15059 {4}new msalt 15058 {5}new idcontext\_15057 {6} insert security\_context\_lookup(initiator,responder, IDir\_15061,IDri\_15060,msecret\_15059,msalt\_15058, idcontext  $150\overline{5}7$ ) {7} insert security\_context\_lookup(responder,initiator, IDri\_15060,IDir\_15061,msecret\_15059,msalt\_15058, idcontext\_15057) Beginning of process oscore\_initiator(initiator) {9}new token\_15072 Beginning of process oscore\_responder(responder) Beginning of process oscore\_responder(responder) {10} new messageid\_15073 {11} new partial\_iv\_15063 responder {32} get security\_context\_lookup(initiator,responder, IDir\_15061,IDri\_15060,msecret\_15059,msalt\_15058, idcontext  $150\overline{5}7$ ) {21}new msg\_1id\_15062 {27} insert token\_to\_message\_lookup(initiator,token\_15072, (responder,IDir\_15061,IDri\_15060,idcontext\_15057, partial\_iv\_15063,aeadNonce(IDir\_15061,partial\_iv\_15063, HKDF(msecret\_15059,msalt\_15058,(emptyld,idcontext\_15057, AES\_CCM,label\_iv),alg\_key\_length(AES\_CCM,label\_iv))))) {28} event request\_binding(token\_15072,(responder, IDir\_15061,IDri\_15060,idcontext\_15057,partial\_iv\_15063, aeadNonce(IDir\_15061,partial\_iv\_15063,HKDF(msecret\_15059, msalt\_15058,(emptyId,idcontext\_15057,AES\_CCM,label\_iv), alg\_key\_length(AES\_CCM,label\_iv))))) {29} event startInitiator(initiator,responder,( (CoAP GETCode, is LightBulbTurnedOn), msg\_1id\_15062)) {30} event startInit(initiator,responder,(CoAP\_GETCode, isLightBulbTurnedOn)) (~M\_15675,~M\_15676,~M\_15677,~M\_15678,~M\_15679, ~M 15680,(~M 15683,~M 15684,~M 15685),~M 15682) ~X 1 {65} get security\_context\_lookup(responder,initiator, IDri\_15060,IDir\_15061,msecret\_15059,msalt\_15058, idcontext  $150\overline{5}7$ ) {64} get unique\_ivs(partial\_15820: bitstring) suchthat (partial\_158\overline{2}0 = partial\_iv\_15063): else branch taken {65} get security\_context\_lookup(responder,initiator, IDri\_15060,IDir\_15061,msecret\_15059,msalt\_15058, idcontext  $150\overline{5}7$ ) {64} get unique\_ivs(partial\_16442: bitstring) suchthat  $(partial_164\overline{4}2 = partial_iv_15063)$ : else branch {53} insert unique\_ivs(partial\_iv\_15063) {54}new msg\_2id\_16479 {55}new responseId\_16480 {61} event endResponder(initiator,responder,((CoAP\_GETCode, isLightBulbTurnedOn),msg 1id 15062)) {62} event sendResponder(initiator, responder, bounded\_by( (CoAP GETCode, is LightBulbTurnedOn))) (~M\_16493,~M\_16494,~M\_16495,~M\_16496,~M\_16497, ~M 16498,~M 16499,~M 16500) {53} insert unique\_ivs(partial\_iv\_15063) {54}new msg\_2id\_15428 {55}new responseId\_15429 {61} event endResponder(initiator,responder,((CoAP\_GETCode, isLightBulbTurnedOn),msg\_1id\_15062))

**Honest Process**